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EQUIVALENCE PROBLEMS FOUND IN MACHINE TRANSLATION OUTPUT: INSIGHTS FROM POST-EDITING ANALYSIS

Dwi Indarti[1], Vera Nurlia[2]
[1]Universitas Bina Sarana Informatika, Jakarta, Indonesia
[2]Universitas Cendikia Abditama, Tangerang, Indonesia
E-mail: dwi.diw@bsi.ac.id

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Abstract

This study examines post-editing strategies and equivalence problems in Google Translate (GT) outputs of a non-literary text, *International Relations Theory* by Ferreira (2017). Focusing on the English–Indonesian translation, the analysis is limited to five levels of equivalence proposed by Baker (2018): word, above-word, grammatical, textual, and pragmatic. Using a qualitative descriptive approach supported by LF Aligner, AntConc, and AntPConc, the study identifies equivalence problems in a parallel corpus. The findings reveal frequent word-level issues, particularly loanwords and lexical mismatches, requiring paraphrasing and cultural substitution. Problems also occur at the above-word and grammatical levels, including idiomatic expressions, collocations, singular–plural mismatches, and passive constructions. Textual issues relate to cohesion gaps, while pragmatic problems are less frequent but involve implicit meaning loss. Overall, GT performs better with high-frequency nouns, adjectives, and adverbs than with verbs. The study highlights the importance of post-editing machine translation (PEMT) and recommends its integration into translation curricula to enhance linguistic competence, digital literacy, and professional readiness in AI-assisted translation contexts.

Keywords: *equivalence; google translate; machine translation; post-editing; translation pedagogy*.

1. Introduction

Machine translation (MT) is a prominent product of Artificial Intelligence (AI) that enables the automatic conversion of texts between languages through technological systems (Lihua, 2022). Among various MT tools, Google Translate (GT) has become one of the most widely used platforms due to its accessibility and its ability to respond to the rapidly increasing demand for translation in the global market—demands that often exceed the capacity of conventional human translation alone (Harto et al., 2022). Consequently, MT has been increasingly adopted in academic, professional, and institutional contexts.

Despite continuous improvements in MT quality, numerous studies have demonstrated that MT outputs still contain a wide range of errors, with translation accuracy varying across language pairs (Harto et al., 2022; Karibayeva et al., 2021; Ziganshina et al.,

2021). Harto et al. (2022) synthesize existing MT error classifications into several key frameworks. First, errors can be examined from the perspectives of acceptability, which includes grammar, syntax, vocabulary, coherence, style, register, and spelling, and adequacy, which involves omissions, additions, mistranslations, and shifts in meaning (Daems et al., 2017). Second, MT errors may be categorized as grammatical, lexical-semantic, and syntactic errors (Sycz-Opon & Galuskina, 2017). Third, Sin-Wai (2017) proposes a broader classification encompassing linguistic, referential, stylistic, syntactical, terminological, and typological errors. These findings indicate that, despite technological advances, MT systems continue to exhibit systematic weaknesses.

As a result, several scholars argue that MT outputs often fail to meet the quality standards expected by end-users (Jia et al., 2019). In academic translation contexts, these end-users include journal reviewers and editors, while the ultimate audience consists of readers who rely on translated texts for accurate and clear information (Harto et al., 2022). To address these shortcomings, MT outputs require human intervention through post-editing machine translation (PEMT). The primary objective of PEMT is to enhance translation quality by identifying and correcting errors in MT outputs, thereby producing texts that are "accurate, faithful, grammatical, idiomatic, and informative" (Sin-Wai, 2017, p. 127). Through PEMT, translators address a range of linguistic, referential, stylistic, syntactical, terminological, and typological issues.

While PEMT has gained increasing scholarly attention, existing research has predominantly focused on literary texts or has examined MT errors without systematically applying post-editing frameworks. While previous studies explored equivalence in literary contexts, limited attention has been given to non-literary texts analyzed through post-editing frameworks, particularly in the English–Indonesian language pair. Non-literary texts are defined as texts intended to inform, explain, instruct, argue, or present factual information for practical purposes (Dordevic, 2017). Such texts are typically characterized by clarity, conciseness, objectivity, structural organization, and a strong emphasis on precision and unambiguous meaning. Dordevic (2017) further argues that non-literary translation follows different principles from literary translation, as it prioritizes accuracy and pragmatic appropriateness over stylistic flexibility. Consequently, translation strategies effective in literary contexts may not be suitable for non-literary texts, especially when processed through MT systems.

Addressing this research gap, the present study investigates equivalence problems in Google Translate outputs of a non-literary text through a post-editing perspective. Drawing on Baker's (2018) framework of equivalence, this study addresses the following research questions: (1) What types of equivalence problems are found in Google Translate outputs at the word, above-word, grammatical, textual, and pragmatic levels? (2) How can post-editing strategies be applied to resolve these equivalence problems? In addition, this study examines the distribution of equivalence problems across major word classes—nouns, verbs, adjectives, and adverbs—to identify patterns in machine translation performance. By doing so, this research contributes to the growing body of PEMT studies and reinforces the critical role of human expertise in ensuring translation quality in AI-assisted translation practices.

2. Literature Review

The idea of equivalency, which describes how well meaning, function, and communicative intent are maintained between the source language (SL) and the target

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language (TL), is frequently used to evaluate translation quality. According to Widya and Ayu (2015), a translation should sound accurate and natural, especially when it comes to grammar and lexis. Thus, equivalency entails the faithful transfer of meaning, message, and purpose from the SL to the TL and goes beyond formal resemblance (Hidayat et al., 2019). Words, phrases, clauses, sentence structure, and semantic and pragmatic aspects are just a few of the language levels at which translation accuracy functions (Zawawi & Maghfiroh, 2020).

Non-equivalency is still a problem despite progress in machine translation (MT), particularly in MT outputs when contextual and cultural awareness is lacking. MT systems frequently fail to account for linguistic diversity and cultural specificity, in contrast to human translators, which leads to inconsistencies between SL and TL interpretations. In translation studies, Baker's concept of equivalency has been widely used to systematically account for these incompatibilities. Baker divides equivalency into five interconnected levels: word, above-word, grammatical, textual, and pragmatic equivalency, as opposed to treating it as a single idea (Baker, 2011, 2018). This paradigm is especially useful for post-editing machine translation (PEMT) since it allows researchers and translators to use targeted post-editing strategies and pinpoint the precise levels at which MT outputs fail.

2.1 Equivalence in Word Level

Non-equivalency occurs at the word level when a lexical item in the SL has a culturally distinctive meaning or has no direct counterpart in the TL. Baker draws attention to recurrent problems such loanwords, semantically complicated words, non-lexicalized concepts, and variations in expressive meaning. These issues frequently show up in MT outputs as literal translations that are correct in theory but incorrect in practice. Research continuously demonstrates that in order to maintain naturalness and clarity in the target language (TL), human intervention is necessary through techniques like paraphrase, cultural replacement, or the use of superordinate terms.

2.2 Equivalence above Word Level

In addition to carrying individual meanings, words often pose translation challenges when they come together to form meaning, called in phrases. The variations in how words are structured in the SL compared to the TL make it challenging, particularly when dealing with collocations, idioms, and fixed expressions (Supardi, et al., 2021). Baker (2018, p. 60-67) as cited in Nufus (2022, p. 2589) describes some problems, namely engrossing effect of source text patterning, misinterpreting the meaning of a source language collocation, tension between accuracy and naturalness, culture specific collocation, marked collocation in the source text, second language fixed expression which has no equivalent in TL and different context of idioms in SL and TL. Furthermore, Baker (2018) explains the strategies to address non-equivalence above word level such as encompass utilizing expressions in the target language with similar meanings or form, opting for idioms with comparable meanings but different structures, directly incorporating SL idioms, expressing the intended meaning through paraphrasing, removing linguistic play associated with the idioms, and omitting the entire idiom when equivalence proves challenging.

2.3 Equivalence in Grammatical Level

Number, tense, voice, person, gender, and other structural variations between languages are the root cause of equivalency issues at the grammatical level. These distinctions are especially noticeable when translating from English to Indonesian because numerous English grammatical categories are not required to be marked in Indonesian. MT systems frequently directly translate SL grammatical patterns into the target language (TL), producing awkward or deceptive sentences. As a result, post-editing frequently entails rearranging sentences or using lexical strategies to make up for grammatical errors.

2.4 Equivalence in Textual Level

Coherence and cohesiveness between sentences and paragraphs are important aspects of equivalency at the textual level. MT systems often fail to preserve logical flow and discourse organization that are consistent with TL norms, even when they may be successful in translating particular coherent devices (Sayogie & Supardi, 2021). This problem is particularly important in nonliterary works because informational accuracy and clarity are crucial. Therefore, the goal of textual post-editing is to improve readability and coherence by modifying conjunctions, reference chains, and theme progression.

In Mona Baker's framework, the textual level aligns with the sentence level. Equivalence in translation at textual level is achieved when cohesive words in the source language are translated literally, maintaining a resonance for the target readers. While a corresponding word in the target language may exist, it carries a different expressive nuance. It becomes a significant translation challenge in a specific context, where the disparity might be explicit or implicit. When the structure of the TL is less equivalent with the norms of the target readers, adjustments are necessary. Furthermore, Mona Baker underscores that cohesion, based on the principle of automatic recognition, is objective.

2.5 Equivalence in Pragmatic Level

At last, pragmatic equivalency entails interpreting the SL's implicit meanings, presuppositions, and cultural presumptions. According to Rustandi et al. (2021), machine translation (MT) systems often produce grammatically accurate but unsuccessful translations because they are unable to deduce implicature or modify meaning to meet the expectations of target language users. At this stage, non-equivalency is frequently recognized from the viewpoint of the reader, highlighting the critical role that human judgment plays in post-editing.

Translators must work out implied meanings in the SL to effectively convey the intended messages. Their role is to create the author's intention in a manner suitable for another culture, ensuring the target culture readers to understand it clearly (Supardi, et al., 2021). This means that pragmatic equivalence is more concerned with the reader's perspective than theoretical considerations. It underscores the importance of the text, encompassing its cultural and emotional nuances. Translations failing under the pragmatic level, at the smallest unit, often employ strategies like paraphrasing with unrelated words to capture various implications. However, at the pragmatic level, if the implications for target readers differ, the translation is considered non-equivalent. The meaning of the sentence may be distracted due to an inappropriate rendering in target language.

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2.6 Related Current Studies

The errors, shortcomings, and challenges of GT into Kazakh language, which is considered as a language with complex morphology and syntax, are investigated by Karibayeva, et al., (2021). They found many inaccurate terms in the translated sentences from English to Kazakh. Meanwhile, Ziganshina, et al., (2021) compare three MT namely DeepL, Google Translate and Microsoft Translator for Russian translations of Cochrane plain language summaries by evaluating the quantitative of human post-editing work in an established translation workflow and quality assurance process. The results show that GT achieved the highest average quality assessments for its output, and the lowest amount of human post-editing, while DeepL performed slightly less effectively, and Microsoft Translator performed the worst.

An interesting study has been conducted by Harto, et al., (2022) about the post-editing of machine translation (PEMT) concerning the actual academic practices of the students and investigating how students' experiences with the challenges posed by PEMT. The paper provides detailed insights into how students initially began practicing PEMT into their academic routines and practical translation exercises. Data is gathered through various means, including focused-group discussions (FGD), survey questionnaires, in-depth interviews, and examination of students' documents. The results reveal that engaging in the post-editing process equips students with the opportunity to enhance their textual knowledge, fostering awareness and sensitivity to academic texts.

The challenge of non-equivalence arises when translating the Harry Potter novel with Google Translate. These problems are analyzed by Alfian (2022). The study employs AntConc and AntPconc software to cluster the top ten-word classes, namely adjective, noun, verb, and adverb identified in the novel. AntConc is used for generating a wordlist to determine the frequency of the words in the English text, whereas AntPConc is employed to designate the English and Indonesian text files as parallel texts. The research determined that Google Translate successfully translated and offered accurate suggestions for the top ten lists of noun, adjective, verb, and adverb. However, non-equivalences are identified at both the word and above-word levels. The challenge of equivalence emerges particularly in various lines of verbs, adjectives and adverbs. The author suggests that to enhance the naturalness of the translation input, multiple translation strategies need to be employed in the post-editing process. Sibuea, et al., (2023) focuses on identifying challenges related to equivalence that emerged during the translation of the Harry Potter novel. The literary work is characterized by its abundance of cultural terms and intricate sentences. The issue of equivalence is scrutinized through the lens of Mona Baker's theory, proposing to classify translation errors evident in the GT-generated output text. The findings reveal challenges for GT when translating literary texts, particularly in terms or words that both languages do not share and sentences featuring multiple perspectives.

3. Research Method

3.1 Research Design

This study employs a descriptive qualitative research design to analyze equivalence problems in machine translation output of non-literary texts. A qualitative descriptive approach is particularly appropriate because the focus of this study is not to measure the

frequency of errors statistically, but to examine, interpret, and explain how meaning equivalence is realized or disrupted between the source text (ST) and the target text (TT).

The descriptive qualitative design allows the researcher to systematically describe translation phenomena as they naturally occur in machine translation output, without manipulation or experimental intervention. Because it allows for a thorough comparison between ST-TT pairs and makes it easier to categorize equivalency concerns using well-established theoretical frameworks, this method is appropriate for machine translation analysis. This paper offers a thorough explanation of how machine translation manages intricate linguistic and discourse elements in non-literary texts by utilizing Baker's five levels of equivalency.

Therefore, a qualitative descriptive method is considered the most appropriate research design for this study, as it supports comprehensive equivalence analysis, theory-driven classification, and interpretative explanation of translation problems found in machine translation output.

3.2 Source of Data

The nonliterary academic work International Relations Theory, which was authored in English as the source text (ST) and translated into Indonesian by Google Translate (GT) as the target text (TT), make up the data. The text was chosen because it is appropriate for analyzing equivalency issues in MT output because it has factual content and sophisticated terminology typical of nonliterary speech. Because Google Translate is so popular in Indonesia, it was selected. According to Hasyim et al. (2021), Indonesia is one of the top ten nations for Google Translate users, especially when it comes to reading online and scholarly texts.

3.3 Unit of Analysis and Criteria for Identifying Equivalence Problems

The unit of analysis in this study consists of aligned sentence pairs from the English source text (ST) and their corresponding Indonesian machine-translated target text (TT). Sentence pairs were chosen as the main analytical unit because equivalency in translation must be considered within a larger textual context that reflects meaning relations, grammatical structure, and pragmatic intent rather than being fully captured at the isolated word level (Baker, 2011). Smaller linguistic elements, such as words and phrases, were looked at inside each sentence pair when needed to pinpoint particular equivalency issues.

Equivalence problems were identified based on Baker's (2011, 2018) five levels of equivalence, namely: (1) word-level equivalence, (2) above-word-level equivalence, (3) grammatical equivalence, (4) textual equivalence, and (5) pragmatic equivalence. A translation segment was categorized as problematic when the GT output failed to convey the meaning, function, or discourse relationship of the source text appropriately in the target language. Specifically, equivalence problems were identified using the following criteria: (a) semantic mismatch, where the translated item did not accurately represent the source meaning; (b) grammatical inappropriateness, involving incorrect tense, number, voice, or syntactic structure; (c) textual incoherence, such as improper thematic progression or misuse of cohesive devices; and (d) pragmatic failure, where implicatures, presuppositions, or context-dependent meanings were not adequately transferred (Baker, 2011). These criteria enabled a systematic and consistent analysis of equivalence problems

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across translation units, ensuring that classification was grounded in established translation theory rather than subjective judgment.

3.4 Data Collection Technique

There are several steps to collect the data. First, the writer downloaded the English source text provided by the lecturer and opened it with a google document type of file. Second, by using the *Translate document* menu in the *Tools tab*, the writer generated Indonesian text, as the target text. Third, the two documents of English text and Indonesian text are then converted and saved in txt file. Fourth, the writer uploaded the English and Indonesian txt files into LF Aligner, an application created by Farkas (2023) to create a parallel spreadsheet tables of source text (English) and target text (Indonesian). The last, in clustering the most top three-word (Noun, Adjective, Adverb, and Verb), the writer uses two software, namely *AntConc* and *AntPConc*. *Antconc* was utilized to generate a Wordlist to seek the frequency of the words in SL, while *AntPConc* was utilized to select the two text files (SL in English and TL in Indonesian) to be analyzed as parallel texts.

3.5 Research Procedures

To ensure systematic analysis, the study followed the following sequential procedures: (1) Data Extraction: The English source text was obtained and converted into a digital document. The Indonesian target text was generated using the *Translate Document* feature in Google Translate. (2) Data Alignment: Both the English and Indonesian texts were converted into .txt files and uploaded into LF Aligner to produce aligned sentence pairs in a parallel corpus format. (3) Classification by Equivalence Level: Each aligned sentence pair was analyzed using Baker's five levels of equivalence: word, above-word, grammatical, textual, and pragmatic. Identified equivalence problems were classified accordingly. (4) Post-editing and Analysis Post-editing strategies were applied to problematic segments to improve accuracy, naturalness, and readability. In addition, AntConc was used to generate word frequency lists from the ST, and AntPConc was employed to examine equivalence issues across major word classes (nouns, verbs, adjectives, and adverbs) in the parallel corpus.

3.6 Data Analysis Technique

LF Aligner's translation memories are employed to analyze and identify translation errors generated by GT, by using the concept of five equivalence levels' problems proposed by Baker (2011, 2018), namely: (1) word level equivalence, (2) above word level equivalence, (3) grammatical equivalence, (4) textual equivalence, (5) pragmatic equivalence. Strategies for translation are suggested during the post-editing GT output, with the aim of enhancing both the readability and naturalness of the translated text.

To enhance the trustworthiness of the findings, several validation strategies were applied. First, theoretical triangulation was employed by consistently applying Baker's equivalence framework across all data analysis stages. Second, tool triangulation was achieved through the use of multiple corpus tools (LF Aligner, AntConc, and AntPConc) to support analytical consistency. Third, peer review was conducted by discussing selected data samples and equivalence classifications with a fellow researcher in translation studies to

minimize subjective bias. These strategies help ensure the credibility, dependability, and transparency of the qualitative analysis.

4. Results and Discussion

This study reveals persistent equivalence problems in Google Translate (GT) outputs across Baker's (2018) five levels of equivalence: word, above-word, grammatical, textual, and pragmatic. Rather than presenting results and discussion separately, this section integrates detailed textual evidence with interpretive discussion to highlight how specific equivalence problems emerge in non-literary machine-translated texts and what these patterns suggest for post-editing practices.

Word-Level Equivalence Problems

Excerpt 1.

Line	SL	TL generated by GT	Post-editing
11	The idea originates from …	*Ide ini berasal dari …*	*Gagasan ini berasal dari …*

Excerpt 1 is taken from line 11 of LF Aligner memories worksheet. According to online dictionary Merriam-Webster, idea means (1) a plan for action, (2) a formulated thought or opinion. The word idea is translated into *ide* by GT. It shows that GT applies loan words to the translation. Post-editing proposes to use paraphrase strategy as suggested by Baker (2018) to translate the word idea into ***gagasan***. According to the Great Dictionary of the Indonesian (KBBI) ***gagasan*** means the results of thoughts. *Ide* and ***gagasan*** have similar meaning, however from the native Indonesia's point of view, the word *gagasan* is more equivalence to substitute the word *ide*.

The implication of this finding is that GT's lexical choices, while technically acceptable, may not fully meet stylistic and pragmatic expectations in the target language. This suggests that post-editing through paraphrasing, as proposed by Baker (2018), remains necessary to enhance naturalness and academic appropriateness. Similar tendencies were reported by Ziganshina et al. (2021), who found that MT systems often favor direct lexical borrowing over context-sensitive equivalents, particularly in academic texts. Moreover, Harto et al. (2022) argue that identifying such lexical inadequacies during post-editing can foster students' critical language awareness, reinforcing the pedagogical value of PEMT.

Excerpt 2.

Line	SL	TL generated by GT	Post-editing
12	… and asserted that the increasing interconnectedness …	*… dan menegaskan bahwa semakin meningkatnya keterhubungan …*	*… dan menegaskan bahwa semakin meningkatnya keterkaitan …*

Excerpt 2. is taken from line 12 of LF Aligner memories. According to online dictionary Merriam-Webster, interconnectedness means (1) mutually joined or related, (2) having internal connections between the parts and or the elements. The word interconnectedness is translated by GT into ***keterhubungan***. From the native Indonesia's point of view, the word ***keterhubungan*** has less neutral meaning. Post-editing suggests using the word ***keterkaitan*** to create natural sounds in target language. In other words,

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post-editing applies paraphrasing as the strategy to address a problem occurring in word level equivalence.

The implication here is that GT's output may require human intervention to ensure that translations not only convey meaning accurately but also adhere to target-language conventions. This finding supports the view that MT systems still struggle with subtle semantic distinctions, particularly in abstract terminology. Comparable results were reported by Ziganshina et al. (2021), who observed that MT often produces semantically close but pragmatically weaker equivalents. In line with Harto et al. (2022), this example further suggests that post-editing activities can serve as an effective learning tool, enabling students to develop both linguistic sensitivity and evaluative skills when working with AI-generated translations.

At the word level, GT frequently relies on loanwords or near-literal lexical equivalents, which may preserve denotative meaning but reduce naturalness in the target language. For example, GT translates *idea* as *ide* (Excerpt 1) and *interconnectedness* as ***keterhubungan*** (Excerpt 2). Although these translations are semantically accurate, post-editing suggests ***gagasan*** and ***keterkaitan*** as more contextually appropriate alternatives. These findings suggest that GT prioritizes lexical proximity over discourse appropriateness, particularly when dealing with abstract or technical terms. Similar patterns have been reported by Alkatheery (2023), who observed that GT often struggles to select culturally and stylistically appropriate equivalents for abstract concepts. The need for paraphrasing in these cases highlights the limitations of MT in capturing subtle semantic preferences, reinforcing Baker's (2018) view that word-level equivalence often requires human judgment.

Above Word Level Equivalence Problems

Non-equivalence above the word level refers to a situation where entire phrases, expressions, or idioms on SL do not have a direct equivalence in TL. Translators must take into account equivalence on a larger scale, considering larger segments of text, including phrase, sentence, paragraph or entire text. Lexical patterning in the case of non-equivalence above word level, such as collocation and idioms and fixed expressions. Below are some examples of non-equivalence above word level.

Excerpt 3

Line	SL	TL generated by GT	Post-editing
14	… that meet the universalist principles of justice.	*… yang memenuhi prinsip keadilan universalis.*	*… yang sesuai dengan asas-asas keadilan secara menyeluruh.*

Excerpt 3 is derived from line 14 of LF Aligner worksheet. GT translated the clause meet the universalist principles of justice into ***memenuhi prinsip keadilan universalis***. From native Indonesian's point of view, this clause sounds less natural and there is a tension between accuracy and naturalness. Post-editing suggests to translate meet the universalist principles of justice into ***sesuai dengan asas-asas keadilan secara menyeluruh***. In this case, post-editing applies one of the strategies to address above word level equivalence problems provided by Baker (2018), that is engrossing effect of source text patterning.

The implication of this example is that GT may prioritize formal equivalence over naturalness, especially when translating abstract ideological concepts. This suggests that above word-level equivalence often requires human intervention to balance meaning accuracy with readability. By restructuring the phrase and expanding implicit meanings, post-editing applies Baker's (2018) strategy of accommodating source-text patterning at a broader textual unit. Similar tendencies were observed by Ziganshina et al. (2021), who reported that MT systems frequently struggle with complex noun phrases in academic texts due to their limited sensitivity to discourse conventions. From a pedagogical perspective, Harto et al. (2022) suggest that identifying such mismatches during post-editing may enhance students' ability to critically evaluate MT output rather than accept it unreflectively.

Excerpt 4.

Line	SL	TL generated by GT	Post-editing
21	There are two themes uniting these approaches that show the connective glue within …	*Ada dua tema yang menyatukan pendekatan-pendekatan ini yang menunjukkan perekat penghubung dalam…*	*Ada dua tema yang menyatukan pendekatan-pendekatan ini yang menunjukkan hubungan erat dalam…*

Excerpt 4 is taken from line 21 of the worksheet generated by LF Aligner. Connective glue is a noun phrase that is translated by GT into ***perekat penghubung***. It raises a problem in the tension between accuracy and naturalness. Post-editing suggests a strategy of collocational equivalence (Baker, 2018). Connective glue is better translated into ***hubungan erat*** in order to achieve above word level equivalence, in this case phrase-level (noun phrase).

The implication here is that GT may have difficulty processing non-compositional expressions and metaphoric collocations, particularly when such expressions require interpretive rather than literal rendering. This finding suggests that phrase-level equivalence is especially vulnerable in MT outputs, reinforcing the need for paraphrasing strategies as outlined by Baker (2018). Comparable findings were reported by Ziganshina et al. (2021), who found that MT systems tend to translate metaphors literally, often at the expense of communicative clarity. In line with Harto et al. (2022), this example further indicates that post-editing tasks can function as a pedagogical space where learners develop awareness of collocational norms and semantic acceptability in the target language.

Overall, Excerpts 3 and 4 imply that the system's limited capacity to negotiate meaning beyond specific lexical elements may be the cause of above-word-level equivalency issues in GT outputs. These results suggest that although GT can produce a translation that is semantically approximate, human post-editing is still crucial for obtaining naturalness and discourse-level appropriateness, especially in academic and nonliterary works.

Grammatical Level Equivalence Problems

When exploring grammatical rules in different languages, it can be challenging to discover an exact match in the TL. Therefore, translators may need to make adjustments to address the absence of certain grammatical categories. These key categories include singular and plural forms for number, the use of feminine and masculine for gender, participant roles for person, adverbials for indicating time reference in tense and aspect, and the use of

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passive structures for voice. Below are some excerpts of non-equivalence grammatical level found in Indonesian translation produced by GT.

Excerpt 5.

Line	SL	TL generated by GT	Post-editing
14	This way, the writings of Kant and Marx …	*Dengan cara ini, tulisan Kant dan Marx …*	*Dengan cara ini, beberapa karya tulis Kant dan Marx …*
73	… the protection of human rights and the political relevance of avoiding human wrongs is a sign of the relevance of these ideas.	*… perlindungan hak asasi manusia dan relevansi politik untuk menghindari kesalahan manusia merupakan tanda relevansi gagasan ini.*	*… perlindungan hak-hak asasi manusia dan relevansi politik untuk menghindari kesalahan-kesalahan manusia merupakan sebuah tanda relevansi dari gagasan-gagasan ini.*

Excerpt 5 illustrates grammatical-level equivalence problems related to number distinction (singular and plural forms) in Google Translate (GT) output. The first example eliminates the inferred plural reference in the source text by translating Kant and Marx's writings as tulisan Kant dan Marx. Even if number neutrality is permitted in Indonesian, leaving out plurality in an academic setting can lessen semantic accuracy because the writings pertain to several scholarly works rather than a broad concept of writing. The post-edited version ***beberapa karya tulis*** *Kant dan Marx* reinstates this plurality, suggesting that post-editing is necessary to preserve the conceptual scope of the source text. This finding may indicate that GT tends to generalize number distinctions when translating into languages with optional plural marking, a tendency also noted by Popović (2018), who found that MT systems frequently neutralize grammatical categories that are not obligatorily encoded in the target language.

In the second example (line 73), plural nouns like rights, wrongs, and ideas are transformed into singular forms (hak, kesalahan, gagasan), exhibiting a similar trend. Even while these translations are grammatically correct, they could lessen the original text's intended generality and abstract scope, especially in theoretical and normative speech. The plurality encoded in the original language is more clearly reflected in the post-edited forms (hak-hak asasi manusia, kesalahan-kesalahan manusia, gagasan-gagasan ini). This implies that readers' interpretations of arguments may be influenced by grammatical equivalency at the number level, particularly in academic and nonliterary works.

Additionally, GT renders the phrase "a sign" as tanda in the absence of an explicit singular identifier. Determiners are not necessary in Indonesian, yet formal academic writing may become unclear if ***sebuah*** is not used. The post-edited text clarifies single reference by adding sebuah, suggesting that GT might not effectively communicate countability and definiteness distinctions. This result is consistent with the findings of Baker and Saldanha (2020), who highlight that grammatical categories like definiteness and number are especially susceptible to loss in machine translation when they are implicit in the target language.

Taken together, these examples show that grammatical equivalency issues in GT output can have a subtle impact on precision and interpretability even though they are not

always immediately apparent. O'Brien (2012) argues that human post-editors are essential in compensating for MT's low sensitivity to context-dependent grammatical elements, particularly in academic and informational writings. This is supported by the requirement of post-editing in addressing such concerns.

Textual Level Equivalence Problems

Textual level equivalence deals with cohesion which refers to the network of lexical, grammatical, and other connections that link different components of a text. It employs referencing, substitution, ellipsis, conjunction, and lexical cohesion. Baker (2018) suggests several methods to achieve textual equivalence, including literal translation, modulation, transposition, and adaptation. Below is an example of non-equivalence at textual level found in Indonesian translation generated by GT.

Excerpt 6.

Line	SL	TL generated by GT	Post-editing
82	Haman stares at the long night behind him when I surprise his absent gaze on the deck of the Blue Star ferry carrying us to the Greek port of Piraeus	*Haman menatap malam panjang di belakangnya ketika aku terkejut dengan tatapannya yang tidak ada di dek kapal Feri Blue Star yang membawa kami ke Pelabuhan Piraeus di Yunani*	*Haman sedang melamun di dek kapal Feri Blue Star yang membawa kami ke Pelabuhan Piraeus di Yunani dengan tatapan kosong saat aku membuatnya terkejut.*

Excerpt 6 illustrates a textual-level equivalence problem related to cohesion and sentence flow. The statement is mostly translated literally and word for word by Google Translate, producing an Indonesian translation that seems structurally disjointed and artificial in style. For example, the translation of Haman stares at the long night behind him is Haman ***menatap malam panjang di belakangnya***. While this translation may be grammatically correct, it may not accurately capture the implicit thoughtful state that is conveyed in the original language. By using modulation to capture the intended experience meaning rather than the surface lexical form, the post-edited version, Haman ***sedang melamun***, demonstrates a change in viewpoint.

This change implies that GT might find it difficult to comprehend narrative complexity and discourse-level meaning, especially when psychological feelings and images are implicitly transmitted. Cohesion in the target text necessitates restructuring beyond literal correspondence, as evidenced by the reordering of clauses—moving ***di dek kapal Feri Blue Star***... to the middle of the sentence—and the reformulation of *when I surprise his absent gaze* into ***dengan tatapan kosong saat aku membuatnya terkejut***. These changes could improve readability and coherence for Indonesian readers, suggesting that human involvement is frequently required to align syntactic flow with target-language norms in order to achieve textual equivalency.

These results are in line with earlier research showing that MT systems frequently ignore more general discourse relations in favor of operating at the sentence-by-sentence level (Amarasinghe & Senevirathne, 2020). According to Ziganshina et al. (2021), human post-editing is still required to address cohesiveness and stylistic naturalness, particularly in

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lengthy or detailed passages, even though GT performs reasonably well at the lexical level. From an educational standpoint, this example further validates the claims made by Harto et al. (2022) that post-editing techniques foster students' awareness of meaning creation and textual coherence in addition to grammatical accuracy. In order to achieve textual equivalency in machine-assisted translation, Excerpt 6 emphasizes the significance of modulation as a post-editing technique and the ongoing involvement of human expertise.

Pragmatic Level Equivalence Problems

Translators should pay attention to achieving pragmatic equivalence. One of strategies to achieve pragmatic equivalence is implicature. Implicature, a captivating element in pragmatics, highlights the significance of not just explicit words, but also the implied meanings. Consequently, translators must work out implied messages to accurately convey the SL's intended meaning.

Excerpt 7.

Line	SL	TL generated by GT	Post-editing
62	Haman was one of them	*Haman adalah salah satunya*	*Haman adalah salah satu dari puluhan pengungsi dari Syiria.*

Excerpt 7 demonstrates a pragmatic equivalence problem related to implicature and contextual reference. Google Translate renders *Haman was one of them* as *Haman adalah salah satunya*, a translation that is lexically accurate but pragmatically underspecified. The pronoun *them* refers implicitly to *dozens of refugees from Syria* mentioned in the preceding sentence; however, this contextual linkage is not made explicit in the GT output. The post-edited version, *Haman adalah salah satu dari puluhan pengungsi dari Syiria*, explicates the implied referent, thereby restoring the intended meaning for target readers.

This instance raises the possibility that GT's ability to resolve discourse-level references and deduce implicit meanings between sentences may be limited. Such translations may result in ambiguity or lessened clarity in the absence of pragmatic enrichment, especially in educational nonliterary works where contextual accuracy is crucial. Pragmatic equivalency frequently necessitates human interpretation that goes beyond superficial correspondence, as seen by the necessity to explain implicit allusions.

These results are consistent with Munková et al. (2021), who contend that because MT systems rely on local linguistic signals rather than global discourse context, they often fail to process implicatures. In a similar vein, Harto et al. (2022) observe that post-editing exercises support the instructional usefulness of PEMT in fostering pragmatic awareness by encouraging translators and students to pay attention to suggested meanings and reader-oriented clarity.

Excerpt 8

'Line	SL	TL generated by GT	Post-editing
77	What unites critical theorists like Cox, Linklater, and others is …	*Yang menyatukan teori-teori kritis seperti Cox, Linklater dan lain-lain adalah ….*	*Kondisi yang menyatukan teori-teori kritis seperti Cox, Linklater dan lain-lain adalah ….*

Excerpt 8 further illustrates pragmatic non-equivalence arising from underspecification. GT translates *What unites critical theorists like Cox, Linklater, and others is …* as ***Yang menyatukan teori-teori kritis seperti Cox, Linklater dan lain-lain adalah …***. While grammatically acceptable, this rendering leaves the abstract interrogative *what* vague in Indonesian, potentially causing interpretive difficulty for target readers. The post-edited version introduces the word ***kondisi*** (condition), resulting in ***Kondisi yang menyatukan teori-teori kritis…***, which clarifies the implicit conceptual reference.

Similar problems have been noted by Ziganshina et al. (2021), who state that MT systems frequently perform poorly when translating relational or abstract meanings that need for contextual elaboration. Similarly, Wei (2023) highlights that a critical post-editing technique to guarantee communicative efficacy is pragmatic enrichment, which can be achieved through explicitation or paraphrase. When combined, Excerpts 7 and 8 highlight the crucial involvement of human post-editors in deciphering and reconstructing suggested meaning and imply that pragmatic equivalency continues to be one of the most difficult areas for MT.

To provide a clearer synthesis of the findings and to highlight recurring patterns of equivalence problems, the following tables summarize the types, distribution, and post-editing strategies identified across the analyzed excerpts.

Table 1

Types and Frequency of Equivalence Problems Across Five Levels

Equivalence Level	Number of Identified Excerpts	Dominant Problem Types	Typical MT Behavior
Word level	2	Loanwords, semantic mismatch	Literal translation, lexical borrowing
Above-word level	2	Collocation, abstract phrase rendering	Literal phrase translation
Grammatical level	1 (multiple instances)	Number (singular/plural), voice (passive)	Neutralization of grammatical distinctions
Textual level	1	Cohesion, sentence flow, word order	Sentence-by-sentence processing
Pragmatic level	2	Implicature, underspecification	Failure to explicate implied meaning
Total	**8 excerpts**	—	—

Interpretive note:

As shown in Table 1, equivalence problems occur across all five levels, with word-level and pragmatic-level issues appearing most frequently. This distribution suggests that GT handles surface-level lexical transfer more consistently than discourse-level meaning, which often requires contextual inference and pragmatic enrichment.

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Table 2
Summary of Equivalence Problems and Post-Editing Strategies

Excerpt	Equivalence Level	GT Output Issue	Post-Editing Strategy (Baker, 2018)
1	Word	Loanword (“ide”) lacks naturalness	Paraphrase
2	Word	Semantically weak equivalent	Paraphrase
3	Above-word	Abstract noun phrase sounds unnatural	Reformulation / paraphrase
4	Above-word	Literal metaphor translation	Collocational equivalence
5	Grammatical	Loss of plurality, passive voice	Grammatical adjustment
6	Textual	Disrupted cohesion and flow	Modulation
7	Pragmatic	Implicit reference unresolved	Explicitation (implicature)
8	Pragmatic	Abstract “what” underspecified	Pragmatic enrichment

Table 2 demonstrates that **paraphrasing and explicitation** are the most frequently required post-editing strategies, particularly at word, above-word, and pragmatic levels. This pattern reinforces Baker’s (2018) claim that equivalence problems often arise not from incorrect meaning but from inadequate contextual realization.

Table 3
Word-Class Frequency and Equivalence Stability

Word Class	High-Frequency Items	Frequency Range	Equivalence Outcome
Noun	theory, global, relations	13–21	Mostly equivalent
Adjective	critical, global, cosmopolitan	8–23	Mostly equivalent
Adverb	therefore, namely, especially	1–7	Equivalent
Verb	is, are, has	10–37	Frequent non-equivalence

Table 3 indicates that **verbs are the most problematic word class**, especially due to tense, voice, and aspect differences between English and Indonesian. This finding aligns with prior research (e.g., Karibayeva et al., 2021; Popović, 2018), suggesting that morphosyntactic complexity remains a persistent weakness of MT systems.

Top Three-Word of Word Class in a Non-Literary Text
Noun

No	Words	Frequency
1	Theory	21
2	Global	13
3	Relations	13

The top three lists of noun occurrences in ***International Relations Theory*** text are **theory** (21 times), **global** (13 times) and **relation** (13 times). Having analyzed the equivalence

problem by using AntPconc, it shows that these words do not need to be post-editied. **Theory** is translated *teori* itu, **global** is translated into *global*, and **relations** is translated into *hubungan.*

Adjective

No	Words	Frequency
1	Critical	23
2	Global	12
3	Cosmopolitan	8

The top three lists of adjectives occurring in ***International Relations Theory*** text are **critical** (23 times), **global** (12 times) and **cosmopolitan** (8 times). Having investigated the equivalence problem by using *AntPconc*, it shows that the words ``**critical**", "**global**" and "**cosmopolitan**" do not need to be post-editied. GT uses loan words to translate them.

Adverb

No	Words	Frequency
1	Therefore	7
2	Namely	2
3	Especially	1

The top three lists of adverbs occurring in ***International Relations Theory*** text are **therefore** (7 times), **namely** (2 times) and **especially** (1 times). Having analyzed the equivalence problem by using *AntPconc*, it shows that these words do not need to be post-editied. "**Therefore"** is translated *into oleh karena* itu, "**namely"** is translated into *yaitu*, and "**especially"** is translated into *terutama*.

Verb

No	Words	Frequency
1	Is	37
2	Are	13
3	Has	10

The first top three-word list of the verbs in ***International Relations Theory*** text is the verb "**is**" which has 37 occurrences. The verb "**is**" is translated by GT into *bahwa, adalah, merupakan, menjadi* dan *yang*. There are several "**is**' that are not translated because it refers to the passive voices. The writer finds an equivalence problem of the verb "**is**"

SL	TL generated by ST	Problem
It is Friday and he knows he much reach the Hungarian border before Tuesday	*Ini adalah hari Jumat dan dia tahu dia harus mencapai perbatasan Hongaria sebelum hari selasa*	Word level equivalence

From the excerpt above, it can be seen that GT did not translate the verb "**is**". Post-editing suggests translating the verb "**is**" into *Ini adalah hari Jumat*, to achieve word level

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equivalence. It has something to do with the problem that the SL concept is not lexicalized in the target language.

The second top list of the verbs in ***International Relations Theory*** text is the verb "**are**" which has 13 occurrences, mostly translated by GT into *bahwa* and *yang*. There are several equivalence problems occurring in translating the verb '**are',** as can be seen in the following excerpts.

SL	TL generated by ST	Problem
…since the Second World war are being displaced from their homes	*… sejak Perang Dunia Kedua terpaksa mengungsi dari rumah mereka.*	Grammatical level equivalence

Grammatical equivalence problems occurring in the clause **are being displaced**. This is a passive voice, while GT translates it in the active voice form '*terpaksa mengungsi*'. Post-editing suggests to keep the passive voice in its translation, into *… sejak Perang Dunia Kedua dievakuasi dari rumah mereka.* This problem includes the use of passive voice categories.

Meanwhile, the third top list of the verbs in ***International Relations Theory*** text is the verb "**has**" which occurs 10 times. GT translated the verb "has" into *mempunyai* and *telah*. The writer found non-equivalence problems in the translation of the verb "**has**" done by GT.

SL	TL generated by ST	Problem
The fact that it has been possible for states in the modern international system to agree …	*Fakta bahwa negara-negara dalam sistem internasional modern bisa menyepakati …*	Above word level equivalence

It can be seen that GT did not translate the clause **has been possible** in SL. It has something to do with the tension between accuracy and naturalness in TL. Post-editing suggests translating the clause into ***memungkinkan***. The complete translation becomes *fakta bahwa **memungkinkan** bagi negara-negara dalam sistem internasional modern untuk menyepakati.*

5. Conclusion

This study has critically examined equivalence problems in the Indonesian output of Google Translate (GT) when applied to a non-literary English text, using Baker's five levels of equivalence: word, above-word, grammatical, textual, and pragmatic. The findings suggest that although GT performs relatively well in translating high-frequency nouns, adjectives, and adverbs, substantial challenges persist across all equivalence levels, particularly in the translation of verbs, complex syntactic structures, and context-dependent meanings. At the word level, lexical mismatches and the excessive use of loanwords may result in translations that sound unnatural to target-language readers, while at the above-word level, idiomatic expressions and collocations often fail to convey their intended meanings, indicating a tension between formal accuracy and naturalness. Grammatical non-equivalence, especially in number marking and passive constructions, further distorts meaning and highlights the necessity of syntactic adjustments during post-editing. Moreover, problems at the textual and pragmatic levels reveal GT's limited discourse awareness, as cohesion breakdowns and failures to interpret implicatures frequently undermine contextual clarity and communicative intent. Despite its contributions, this study's limitations arise from its use of

a single machine translation engine and its concentration on a single nonliterary text, which limits how broadly the results may be applied. In order to investigate equivalency issues more thoroughly across genres and languages, future study may increase the corpus, compare several MT systems, or use mixed-method approaches. Overall, this study emphasizes that human post-editing is still necessary to guarantee contextual fidelity, pragmatic accuracy, and communicative effectiveness in translation, especially for non-literary texts that require precision, coherence, and sensitivity to meaning. This highlights the critical role of human expertise in the era of AI-assisted translation, even as machine translation continues to advance in efficiency and accessibility.

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