

## Translation accuracy of computer terms by ChatGPT, Gemini, DeepL, and Google Translate from English to Indonesian

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### ABSTRACT

*This study evaluates how accurately four freely accessible translation systems (Google Translate, DeepL, ChatGPT, and Gemini) render 67 computer-specific terms from English to Indonesian. All 67 terms gathered from Word 2016 for Professionals for Dummies were translated by each system. Prompts were used to create simple sentences in which the specific terms were employed. The translations were then rated independently and quantitatively using Nababan's translation quality assessment model theory which assesses translation accuracy into three categories, accurate, less accurate, and inaccurate. Of the 21 data sampling analyzed, Google Translate produced 16 accurate translations, 4 less accurate translations, and 1 inaccurate translation. DeepL produced 15 accurate translations, 6 less accurate translations, and 0 inaccurate translations. ChatGPT produced 18 accurate translations, 3 less accurate translations, and 0 inaccurate translations. Gemini produced 18 accurate translations, 3 less accurate translations, and 0 inaccurate translations. Then, it can be concluded that both ChatGPT dan Gemini outperform Google Translate and DeepL by average accuracy score of 2.85 compared to 2.71.*

**Keywords:** Machine translation; ChatGPT; Gemini; DeepL, Google Translate; Computer Terminology; Indonesian

### INTRODUCTION

Accuracy is one of the most important aspects of translation. A quality translation relies on the translator's ability to choose words that not only convey the intended meaning accurately, but also match the structures of the target language (Riza, 2024). Accuracy in translation can be referred to as the degree to which a translation successfully conveys the original content in the target language (Lestari et al., 2023). This is in line with the translation itself which involves interpreting a text from one language to another without altering its content. This process includes not only the transfer of words from the source language to the target language but also the meaning of the original message (Sumiati et al., 2022). For this reason, translation accuracy must be taken into account for the success of a translation.

Translation accuracy is particularly important for technical texts in fields such as computers that contain technical terms to convey complex concepts. Technical terms

can be defined as single words or phrases that have a specific meaning within a specific scientific discipline (Kurniaty et al., 2022). Accurately translating said terms ensures that the meaning is conveyed precisely into the target language and avoids any potential misunderstandings that could lead to misinterpretations. Moreover, the field of translation is increasingly focused on the translation of scientific and technical literature. The rapid advancements in science and technology suggest that the demand for this type of translation will continue to grow (Akbalaeva, 2020).

The growing demand for translation services, combined with the globalisation situation that also requires communication across different languages, has promoted the use of machine translation technology. Such technology is considered to be the most viable solution to this challenge (Rivera-Trigueros, 2022). This is due to several key advantages, including the ability to translate in real time, the support of multilingual translation and the convenience of access (Hoi, 2020). In addition to machine translation, chatbots such as ChatGPT and Gemini have also gained popularity and are often used for translation. A chatbot is an advanced conversational system capable of understanding and processing human language (Kumar & Ali, 2020). One study found that the use of ChatGPT and Gemini chatbots is more popular among university students than Google Translate, as they are perceived to produce more accurate translations (Hidayati & Nihayah, 2024). However, the translation accuracy of ChatGPT and Gemini requires further investigation, as their performance across different linguistic structures and specialized terminologies remains underexplored.

While the accuracy of translations produced by machine translation tools and chatbots has been extensively studied, there is still a lack of research focusing specifically on translation accuracy of text containing computer-specific terms from English to Bahasa Indonesia. Research conducted by Woodrum (2024) suggests that ChatGPT's translation quality was comparable to that of Google Translate and even human translators when translating five 250-word English passages into Mandarin. Meanwhile, Elham Alzain et al. (2024) found that Google Translate outperformed ChatGPT in translating 33 scientific texts from English to Arabic. The translations produced by Google Translate were less error-prone and received a higher average evaluation score of 3.93, compared to ChatGPT's score of 3.22 (Elham Alzain et al., 2024). Putera & Sujana (2024) also conducted a comparative analysis to evaluate the translation accuracy of Google Translate and Gemini in translating scientific journal abstracts from Indonesian to English. The results indicated that Google Translate was slightly more accurate, with an accuracy rating of 99.7%, compared to Gemini's 99.1%.

Unlike previous studies, this research will focus on evaluating the translation accuracy of a text containing computer terms found in a textbook. This will be done using Nababan's translation quality assessment model. The scoring matrix will be defined

with three levels: “accurate”, “less accurate”, and “inaccurate” which serves as an indicator of translation accuracy. In addition to Google Translate and ChatGPT, this study will also assess the translations provided by DeepL and Gemini, which have been less commonly researched in this context.

## LITERATURE REVIEW

### *Translation*

In general, translation can be defined as the process of translating a text from one language to another. However, experts have different definitions of translation. This is because translation is defined differently based on background, theory, and approach (Sayogie, 2014).

1. According to Newmark in his book “*A Textbook of Translation*”, said that translation involves expressing the meaning of a text in another language while staying true to the author’s original intent (Newmark, 1988).
2. Similar to the definition above, Catford defines translation as a linguistic operation that involves substituting text in one language for another (Catford, 1978).
3. Pinchuck also provides a definition of translation as "a process of finding a TL (target language) equivalent for an SL (source language) utterance" (Pinchuck, 1977).
4. Translation according to Larson is the process of transferring meaning from one language to another. Semantic structure facilitates this transfer from the first language's form to the second language's form. While the language form can change, the transferred meanings need to be maintained (Larson, 1998).
5. While Nida and Taber suggest that “translation consists of reproducing in the receptor language the closest natural equivalence of the source language message, first in terms of meaning and secondly in terms of style.” (Nida & Taber, 2003). Essentially, translation involves expressing a message and language in one language into another. The term ‘receptor language’ highlights that translation is a form of communication. Consequently, the idea of correctness in translation is context-dependent, determined by the intended audience. There is no universally correct or incorrect translation; correctness also hinges on the purpose behind the translation (Sayogie, 2014).

The target language text must be textually equivalent (in content) to the source language text if the translator's goal is to re-express the message from the source language in the target language. According to translation theory, two texts (one in the

source language and the other in the target language) are equal if their contents are similarly understood by the readers from both the source language and target language. Hence, according to Nida and Taber, a textually accurate translation of a text in the target language is one that is a "dynamic equivalence" with the text in the source language; that is, a translation where the form may differ but the "meaning" remains the same, that is, a translation where the recipient in the target language understands the text as the recipient in the source language understands the text. Hence, although the form differs, the "value" or "meaning" remains the same (Nida & Taber, 2003).

From the above definition, it can be concluded that translation is the process of conveying a message or meaning from one language to another while ensuring that the meaning remains the same even if the form changes.

### *Translation Accuracy*

Accuracy in translation refers to the degree of similarity between the original text in one language and its equivalent in another language. A high level of accuracy in translation is crucial when the text contains important information that needs to be conveyed accurately and unambiguously. If the translated text produces a meaning similar to the meaning of the original text, then the translation is considered successful.

Nababan in his study also summarized that most experts in the field of translation agree that one indication of a quality translation is how accurately it is translated into the target language. He also stated that accuracy is a term used in translation evaluation to refer to whether the source language text and the target language text are equivalent or not. The concept of equivalence refers to the similarity of content or message between the two. Therefore, attempts to reduce or add to the content or message of the source language text in the target language text must be avoided. Such attempts are betraying the original author of the source language text and at the same time deceiving the target reader. In a broader context, omission or addition can have fatal consequences on the people who use a translated work, especially in high-risk translated texts, such as translated texts in the fields of law, medicine, religion and engineering (Nababan & Nuraeni, 2012).

Similar to the definition of translation, experts also have different opinions and indicators of what is an accurate translation. Larson in her book simply says that accuracy in translation emphasizes on the transfer of meaning. An accurate translation means that a translation has the same meaning as what is in the source language. In assessing translation accuracy, Larson says that a translator wants to ensure that there are no additions to a translation, nor deletions and alterations of information (Larson, 1998). Meanwhile, Nababan in his translation quality assessment model which specifically discusses the assessment of translation quality from English to Indonesian

explains further about translation accuracy. Nababan said that in assessing the accuracy of a translation, there are several parameters, each of which describes a category of translation accuracy. These categories are Accurate, Less Accurate and Inaccurate. Nababan's accuracy assessment model can be seen in the following table:

**Table 1**

*Nababan's Translation Accuracy Assessment Model*

Translation Category	Score	Parameter
Accurate	3	The meaning of source language words, technical terms, phrases, clauses, sentences or texts is accurately transferred into the target language; there is absolutely no distortion of meaning.
Less Accurate	2	Most of the meanings of source language words, technical terms, phrases, clauses, sentences or texts have been accurately transferred into the target language. However, there are still distortions of meaning or double-meaning translations or omitted meanings, which disrupt the integrity of the message.
Inaccurate	1	The meaning of source language words, technical terms, phrases, clauses, sentences or texts are inaccurately transferred into the target language or excluded.

The accuracy assessment tool comprises three sections. The first section specifies the translation category. The second section assigns a score on a scale from 1 to 3, structured in an inverted pyramid—where higher-quality translations receive higher scores and lower-quality translations receive lower scores. The third section outlines the qualitative parameters associated with each translation category. This evaluation tool follows a 1-to-3 scale, where a higher score reflects greater translation accuracy, while a lower score indicates lower accuracy.

## RESEARCH METHOD

The dataset comprises 67 distinct computer-related terms taken from the textbook *Word 2016 for Professional for Dummies*. Items include single- and multi-word terms (e.g., *web browser*, *save as*, *descending*, etc.) used in a technical sense in the textbook. The dataset includes how these specific computer terminologies are employed in sample sentences. This full-sample approach addresses representativeness and avoids sampling bias.

Four systems produced Indonesian translations for every term: Google Translate, DeepL Translator, ChatGPT, and Gemini. For Google Translate and DeepL, each term was entered via the web UI with the target language set to Indonesian; no manual post-editing was performed. For ChatGPT and Gemini, a single standardized prompt was used to translate the list and preserve technical sense. The procedure was as follows: (1) carefully read the textbook, highlight the specific terminologies; (2) translate the complete 67-item list with sample sentence as a prompt in which the terminologies are mostly used; and (3) copy the translated results and save them as data cards.

All the data were rated independently and quantitatively using Nababan’s 3-point accuracy scale (1 = inaccurate, 2 = less accurate, 3 = accurate). The scaling criteria are presented in Table 1, which outlines the qualitative descriptors underlying these numerical scores.

## RESULTS AND DISCUSSION

For this research, 67 unique entries for computer terms were found in the textbook. After the data collection, all the data will then be translated into Bahasa Indonesia by Google Translate, DeepL, ChatGPT, and Gemini. All 67 terms are presented in Table 2 below. However, to avoid redundancy, 21 of the 67 data were sampled to determine translation accuracy.

**Table 2**

*Computer Terms Data*

Computer Terms
Access, Account, Align Left, Align Right, Apps, Ascending, Backup, Bold, Bug, Cloud storage, Command, Character, Center, Computer, CTRL/Control, Copy and Paste, Cursor, Cut and Paste, Delete, Descending, Download, Encrypt, Enter, Email, Export, File, Folder, Format, Full-screen, Hardware, Home, Hyperlink, Import, Input, Internet, Install, Installed, Reinstall, Italic, Justify, Key, Keyboard, Link, Macro, Malware, Monitor, Mouse, Network, Online, Operating System, Password, Program, Recycle Bin, Redo, Refresh, Run, Save As, Shortcut, Software, Spacebar, Spreadsheet, Undo, Upload, User Interface, Web browser, Window, Worm.

The previously collected source language (SL) data of computer terms was then translated into Bahasa Indonesia by Google Translate, DeepL, ChatGPT, and Gemini to create target language (TL) data to be used as a dataset for analysis. Both SL and TL data are presented in a table. There are four TL data labeled TL 1, TL 2, TL 3, and TL 4 which represent translation results of SL data to Indonesian by Google Translate, DeepL, ChatGPT and Gemini respectively. Then, to determine how accurately the

source language text were translated into the target language, Nababan's theory of Translation Quality Assessment Model was used in the analysis, which divides the accuracy of a translation into three categories, namely accurate, less accurate, and inaccurate.

Five samples which include each rating category (accurate, less accurate, and inaccurate) are presented below:

### Datum 1

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SL	“Cloud storage is accessed from a computer, laptop, tablet, or cell phone.”
TL 1	“Penyimpanan cloud diakses dari komputer, laptop, tablet, atau ponsel.”
TL 2	“Penyimpanan awan diakses dari komputer, laptop, tablet, atau ponsel.”
TL 3	“Penyimpanan cloud dapat diakses dari komputer, laptop, tablet, atau ponsel.”
TL 4	“Penyimpanan awan diakses dari komputer, laptop, tablet, atau telepon seluler.”

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The translation results of the four translation engines are similar. In terms of translation accuracy, all four translation engines can accurately translate the SL text into the target language, including the source language term "cloud storage". The difference is that Google Translate and ChatGPT retain the source language term, while DeepL and Gemini translate it to "*penyimpanan awan*". In computing, the term "cloud" means "a computer network where files and programs can be stored, especially the Internet". Although the word "*awan*" does not have a specific definition in the target language that refers to a computer term, this translation is still considered accurate because it is officially registered as an equivalent term on the *PASTI (Padanan Istilah)* website to refer to the source language term "cloud". Therefore, all four translations are considered **accurate**.

### Datum 2

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SL	“The best software to use for creating a web page is a specific web page editor.”
TL 1	“Perangkat lunak terbaik yang digunakan untuk membuat halaman web adalah editor halaman web tertentu.”
TL 2	“Perangkat lunak terbaik yang digunakan untuk membuat halaman web adalah editor halaman web tertentu.”
TL 3	“Perangkat lunak terbaik untuk membuat halaman web adalah editor halaman web tertentu.”
TL 4	“Perangkat lunak terbaik untuk membuat halaman web adalah editor halaman web khusus.”

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For context, the SL text explains that although creating a web page can be done using a regular text editor app, the web page editor is the best software of choice. For the translation results, all four translations produce similar output. In terms of how accurately these four translation engines translate the source language text into target language, Google Translate, DeepL, Gemini and ChatGPT produce a translation that can accurately convey the SL text, including translating the source language term into "*perangkat lunak*". The usage of this term is accurate in target language and it is officially registered on the *PASTI (Padanan Istilah)* website as an entry for the foreign language equivalent of the term "software", while also commonly used in the target language to refer to source language terms.

While most of the source language text is accurately conveyed, there is translation error that disrupt the intended message. As the phrase "*editor halaman web tertentu*" and "*editor halaman web khusus*" implies that, compared to other similar web page editor software, there are some that are considered the best to use for creating web page. This translation contradicts the message contained in the SL text, as the main idea of the source text is to point out that the best software for creating a web page is the one that is specifically designed for the task, which is a web page editor. This creates a distortion in meaning, making Google Translate, DeepL, and ChatGPT's translation categorized as **less accurate**. More accurate translation would be "*editor khusus halaman web*".

### Datum 3

SL	"When you need to reference another part of your eBook, insert a hyperlink into your document."
TL 1	"Jika Anda perlu merujuk ke bagian lain dari eBook Anda, masukkan hyperlink ke dalam dokumen Anda."
TL 2	"Ketika Anda perlu merujuk ke bagian lain dari eBook Anda, sisipkan hyperlink ke dalam dokumen Anda. "
TL 3	"Ketika Anda perlu merujuk ke bagian lain dari eBook Anda, sisipkan hyperlink ke dalam dokumen Anda."
TL 4	"Ketika Anda perlu merujuk ke bagian lain dalam eBook Anda, sisipkan hyperlink ke dalam dokumen. "

In terms of translation accuracy, all four translation engines accurately translated the terms and messages in the source text. However, in Gemini's translation, there is an omission in the translation of the "your document" part, which is only translated to "dokumen". Therefore, Gemini's translation is categorized as **less accurate**, while Google Translate, DeepL and ChatGPT are **accurate**.

#### Datum 4

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SL	"Always assume that all Internet images are copyrighted."
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TL 1	"Selalu berasumsi bahwa semua gambar di Internet memiliki hak cipta."
TL 2	"Selalu asumsikan bahwa semua gambar Internet memiliki hak cipta."
TL 3	"Selalu anggap bahwa semua gambar di internet dilindungi hak cipta."
TL 4	"Anggaplah selalu bahwa semua gambar di internet memiliki hak cipta."

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In terms of translation accuracy, all four translation engines produce similar output and can accurately convey the message of the SL text. However, for the translation case of DeepL, there is a distortion of meaning that results in the target language conveying a message that is different from that intended by the SL text. Specifically, in the "Internet images" part of the SL text which refers to images that users find on the Internet. DeepL translated this literally into "*gambar Internet*" which means the image of the internet. While the translations of "*gambar di Internet*" produced by Google Translate, ChatGPT, and Gemini can accurately convey this, making them fall into the **accurate translation** category. While the translation from DeepL falls into the **less accurate** category.

#### Datum 5

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SL	"If so, the text is cut and pasted at the end of the document."
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TL 1	"Jika sudah, teks tersebut dipotong dan ditempel di akhir dokumen."
TL 2	"Jika demikian, teks akan dipotong dan disisipkan di akhir dokumen."
TL 3	"Jika demikian, teks tersebut dipotong dan ditempelkan di akhir dokumen."
TL 4	"Jika demikian, teks akan dipotong dan ditempel di akhir dokumen."

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"Cut and paste" according to *Cambridge Dictionary* is "to move words or pictures from one place to another in a computer or internet document, app, post, etc." In this context, the cut and paste function is used in the Microsoft Word program to move text. The translation results from Google Translate, DeepL, ChatGPT, and Gemini produce similar outputs, but there are differences in the translation of technical terms from the source language. Google Translate, ChatGPT, and Gemini translate it as "*dipotong dan ditempel*" while DeepL translates it as "*dipotong dan disisipkan*."

In terms of translation accuracy, all four translation engines can accurately translate the SL text into the target language. However, DeepL inaccurately translates the

computer term "paste" as "sisip" in the target language. According to *PASTI (Padanan Istilah)*, the term "sisip" is the equivalent of another computer term, namely "insert", which is a command to add new content to a file or document such as text, while "paste" is used to place content that has been copied or cut from another location, in this case, a text into a document. Therefore, the translation provided by DeepL can be considered **less accurate** as there is an inaccurate translation in technical terms.

While the translations of the terms "*dipotong dan ditempel*" generated by Google Translate, Gemini and ChatGPT are accurate because they are direct equivalents in the target language. According to KBBI, *potong tempel* means "*pemindahan berkas, folder, dan teks yang dipilih ke lokasi lain*". Since the target language can accurately translate the SL text and its technical terms, the translations of the three translation engines can be classified as **accurate translations**.

Of the 21 data analyzed, Google Translate produced 16 accurate translations, 4 less accurate translations, and 1 inaccurate translation while DeepL produced 15 accurate translations, 6 less accurate translations, and 0 inaccurate translations. As for chatbots, ChatGPT provided 18 accurate translations, 3 less accurate translations, and 0 inaccurate translations. Gemini generated 18 accurate translations, 3 less accurate translations, and 0 inaccurate translations. The translation accuracy assessment of four translation engines based on Nababan's quality assessment model are presented in the following table:

**Table 3**

*Google Translate, DeepL, ChatGPT, and Gemini 's Translation Accuracy Assessment*

No	Translation Engine	Accurate Translation	Less Accurate Translation	Inaccurate Translation	Score	Average Accuracy Score
1	Google Translate	16	4	1	57	2.71
2	DeepL	15	6	0	57	2.71
3	ChatGPT	18	3	0	60	2.85
4	Gemini	18	3	0	60	2.85

## CONCLUSION

Based on the findings of this study, it can be concluded that Google Translate produced 16 accurate translations, 4 less accurate translations, and 1 inaccurate translation while DeepL produced 15 accurate translations, 6 less accurate translations, and 0 inaccurate

translations. As for chatbots, ChatGPT provided 18 accurate translations, 3 less accurate translations, and 0 inaccurate translations. Gemini generated 18 accurate translations, 3 less accurate translations, and 0 inaccurate translations.

The study also concluded that both ChatGPT and Gemini outperform Google Translate and DeepL in translating text that contains computer specialized terms from English to Indonesia. With an average accuracy score of 2.85, both ChatGPT and Gemini demonstrate a slightly superior performance compared to machine translation, Google Translate and DeepL with an average score of 2.71. Although both ChatGPT and Gemini demonstrated higher accuracy in translation results compared to Google Translate and DeepL, the overall performance gap was not significant. Nevertheless, human involvement remains crucial to ensure high translation accuracy, especially for texts that requires it, such as textbooks, scientific journals, and documents.

## REFERENCES

- Akbalaeva, Z. (2020). *Some Challenges of Scientific-Technical Texts Translation*. *KAU Transactions*, 6–10.
- Catford, J. C. (1978). *A linguistic theory of translation: An essay in applied linguistics* (5th impr). Oxford Univ. Press.
- Elham Alzain, Nagi, K. A., & AlGobaei, F. (2024). The Quality of Google Translate and ChatGPT English to Arabic Translation the Case of Scientific Text Translation. *Forum for Linguistic Studies*, 6(3), 837–849.  
<https://doi.org/10.30564/fls.v6i3.6799>
- Hidayati, N. N., & Nihayah, D. H. (2024). Google Translate, ChatGPT or Google Bard AI: A Study toward Non-English Department College Students' Preference and Translation Comparison. *Inspiring: English Education Journal*, 7(1), 14–33.  
<https://doi.org/10.35905/inspiring.v7i1.8821>
- Hoi, H. T. (2020). *Machine Translation and Its Impact in Our Modern Society*. 9(02).
- Kumar, R., & Ali, M. M. (2020). *A Review on Chatbot Design and Implementation Techniques*. 07(02).
- Kurniaty, K., Fatimah, A., & Aswad, I. (2022). *A Study of Technical Terms in Shipping Science: 9th Asbam International Conference (Archeology, History, & Culture in The Nature of Malay) (ASBAM 2021)*, Makassar, Indonesia.  
<https://doi.org/10.2991/assehr.k.220408.103>
- Larson, M. L. (1998). *Meaning-based translation: A guide to cross-language equivalence* (2nd ed). University Press of America.
- Lestari, S., Abduh, A., & Talib, A. (2023). The Analysis of Accuracy in Translating Abstract Journal by The Students of English Education Universitas Negeri

- Makassar. *PERFORMANCE: JOURNAL OF ENGLISH EDUCATION AND LITERATURE*, 2(4), 585. <https://doi.org/10.26858/performance.v2i4.54293>
- Nababan, M., & Nuraeni, A. (2012). PENGEMBANGAN MODEL PENILAIAN KUALITAS TERJEMAHAN. *Kajian Linguistik dan Sastra*, 24(1).
- Newmark, P. (1988). *A textbook of translation*. Prentice-Hall International.
- Nida, E. A., & Taber, C. R. (2003). *The theory and practice of translation*. Brill.
- Pinchuck, I. (1977). *Scientific and technical translation*. A. Deutsch.
- Putera, L. J., & Sujana, I. M. (2024). A COMPARATIVE ANALYSIS OF ACCURACY BETWEEN GOOGLE TRANSLATE AND BARD IN TRANSLATING ABSTRACTS OF SCIENTIFIC JOURNALS. 10.
- Rivera-Trigueros, I. (2022). Machine translation systems and quality assessment: A systematic review. *Language Resources and Evaluation*, 56(2), 593–619. <https://doi.org/10.1007/s10579-021-09537-5>
- Riza, A. N. (2024). AKURASI HASIL TERJEMAH NOVEL “IMRA’AH ‘INDA NUQTATI AŞ-ŞIFR” DENGAN WEBSITE “DEEPL TRANSLATOR.” *Sabda: Jurnal Sastra Dan Bahasa*, 3(1). <https://doi.org/10.572349/sabda.v3i1.1817>
- Sayogie, F. (2014). *Teori dan Praktik Penerjemahan Inggris—Indonesia* (1st ed.). Transpustaka.
- Sumiati, Baharuddin, & Saputra, A. (2022). THE ANALYSIS OF GOOGLE TRANSLATE ACCURACY IN TRANSLATING PROCEDURAL AND NARRATIVE TEXT. *Journal of English Education Forum (JEEF)*, 2(1), 7–11. <https://doi.org/10.29303/j.v2i1.270>
- Woodrum, C. (2024). ChatGPT and Language Translation: A Small Case Study Evaluating English – Mandarin Translation. In H. Degen & S. Ntoa (Eds.), *Artificial Intelligence in HCI* (Vol. 14736, pp. 147–157). Springer Nature Switzerland. [https://doi.org/10.1007/978-3-031-60615-1\\_10](https://doi.org/10.1007/978-3-031-60615-1_10)