

Evaluating the Accuracy of French-to-English Translations of Educational Segments by Various AI Systems

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Abstract: In recent years, the trends of globalization and artificial intelligence translation have grown. This paper will select the highly representative children's book *The Little Prince* and compare it with the globally popular AI tool ChatGPT 4.0, the domestically favored AI tool ERNIE Bot, and the notably accurate translation website dochoero.ai. Utilizing the CRISPE directive, the research will enable the AI translation tools to translate the original French text. The study will identify ten educationally significant sentences from *The Little Prince* and employ the three aforementioned AI translation tools to convert these sentences from French to English respectively. Subsequently, an evaluation will be conducted from multiple perspectives—including grammar, word choice, translation effectiveness regarding educational significance, and reader preference—using the Oxford English Dictionary and the Grammarly platform. It is hoped that the research can positively enhance the collaborative function between human translators and AI translation tools, thereby advancing global education.

Keywords: AI (Artificial Intelligence), translation, education, translate French to English.

1. Introduction

The development of AI translators dates from the Mid-20th century. At that time, translation techniques primarily relied on regulation and corpus, so the final translation was inflexible. From the initial Utopia conception of mechanical translation to today's intellectual science-based mechanism, translation is not limited to a simple conversion of languages, but a significant bridge of cultural communication and knowledge dissemination [1]. Especially in the background of globalization and digitization, the quality of translation has become the important standard of the ability of language processing. The emergence of the AI model, like chatGPT, advanced the AI translator further, triggering considerable attention from Academic and industry sectors. With the development of computer science and language processing, AI translators have rapidly satisfied the translation need on speed and amount. Since the 21st century, the introduction of deep learning and neural network technology has enhanced the significant progress of AI translators. NMT greatly improves fluency and accuracy, leading to a new phase of translation technique. Nowadays, Google Translate, DeepL, ChatGPT, and other AI translators have been widely used, especially in translations from French to English, and it is well-performed. The result of translation has significantly improved, but AI tools

still have difficulty on dealing with complex grammar and semantics. AI translators, however, present their limitation, especially on translating texts with a multitude of metaphors and emotional colouration [2]. The grammar, vocabulary and cultural differences between French and English make AI translators show their inaccuracy on texts with complex contexts or emotional colouration, so they still require post-editing by human translators [3]. Thereby, this dissertation mainly focuses on the accuracy of translations from three AI translators and demonstrates the pros and cons of current AI translators from surveys of professionals. In this way, theory-reference and technological support can be provided to people, so that they will be able to advance AI translation quality.

2. Method

2.1. The Reasons of Chosen AI Translator

2.1.1. ERNIE Bot

ERNIE Bot is a LLM designed by Baidu. It involves cross-modal and cross-linguistic deep semantics understanding and production capacity. ERNIE Bot possesses five key capabilities, including literary creation, commercial copywriting, mathematical logic reasoning, Chinese comprehension, and multimodal generation. This versatility opens up broader prospects in search and answer, content generation, and intelligent office applications [4].

Furthermore, it employs advanced neural network models like the Transformer architecture, which has demonstrated exceptional performance in machine translation. The innovative technology behind it allows for a more accurate understanding and generation of natural language, resulting in high accuracy and fluency in translating tasks from French to English.

ERNIE Bot emphasizes enhancing its language model through the integration of domain knowledge, particularly by incorporating knowledge graph information via the ERNIE model. It thus optimizes its understanding of specialized terminology and domain-specific knowledge [5].

2.1.2. Chatgpt4. 0

ChatGPT 4. 0 represents the latest generation of language models from OpenAI. It demonstrates high accuracy and fluency in English-French translation tasks. It outperforms human translation in terms of vocabulary diversity and lexical density. The model can express the same concepts using varied vocabulary and structures while maintaining the original meaning, which enhances content richness and linguistic variety [6]. In particular, its ability to handle sentence transformations through precise prompts ensures that its translations or transformations remain highly relevant [7].

Moreover, its multilingual processing capabilities cover a wide range of languages. It deeply understands cultural differences, allowing it to accurately translate unique cultural elements into idiomatic expressions and convey puns from the original text [3]. Additionally, ChatGPT effectively understands and addresses various language tasks in translation, providing accurate and useful results that support foreign language education and research [6].

2.1.3. Dochero.ai website

Dochero.ai offers various language style options, such as professional, academic, business, friendly, and colloquial. This allows users to select the most suitable style based on their specific needs, ensuring that translations adhere to the desired tone and format, which enhances the practicality and accuracy of translations.

With advanced AI technology, particularly in deep learning and natural language processing, Dochero.ai significantly improves translation accuracy. It can precisely convert vocabulary and

syntax while deeply understanding and preserving the cultural context and semantic nuances of the original text. This capability excels in handling complex sentence structures, industry-specific terminology, and cross-cultural translations, ensuring high quality and fluency in the translated texts.

Dochero.ai also pays special attention to cultural differences between languages. It can identify and retain cultural elements from the source language during the translation process and cleverly transform them into equivalent expressions in the target language, making translations more authentic and in line with the target culture's conventions.

2.2. The Reasons of the Chosen Book

The reasons why the authors chose content from the renowned French novel *The Little Prince*, written by Antoine de Saint-Exupéry due to the book's rich philosophical insights and profound educational significance. (Refer to Table 1 for the specific selection of text segments.) *The Little Prince* narrates the journey of a young prince who resides on planet B612 as he explores the universe, with the pilot, "I," serving as the storyteller. Through interactions with the Little Prince, "I" gradually recognizes the absurdities of the modern material world, the arrogance of adulthood, and the emptiness of the spiritual realm. As the Little Prince shares his experiences, the narrator's personality evolves through their dialogues. Notably, the pilot "I" represents Saint-Exupéry himself. Through this enchanting exchange with the "world of innocence," the author critiques contemporary societal values, exposing the arrogance and stubborn selfishness of adult society [8].

Table 1: The French text selected by the author requires translation.

Serial Number	French Sentences	Concept
1	Quand on est tellement triste on aime les couchers de soleil.	This passage reflects the loneliness and sorrow of the Little Prince. The sunset symbolizes inner solace and beautiful moments. When one feels sadness, they are often drawn to the beauty of nature.
2	On ne voit bien qu'avec le coeur. L'essentiel est invisible pour les yeux.	This statement unveils the core philosophy of the Little Prince: what truly matters is invisible and can only be perceived through the heart. It conveys a classic expression of learning to feel love with the heart.
3	Le plus important est invisible.	It emphasizes that intangible emotions and values are more significant than external material goods, conveying that what remains unseen often holds the most cherished thoughts.
4	On n'est jamais content là où on est.	It mirrors a universal human phenomenon: dissatisfaction with the present and a yearning for the unknown. Through this statement, the Little Prince expresses profound observations on human anxiety.
5	Tu deviens responsable pour toujours de ce que tu as apprivoisé.	It articulates the close connection between responsibility and relationships. The Little Prince believes that once we establish a bond with a being or object, we must care for it for a lifetime.
6	C'est bien d'avoir eu un ami, même si l'on va mourir.	This statement highlights the importance of friendship; even if life is brief, the existence of friendship itself brings meaning and comfort.
7	Je ne savais pas trop quoi dire. Je me sentais très maladroit. Je ne savais comment l'atteindre, où le rejoindre. C'est tellement mystérieux, le pays des larmes.	It portrays the feeling of helplessness and complex emotions when faced with another's suffering. The "Land of Tears" symbolizes the unknown and difficult-to-express depths of emotions.

Table 1: (continued).

8	Il est bien plus difficile de se juger soi-même que de juger autrui. Si tu réussis à bien te juger, c'est que tu es un véritable sage.	This passage underscores the significance of introspection. The Little Prince asserts that self-reflection is much harder than judging others, with true wisdom lying in the ability to recognize oneself.
9	Si tu aimes une fleur qui se trouve dans une étoile, c'est doux, la nuit, de regarder le ciel. Toutes les étoiles sont fleuries.	Using stars as a metaphor, the Little Prince expresses the emotional connection between individuals and their loved ones. Despite physical distance, one can still feel each other's presence through imagination and memory.
10	Quand tu regarderas le ciel, la nuit, puisque j'habiterai dans l'une d'elles, alors ce sera pour toi comme si riaient toutes les étoiles.	This passage connects stars with laughter, endowing the night sky with warmth. When we lose loved ones, finding a symbol allows them to "continue existing," providing profound solace.

These classic quotes resonate because they express the profound reflections of the Little Prince on life, love, responsibility, loneliness, and human connections in concise language. Through these phrases, the author helps readers recognize that the truly important aspects are often invisible, perceived only through the heart. Additionally, they convey themes of friendship, a sense of duty, deep ties between humans and nature, and philosophical contemplation when confronting grief and confusion in life. These sentences touch the heart, as they evoke a resonance and deep reflection on the essence of existence.

2.3. Translations

To ensure the consistency and comparability of translation results, this essay will uniformly utilize three AI translation tools: ERNIE Bot, ChatGPT 4.0, and DoChero.ai, to conduct French-to-English translations of selected text segments. During the translation process, this essay will adhere strictly to a unified input format standard. For this exercise, authors will employ the CRISPE directive format: C, R: "Capacity and role," assigns a role to the AI translation tool, allowing the AI to have an identity awareness, which enhances the accuracy of the translated content.

I: "Insight," aids the AI translation tool in comprehending its role, enabling insight into the cultural context of the original text, reducing literal translations, and ensuring the translation is more accurate and authentic.

S: "Statement," provides the AI with key details before translation to minimize error rates.

P: "Personality," expresses the desired style and characteristics for the AI output, aiming for a professional, reliable, and user-friendly persona. The output should be concise and clear, while maintaining politeness and respect, catering to users from diverse cultural backgrounds. This can guide the design of translations to make them educational.

E: "Experiment," allows users unsatisfied with the translation to try commands and generate multiple outputs for testing.

The directive designed based on the CRISPE format is as follows:

You are an experienced French-to-English translator in the education sector. You hold multiple translation certificates and have achieved high scores on various translation exams. With extensive experience in French-to-English translation, you need to accurately convert French educational articles into English, emphasizing the transmission of educational content. Delve into the educational and cultural contexts, avoiding literal translations, ensuring that the final text is idiomatic and easily

comprehensible. Understand the cultural background, prioritize authentic expressions, and avoid obscure language. Your translations must meet the criteria of “faithfulness, expressiveness and elegance”, while also ensuring readability for children. Focus on innovative education and child development in the articles, highlighting educational meaning and child-friendliness. Maintain a professional and approachable style that engages readers on education topics. Adjust translations based on user feedback to ensure quality until satisfaction is achieved. Continuously monitor translation efficiency and accuracy.

2.3.1. Grammatical Accuracy Assessment: Utilizing the Grammarly Online Language Evaluation Platform

Its advantages include ease of use, a rich vocabulary, and broad applicability.

Grammarly's automated writing assessment system utilizes generative artificial intelligence. Initially, the automated writing assessment system offered users comprehensive writing support through features such as grammar checks, spelling corrections, and style suggestions [9]. It employs AI technology to rectify grammatical errors and optimize sentence structure while providing editing and enhancement recommendations for academic writing [10].

2.3.2. Content Fidelity Analysis

Based on grammatical analysis, further examine the educational significance conveyed by the translated content, the accuracy of technical terminology translation, and the completeness of information. By comparing the original text and the translated version, identify and document any potential information omissions or misunderstandings to thoroughly assess the quality of the translation.

After translation, we will utilize the Oxford English Dictionary's definitions to verify the accuracy of the English lexicon. The dictionary provides comprehensive word meanings along with numerous example sentences. These examples assist users in understanding word usage in various contexts, ensuring precision in comprehension by the post-translation editor. Furthermore, the Oxford Dictionary compiles its entries from extensive corpora, reflecting the evolution and development of the English language. This offers the most precise and timely lexical definitions, thereby mitigating any potential deviations or misunderstandings during the translation process.

2.3.3. Public Assessment - Questionnaire Survey

The target respondents for the questionnaire primarily consisted of native English speakers and university English instructors. The survey was distributed online over the course of one week, ultimately yielding 40 valid responses.

3. Result

3.1. A Comparative Analysis of Three Translation Platforms

The authors selected two representative sentences for analysis. Table 2 shows the first French text and the three translations.

3.1.1. The First Sentence

Table 2: Translation results of Text One

French text	Quand on est tellement triste on aime les couchers de soleil.
ChatGPT Translation	When we are so sad, we find comfort in watching the sunset.
dochero.ai Translation	When one feels immense sadness, one finds solace in sunsets.
ERNIE Bot Translation	When we're extremely sad, we find solace in sunsets.

- Grammatical Accuracy:
 - ChatGPT: Utilizes a combination of subject and linking verb, clearly articulated; the combination of predicate and object complements accurately conveys the emotional essence of the original text.
 - Dochero.ai: Similarly adheres to English grammatical rules. The parallel predicate structure reflects formality while maintaining sentence balance.
 - ERNIE Bot: Its translation is concise and clear; "find solace in" aligns with ChatGPT and Dochero.ai's translations, conveying the same sentiment. However, Grammarly critiques the pairing of "extremely sad" as suboptimal.
- Content fidelity
 - ChatGPT: Its translation, while emotionally fitting, uses "comfort," which is semantically broader than "aimer." It leans more towards seeking solace rather than pure affection. Thus, this translation deviates slightly in content fidelity.
 - Dochero.ai: This translation accurately captures the emotional nuance of the original text. The term "solace" conveys both comfort and an implicit affection for the sunset. Furthermore, the use of "immense sadness" enhances the emotional depth, aligning the translation closely with the original.
 - ERNIE Bot: Its translation bears similarity to Dochero.ai and accurately communicates the original's emotional essence. However, "extremely sad" may lack the emotional intensity of "immense sadness," though it still maintains a high level of content fidelity.
- Comprehensive evaluation

In summary, the three translations excel in grammatical accuracy and content fidelity. However, in the nuances of content fidelity, Dochero.ai's translation more effectively conveys the emotional depth and imagery of the original text through the combination of "immense sadness" and "finds solace in sunsets." Although the translations by ChatGPT and ERNIE Bot also successfully communicate the original meaning, they fall slightly short in the subtlety of emotional expression. To further enhance translation quality, one might consider selecting vocabulary and expressions that closely align with the original context while maintaining the emotional undertones. For instance, adjusting "find comfort/solace in watching sunsets" to "find beauty and solace in sunsets" could more comprehensively reflect the simultaneous emotion of "fondness" and "comfort" present in the original text.

3.1.2. The Second Sentence

Table 3 shows the second French text's translation results from various AI platforms.

Table 3: Translation results of Text Two

French text	On n'est jamais content là où on est.
Chatgpt Translation	We are never satisfied with where we are.
dochero.ai Translation	One is never satisfied where one is.
ERNIE Bot Translation	We are never content where we are.

- Grammatical Accuracy

ChatGPT translation: The translation exhibits correct grammar, clear structure, and no grammatical errors.

Dochero.ai translation: The translation contains no grammatical mistakes and features complete sentence structure.

ERNIE Bot translation: The translation demonstrates perfect grammar, clear structure, and precise word choice.

- Content Fidelity

ChatGPT's translation expresses the core meaning of the original text, indicating that "we are never satisfied with our current state." However, the term "satisfied" leans more toward fulfillment rather than the inner peace or deeper dissatisfaction suggested in the original text. Despite this, the difference is acceptable in most contexts and does not hinder overall comprehension.

Dochero.ai's translation also conveys the essence of the original message. However, it employs the subject "One," which, while grammatically correct in English, may lack the warmth and relatability of "We" in informal speech and emotional expression. This choice slightly impacts the directness of the message conveyed.

The translations of ERNIE Bot remain highly faithful to the original content. It uses "content," which corresponds directly to the original term, accurately reflecting the philosophical significance and emotional undertone of the text. This approach preserves the essence of the original while aligning with the reading habits and understanding of English-speaking audiences.

- Comprehensive evaluation

From the perspectives of grammatical accuracy and content fidelity, all three translations achieve a commendable standard. However, in the nuances of content fidelity, the translation by ERNIE Bot captures the original text's deeper meanings and emotional undertones more effectively by precisely selecting the term "content." Thus, it excels in this dimension. The translation by ChatGPT, while fluid, employs the term "satisfied," which is somewhat generic and fails to fully convey the philosophical implications of the original text. Meanwhile, Dochero.ai's translation, though grammatically impeccable, employs "one," which renders the emotional expression somewhat rigid.

3.2. Results from the Professionals' Survey

The investigation of ten texts reveals that Dochero.ai's translations outperform those of ChatGPT-4o and ERNIE Bot, with Dochero.ai excelling in seven out of ten questions. This study finds commonalities in the translation approaches of ChatGPT and ERNIE Bot: both strive to deliver concise and meaningful translations that effectively convey the educational emotions and implications of the original texts. However, variations in translation accuracy will influence public preferences. Most participants regard Dochero.ai as placing a greater emphasis on lexical and syntactic diversity in educational passages, using more vivid language. Notably, the majority of participants agree on the grammatical and content evaluations of translations across different

platforms. Nevertheless, this does not imply that one tool excels in all scenarios, as translation quality also depends on factors such as the complexity of the source text, contextual understanding, and cultural nuances. Therefore, in practice, one must select an appropriate translation tool based on specific needs and contexts and may still require human proofreading and corrections.

Furthermore, as noted in the introduction, the translation of specific texts should not rely solely on AI tools; rather, human-AI collaboration represents a crucial trend in the future of translation. By integrating human insight with AI efficiency, we can further enhance the quality and effectiveness of translations.

4. Discussion

Based on translation quality analysis and survey results, this study will comprehensively evaluate the performance of three AI tools in French-to-English translation within the educational domain. Through analysis of the translations, it is evident that ChatGPT's translations are highly complete, with virtually no grammatical or lexical errors. Dochero.ai tends to be somewhat verbose in translating certain sentences. The translations of ERNIE Bot require improvement in sentence conciseness and lexical accuracy. It is hoped that future versions of Dochero.ai will gradually optimize sentence structures, enhance conciseness, and reduce the use of long and complex sentences. ERNIE Bot, on the other hand, needs further refinement in vocabulary collocation. Additionally, this study discusses the application prospects and development directions of AI translation technology in the educational field, providing references for related research and applications.

5. Conclusion

Through this study, it is found that all three AI translation platforms can accurately convey the meaning of the original educational text. However, in terms of word choice and sentence structure, ERNIE Bot slightly lags behind. In contrast, ChatGPT and dochero.ai perform well in these two aspects, meeting the current requirements for translations in translation work. The main contribution of this paper is to facilitate educators in selecting AI translation platforms for translation tasks. However, the research also highlights that post-editing is an important aspect that cannot be ignored. Finally, this study has some limitations, as the majority of respondents were female and mostly confined to the 19-25 age group. We hope that future studies can address these limitations and that AI translation tools can continue to improve the accuracy of translations.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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