



Artificial Intelligence in Translation Education: a Combination of Google Translate and Grammarly for Students' Accurate Translation Products

Rudi Hartono 

English Department, Universitas Negeri Semarang, Semarang City, Central Java Province, Indonesia

rudi.hartono@mail.unnes.ac.id

Abstract. Artificial intelligence (AI) in language education is so great that it can become essential in learning and teaching languages, especially foreign languages, and mastering listening, speaking, reading, and writing skills. Likewise, in translating from Indonesian to English, AI products in machine translation and editing applications help speed up the translation process and produce more accurate translations. The students I teach usually translate Indonesian texts into English manually without AI usage, so the translation results are less accurate; for example, the grammar is not correct, the choice of vocabulary is erroneous, the sentence structure is not standard, and the writing mechanism is not by standard spelling. The aim of the study is to improve students' translation quality, especially translation accuracy. In this research used Classroom Action Research (CAR) as the research method. This research involved ten students as the participants with poor translation skills. The research instruments are translation tests and Google Translate and Grammarly Combination (GTG-Com) Application. The research steps I conducted are firstly, students translated the text using Google Translate, secondly, they edited the translation products using the Grammarly App. Based the result of research it was found that GTG-Com improved the students' translation quality. Their translation accuracy is now better than before, more accurate. The translation accuracy increased from inaccurate to less accurate (60%) and from less accurate to accurate (40%), from 1.4 to 2.6, so the average progress score of each student is 2. It can be concluded that the combination of Google Translate and Grammarly (GTG-Com) App is very significant to translate texts and edit the translation results and produced more accurate translation products.

Keywords: artificial intelligence, translation education, Google Translate, Grammarly, translation accuracy

1 Introduction

Artificial Intelligence (AI) in education is now a new phenomenon that is shocking because it is a controversial issue [1]. On the one hand, many educators welcome this product because it can be a partner in teaching and facilitating the learning process.

© The Author(s) 2024

N. A. S. Abdullah et al. (eds.), *Proceedings of the International Conference on Innovation & Entrepreneurship in Computing, Engineering & Science Education (InvENT 2024)*, Advances in Computer Science Research 117, https://doi.org/10.2991/978-94-6463-589-8_37

On the other hand, many people still refuse because there are many concerns about the impact of AI on the world of education and daily life. Many predict that AI with high intelligence can replace the role and function of humans in work. AI can replace the teacher's position; some future teachers are expected to be replaced with robots [2], [3]. Is that true?

What exactly is artificial intelligence (AI)? Many experts define AI in various definitions. First, some say that AI is a technology that enables computers and machines to simulate human intelligence and problem-solving capabilities [4]. Second, AI refers to computer systems capable of performing tasks traditionally associated with human intelligence—such as making predictions, identifying objects, interpreting speech, and generating natural language [5]. Third, AI is the intelligence of a machine or computer that enables it to imitate or mimic human capabilities [6].

Artificial Intelligence (AI) used in the translation process involves the types of machine translation and translation software, for examples: 1) Machine Translation (MT): Computer-Assisted-Translation (CAT), Google Translate, Rule-Based Machine Translation (RBMT), Rule-Based Machine Dictionary (RBMD), and Statistical Machine Translation), 2) Neural Machine Translation: DeepL Neural Translation Software, 3) Translation Software: Microsoft Translator, Systran, Meta's AI translation software, and ChatGPT from OpenAI [7]. How do all AI devices function in the translation process? The primary application of artificial intelligence (AI) in translation is the translation of text or speech from one language to another. It can translate business documents, websites, live discussions, and even text messages. Artificial Intelligence devices and tools in translation come in a variety of forms, including translation apps and more professional translation equipment such as translation earbuds [8]. About translation technologies, Seljan 2011 [9] argued that computer-assisted translation tools (CAT), machine translation, or computer translation, include general-purpose applications, standard tools (e.g. spelling, grammar, and style-checkers), as well as specific tools like electronic dictionaries, glossaries, terminology bases, translation memories, and machine translation software.

Artificial Intelligence (AI) has significantly impacted translation education, bringing several key benefits and advancements:

a) Enhanced Learning Tools

1. Interactive Learning: AI-driven tools provide interactive and hands-on training courses in virtual environments. This allows students to engage more deeply with the material and practice translation in real-time scenarios [23].
2. Personalized Feedback: AI can offer targeted feedback, helping students quickly identify and correct their mistakes. This personalized approach accelerates learning and improves language skills more efficiently [24].

b) Improved Translation Accuracy

1. Machine Translation: AI-powered machine translation tools, such as Google Translate, have become integral in teaching translation. These tools help students understand foreign languages better and provide a foundation for learning more complex translation techniques [24].
2. Natural Language Processing (NLP): NLP technologies enhance the accuracy of translations by understanding context and nuances in language, making the learning process more effective [25].

c) Accessibility and Convenience

1. 24/7 Availability: AI tools are available around the clock, allowing students to practice and learn at their own pace and convenience [24].
2. Cost-Effective: AI-driven translation tools reduce the need for expensive resources and can be a cost-effective solution for educational institutions [24].

d) Data-Driven Insights

1. Progress Tracking: AI can analyze both qualitative and quantitative data to track student progress. This helps educators identify areas where students need more support and adjust their teaching methods accordingly [23].
2. Curriculum Development: Insights from AI tools can inform the development of more effective and tailored curricula, ensuring that educational programs meet the needs of students [23].

e) Broader Implications

1. Global Communication: AI in translation education supports the development of skills necessary for proficient cross-cultural communication, which is increasingly important in our globalized world [26].
2. Innovation in Teaching: The integration of AI encourages innovative teaching methods and the adoption of new technologies in education, preparing students for future advancements in the field [26].

How can all these AI products play a role in translation? Translation is a process of reproducing the closest natural equivalent from the source language to the target language both in terms of meaning and style or as an effort to replace the source language text with a proportional text in the target language [10], [11], [12], [13] requires the role of translators who can translate text accurately, naturally, and read. AI, as an auxiliary machine in translating, can accelerate the translation process so that the translation results can be produced more quickly and accurately in grammatical, syntactic, lexical, and mechanical [14]. For example, Machine Translation (MT), as a fully automated software that translates content into a target language without human intervention and leads solutions like Google Translate, Bing Translator, and Slate Desktop, is very significant in the translation process. So, it can help human translators produce accurate translation products fast [15]. Another example is the use of Translation Memory (TM). This translator tool is also beneficial for the translator in the accurate translation process. TM saves translated content in a database for later retrieval, while simultaneously translating new content. It is a database that stores previously translated sentences, paragraphs, and text chunks [16].

The combination of Google Translate and Grammarly (GTG-Com), a combination of machine translation and editing software, as part of the use of AI in translation, plays a vital role in helping accurate translations. A free translation service, Google Translate uses vast data to assist translation process, which can translate many texts from one language to another [17]. It can be helpful if we wish to translate words or phrases between other languages. Using vast amounts of internet data, it takes words or phrases that we input and searches for translations that are fairer and more acceptable among billions of documents. This machine translation can provide us with equivalent results in a reasonable amount of time in complete translations under the original text [18]. Grammarly as a "writer assistant" can assist professionals, including writers and translators, with editing and proofreading their work. This program improves

vocabulary usage while detecting more than 250 different kinds of spelling, grammatical, and punctuation mistakes. Grammarly can outperform the built-in editing and proofreading capabilities included in Word and Email. Six writing styles are supported by it for edits: academic, business, casual, technical, creative, and general [19]. Grammarly automatically assigns a document's total score based on the number of faults and issues detected. After that, we can each edit our grammar with the help of this application. Every problem found by the system has a detailed and concise explanation provided. This approach is repeated until our documents are correct and the discomfort and scoring errors are eliminated [17].

The combination of Google Translate and Grammarly has led to several key discoveries and improvements in the translation process:

a) Main Discoveries

1. **Enhanced Accuracy:** Research has shown that using both tools together significantly improves the accuracy of translations. Google Translate provides a quick and broad translation, while Grammarly refines the text by correcting grammatical errors and improving sentence structure [27].
2. **Improved Naturalness:** Translations using both tools tend to be more natural and fluent. Grammarly helps in making the translated text sound more like it was written by a native speaker [27].
3. **Efficiency:** The integration of these tools allows for a faster translation process. Users can translate text directly within Grammarly, minimizing the need to switch between different applications [28].

b) Importance

1. **Quality of Academic Papers:** For academic translations, especially from languages like Indonesian to English, the combination of these tools has been shown to produce more accurate and natural translations, which is crucial for the clarity and professionalism of academic work [27].
2. **User Convenience:** The ability to translate text directly within Grammarly helps users stay focused on their work without the distraction of switching between different tools [28].
3. **Broader Language Support:** This combination supports a wide range of languages, making it accessible for users worldwide [28].

The combination of Google Translate and Grammarly offers several advantages and disadvantages:

a) Advantages

1. **Enhanced Accuracy:** Google Translate provides a quick translation, and Grammarly refines it by correcting grammatical errors and improving sentence structure, resulting in more accurate translations.
2. **Improved Naturalness:** Grammarly helps make the translated text sound more natural and fluent, closer to what a native speaker would write.
3. **Efficiency:** This combination allows for faster translation processes, as users can translate and edit text within the same platform, reducing the need to switch between different tools.
4. **Cost-Effective:** Both tools are either free or relatively inexpensive compared to hiring professional translators, making them accessible for users with limited budgets.

5. User-Friendly: The integration of these tools is straightforward and easy to use, even for those who are not tech-savvy [29].

b) Disadvantages

1. Contextual Limitations: While the combination improves grammatical accuracy, it may still struggle with understanding context, idiomatic expressions, and cultural nuances, leading to less accurate translations in complex scenarios.
2. Quality Variability: The quality of translations can vary depending on the language pair and the complexity of the text. Some languages may not be as well-supported as others.
3. Lack of Human Touch: Unlike professional human translators, these tools cannot adapt translations based on the intended audience or purpose, which can be crucial for formal or specialized documents.
4. Character Limitations: There are limits on the number of characters that can be translated at once, which can be a constraint for longer texts.
5. Dependency on Internet: Both tools require an internet connection to function, which can be a limitation in areas with poor connectivity [29].

The accuracy of the translations produced by the combination of Google Translate and Grammarly is proven in translating the meaning of words, technical terms, phrases, clauses, sentences, and language texts. The source is transferred into the target language very accurately and equally there is no distortion of meaning [20]. To assess the accuracy of the translation results, I used a quality assessment rubric with three levels of accuracy, namely 1) Accurate level with a score of 3 has a translation quality description: The meaning of words, technical terms, phrases, clauses, sentences or source language text are transferred accurately into the target language; there is no distortion of meaning. 2) Less Accurate with a score of 2 describes the translation quality: Most of the meanings of words, technical terms, phrases, clauses, sentences or source language texts are transferred accurately into the language target. However, there are still distortions of meaning or double-meaning translations, or some meanings are omitted, which disrupts the integrity of the message. 3) Inaccurate with a score of 1, which describes the quality of the translation: The meaning of words, technical terms, phrases, clauses, sentences or text in the source language is transferred inaccurately into the target language or is omitted [17], [20].

The combination of Google Translate and Grammarly has advantages in the accuracy and precision of translation results.

1) Professional Human Translators: Human translators excel in understanding the nuances of language, cultural contexts, and idiomatic expressions. They can accurately convey the intended meaning, ensuring high-quality translations.

2) Google Translate + Grammarly: While this combination improves grammatical accuracy and fluency, it may still struggle with complex sentence structures, idioms, and cultural references. The quality can vary depending on the language pair [30].

2 Methods

The research method used in this study was Action Research, which led to five research steps: Identifying the problem, gathering data, interpreting data, acting on evidence and evaluating results [21]. The final goal of this method is qualitative

measures of self-reliance attitude formation of a group or community and lovers of the translation. Here, students of translation classes are being targeted not at all in a position as a laboratory but as agents of the learning process. This action research was the process of learning and community empowerment. In terms of the students of translation class, translators produced the translation results, overcame various problems encountered, and continuously developed sustainably. On that basis, the nature of the role of the researcher as the companion and facilitator [22]. This action research model used five main steps or procedures in the cycle. The procedure conducted in this study was as follows: 1) Identifying the problem, the step in which the researcher identified in detail the problems of translating the Indonesian text into English. 2) Gathering data: after identifying the translation problems, the researcher manually gathered the data from the translation test the students did. 3) Interpreting data: In this step, the data that had been obtained was thoroughly interpreted in detail. 4) Acting on evidence after the interpretation step and interpreting data showed a poor result. The students' translations were inaccurate; then, the researcher addressed the existing problems by asking the students to use Google Translate and Grammarly in their translation process. 5) After evaluating the results, the researcher assessed the translation results [22]. The students' translation results were tabulated in the table and analyzed, and the findings were concluded.

3 Findings and Discussion

Based on the research results, it was found that students' translation scores experienced significant changes. The level of accuracy of the translation results in changes from inaccurate and less accurate to accurate. Based on Figure 1 below, we can see that when students 1, 2, 5, 7, 8, and 10 translated the texts manually, they got scores of 1. This means that their translation products are inaccurate. However, when they combined Google Translate and Grammarly (GTG-Com), their score increased significantly from 1 to 3. Students 2, 5, 8, and 10 got scores of 1 (not accurate) when they translated the texts manually, but their scores increased to 2 (less accurate) when they translated the texts using GTG-Com. On the other hand, students 3, 4, 6, and 9 got scores of 2 (less accurate) when they translated the texts manually, and then their scores increased to 3 (accurate) when they translated the texts using GTG-Com [17], [20]. To make it more transparent, please see Figure 1 below. So, 60% of students' scores increased from inaccurate to less accurate, and 40% increased scores from less accurate to accurate.

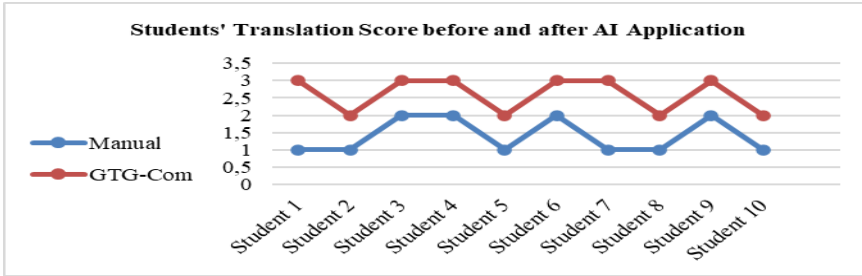


Fig. 1. The score progress of students' translations before and after AI applications.

From Figure 1, we get the idea that if the translation process from one language to another [10], [11], [12], [13] is translated manually, the results are, on average, inaccurate or less accurate. When translators translate texts manually, they often make many mistakes in translating the meaning of words, technical terms, phrases, clauses, and sentences. So, the source language text is transferred inaccurately into the target language, even if the meaning is omitted or distorted. However, when translators use Artificial Intelligence (AI) in translation, the results are accurate and quickly translated. The translation results have no distortion. AI's role is to use a combination of Google Translate and Grammarly (GTG-Com) for students to translate Indonesian texts into English to produce accurate translation results. Google Translate translates the text quickly, then the English translation result is edited and corrected for grammar and structure of phrases and sentences, appropriate and natural vocabulary is chosen, and the writing system is corrected to standard writing [15], [17], [18].

How are the students' progress scores of translations achieved when they translated the texts manually (without AI usage) and after they translated the texts using the combination of Google Translate and Grammarly (a part of AI types)? The translation progress score of each student can be seen in Table 1. The average score of translation results without AI (manual) is 1,4 (almost less accurate) while the average score of translation results with AI is 2.6 (almost accurate). There is a 1.2 score of translation progress from manual (without AI) to GTG-Com (with AI). While the average progress score of translation of all students from manual to GTG-Com usage is 2. It means that the students' translation improved well accurately. For a clear information of the impact of AI to the students' translation can be seen in Table 1.

Table. 1. The progress scores of students' translations before and after AI applications.

Participant	Manual	GTG-Com	Progress Score
Student 1	1	3	2
Student 2	1	2	1.5
Student 3	2	3	2.5
Student 4	2	3	2.5
Student 5	1	2	1.5
Student 6	2	3	2.5
Student 7	1	3	2
Student 8	1	2	1.5
Student 9	2	3	2.5
Student 10	1	2	1.5

Average Score	1.4	2.6	2
---------------	-----	-----	---

4 Conclusion

What we can conclude is that the role of Artificial Intelligence (AI) in translation education is vital and helps translators obtain translation results quickly and accurately. The meaning of words is translated; naturally, the target language's grammar is more standard and accurate, the structure of phrases and sentences is more appropriate, the writing system is more standard, and there is no distortion or loss of meaning. If the translator translates the text manually, the translation result tends to have many errors in grammar, sentence and phrase structure, and writing, as well as inappropriate word choices. Besides that, the text is translated slowly. Using a combination of Google Translate and Grammarly (GTG-Com) as part of AI helps students translate Indonesian texts into English quickly and accurately because machine translation can translate texts rapidly. Grammarly, as an editing tool, edits the translation results accurately. Therefore, AI must be used to speed up the process and produce more accurate translations. However, humans must still be the final post-editors so that the translated text is accepted by the target community, mainly if what is translated has cultural and literary content. However, AI is a translator's friend and partner, not an enemy that translators must avoid.

References

1. Sloane, M.: Controversies, contradiction, and “participation” in AI. *Big Data & Society* 11(1), 1-5 (2024).
2. Berditchevskaia, A., Malliaraki, E. and Peach, K.: Participatory AI for Humanitarian Innovation: A Briefing Paper. Nesta, London (2021).
3. Birhane, A., Isaac, W., Prabhakaran, V., et al. (2022) Power to the people? Opportunities and challenges for participatory AI. In: *Equity and Access in Algorithms, Mechanisms, and Optimization*, EAAMO '22. Association for Computing Machinery, New York, 1–8 (2022).
4. IBM Homepage. <https://www.ibm.com/topics/artificial-intelligence>, last accessed 2024/07/11.
5. Builtin Homepage. <https://builtin.com/artificial-intelligence>, last accessed 2024/07/11.
6. Spiceworks Homepage. <https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-ai/>, last accessed 2024/07/11.
7. OPTILUNGUAEUROPE Homepage. <https://www.alphatrad.com/news/future-impact-ai-translation>, last accessed 2024/07/12.
8. Mymanu Homepage. <https://blog.mymanu.com/choose-ai-translation-over-human-translation/>, last accessed 2024/07/12.
9. Seljan, S.: Translation Technology as Challenge in Education and Business. *Informatol.* 44(4), 279-286 (2011).
10. Nida, E. A. dan Taber, C. R. *The Theory and Practice of Translation*. E.J. Brill, Leiden (1982).
11. Catford, J.C. *A Linguistic Theory of Translation*. Oxford University Press, London (1978).

12. Larson, M.L. *Meaning-Based Translation: A Guide to Cross-language Equivalence*. Lanham: University Press of Amerika,™ Inc., Lanham (1984).
13. Newmark, P. *A Textbook of Translation*. United Kingdom: Prentice Hall International (UK) Ltd, United Kingdom (1988).
14. Hartono, R. Guest Lecture, Topic: “Translation and AI: Challenges, Opportunities, and Future Directions.” Faculty of Psychology and Education, Universiti Malaysia Sabah, Malaysia, June 25, 2024.
15. Dutchtrans Homepage. <https://www.dutchtrans.co.uk/three-ways-that-you-can-make-a-funny-mess-with-translations/>, last accessed 2024/07/12.
16. Trados Homepage. <https://www.trados.com/learning/topic/translation-memory/>, last accessed 2024/07/12.
17. Hartono, R. et al.: A Combination of Google Translate and Grammarly App for a Better Translation Quality of Academic Papers. In: *The English Language Teaching, Literature, and Translation (ELTLT) 2022*, pp. 197-207, English Department of UNNES, Semarang (2022).
18. Dummies Homepage. <https://www.dummies.com/article/technology/notable-websites/google/what-is-google-translate-145070/>, last accessed 2024/07/12.
19. The Balance Homepage. <https://www.thebalancemoney.com/grammarly-proofreading-and-grammar-checker-review-2062231>, last accessed 2024/07/12.
20. Nababan, M., Nuraeni, A, & Sumardiono.: Pengembangan Model Penilaian Kualitas Terjemahan. *Kajian Linguistik dan Sastra*, 24(1), 39-57 (2012).
21. Ferrance, E.: Action Research. New York: Northeast and Islands Regional Educational Laboratory at Brown University, New York (2000).
22. Hartono, R.: Teaching Translation through the Interactive Web. *Language Circle Journal of Language and Literature*, 9(2), 129-140 (2015).
23. Wang, Y. Artificial Intelligence Technologies in College English Translation Teaching. *J Psycholinguist Res* 52, 1525–1544 (2023). <https://doi.org/10.1007/s10936-023-09960-5>
24. LatinoBridge. March 20, 2023. Artificial Intelligence: The Impact of AI in the Translation Industry. [https://latinobridge.com/blog/artificial-intelligence-the-impact-of-ai-in-the-translation-industry/\(2023\)](https://latinobridge.com/blog/artificial-intelligence-the-impact-of-ai-in-the-translation-industry/(2023)), last accessed 2024/08/31.
25. Lexigo. Unlocking the Future: The Role of AI in Translation. <https://lexigo.com/unlocking-the-future-the-role-of-ai-in-translation/>, (2024), last accessed 2024/08/31.
26. Adie, M.A.E and Abdelgadir, Y. The Impact of Artificial Intelligence on Language Translation: A Review. *Languages, Artificial Intelligence, Translation, English Translation*. <https://doi.org/10.1109/ACCESS.2024.3366802> (2024).
27. Hartono, R., Subhan, S., Hetami, F., & Anjaniputra, A. G. A Combination of Google Translate and Grammarly App for a Better Translation Quality of Academic Papers. *The Proceedings of English Language Teaching, Literature, and Translation (ELTLT)*, 11(1), 196–208. Retrieved from <https://proceeding.unnes.ac.id/eltlt/article/view/1712>. (2022).
28. Grammarly. Introducing Grammarly’s translation feature. <https://support.grammarly.com/hc/en-us/articles/27518589299725-Introducing-Translate-with-Grammarly>, (2024), last accessed 2024/08/31.
29. BeTranslated. How Good Is Google Translate? The Most Accurate Language Pairs. SEP 9, 2019, last accessed 2024/08/31.
30. Haiying Li, Arthur C. Graesser, Zhiqiang Cai. Comparison of Google Translation with Human Translation. *Proceedings of the Twenty- Seventh International Florida Artificial Intelligence Research Society Conference, FLAIRS (2014)*. <https://aaai.org/papers/flairs-2014-7864/>, last accessed 2024/08/31.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

