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The Role of Artificial Intelligence in enhancing translation quality
(دور الذكاء الاصطناعي في تعزيز جودة الترجمة)

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الملخص :

ركز هذا البحث بشكل أساسي على دراسة تأثير أدوات الذكاء الاصطناعي على تحسين جودة المحتوى المترجم، مع التركيز على الدقة والمفردات والأسلوب اللغوي. وخلصت الدراسة إلى أن الترجمة باستخدام الذكاء الاصطناعي تُعدّ شكلاً من أشكال الترجمة الوسيطة، وأن استخدام هذه التقنيات يُمكّن المترجمين من تقليل مستويات التوتر الذهني لديهم، وبالتالي إنتاج ترجمات بجودة أفضل مما لو كانت الترجمة بدون استخدام الذكاء الاصطناعي. ولتحليل هذه الظاهرة، استُخدمت منهجية شبه تجريبية، حيث خضع 15 مترجمًا لخمس دورات تدريبية منظمة. وخلال كل دورة، تعرّف المترجمون على استخدام أدوات الذكاء الاصطناعي في جميع مراحل عملية الترجمة (مرحلة ما قبل الترجمة، ومرحلة الترجمة، ومرحلة ما بعد الترجمة). وأظهرت نتائج التحليل تحسنًا ملحوظًا في دقة المترجمين أثناء الترجمة، وكفاءتهم في اختيار الكلمات، واتساق أسلوبهم في الكتابة عبر مختلف الترجمات.

الكلمات المفتاحية : الذكاء الاصطناعي ، تعزيز ، جودة الترجمة، تأثير، منهجية.

Summary

The main focus of this research was an investigation into the impact that AI (Artificial Intelligence) tools have on improving the overall quality of translated content with the sub focuses being Accuracy, Lexis and Linguistic Style. The study found that translating through use of AI translates as a form of mediated translation and that by utilizing these technologies, translators can reduce their cognitive stress levels and therefore produce better quality translations than they did without the aid of AI Technology. In order to analyze this phenomenon, a quasi-experimental methodology was used where there were five structured training sessions over a period of 15 translators. During each training session translators were introduced to using AI-assisted tools throughout the translation process (pre-translating phase, while translating phase, post translational phase). Analysis results showed significant increases in the translators' accuracy when translating, proficiency with word choice and consistency with regards to their style of writing across multiple translations.

Keywords: Artificial intelligence ،enhancing ، translation quality ،Impact methodology ،

Introduction

Translation is a major part of cross-cultural communication; it plays a very important role in helping people communicate effectively with each other, regardless of their native languages or cultural differences. The act of translating enables the transfer of ideas,

knowledge, and information between individuals speaking differing languages; as a result, translation creates greater mutual understanding and cooperativeness between individuals who belong to different cultures. Translation is increasingly becoming important for international diplomacy, international business, international education, and international media as our world continues to develop into a more globalized society; therefore, translation is used to provide accurate and culturally sensitive communications across national borders. Translation breaks through the barriers created by having different languages by increasing inclusivity, improving accessibility, and increasing knowledge transfer; thus, translation is vital in creating an increasingly interconnected and peaceful global society.

The authors of Alrishan & Smadi's report (2015), EFL students have substantial difficulties when attempting to translate English idioms into Arabic. Alqaed highlights various challenges Arab EFL learners face in translation, including lexical errors, semantic errors, and syntactic errors; many of these challenges result from the limited availability of collocation dictionaries, as well as from differences in idiomatic expressions across languages.

It is easy to see from all of these difficulties that traditional methods for translating have created some problems, including time limits, personal perceptions, consistent structure, and total precision. Due to these issues, there has been an increase in AI technology and its ability to improve the overall quality of translations and make workflow easier while= solution to the different languages (Kassem, 2021).

AI may also assist in overcoming many of the challenges associated with translating materials by taking into account the various nuances of languages, uncertainties due to the context of language, and cultural differences that typically are key elements for providing quality translations. (Pietrzak, & Kornacki, 2020).

This research builds on previous research into how effective artificial intelligence (AI) is at translating. Its focus is on using AI as an intermediary or assistant to improve overall translation quality. The research looks at how AI-based tools help EFL learners improve their translations in terms of accuracy, vocabulary usage, and how they use language consistency by giving them a space where they can practice translating or use some other way of interacting with the translation process. In addition, the research will look at how AI relates to human expertise to show how new AI-based translation technology relates to human practices related to translation. Ultimately, this research is designed to provide the best-quality translated material possible..

Statement of the problem

As a means of communication between different cultures, translation is an essential element in facilitating contact between people who speak different languages and sharing information, ideas, and knowledge globally. Traditional approaches to translation have faced challenges in providing a consistently accurate translation, having difficulty in

conveying nuance and cultural meaning; and processing large amounts of text. These challenges can negatively impact the overall quality of the translated text, especially for specialized translations that require high levels of accuracy and an understanding of the text's context. Consequently, the advent of Artificial Intelligence (AI) has generated exciting new opportunities for improving translation quality, including the use of neural machine translation systems and computer-aided translation. The purpose of this research is to explore how AI is being utilized to enhance translation quality and to evaluate the methods by which AI is enhancing the quality of translations.

Hypotheses of the Study

The primary hypothesis analyzed in this study was, "AI translation tools significantly enhance the quality of translations".

This aforementioned was further divided into following supplementary subsections:

- Machine learning powered translator techniques significantly improve interpretation effectiveness.

- The uniform nature of style of language translated texts can be substantially improved due to AI- based translations technologies.

- Conventional linguistic word – level proficiency is greatly improved by artificial intelligence translations systems.

Literature Review

1- Accuracy of Translation

Definitions

The process of performing an origin text into a single language and then generating an analogous source text from another while retaining what it originally meant is recognized to be the standard linguistic translation (Warwal, 2015).

In recent years, the definition of translation has changed significantly, meaning that it can now include a wider variety of areas, such as Psychology, Sociology and Philosophy, in addition to its traditional connection with Language Studies (Linguistics) (Kolawole 2013). It has also been identified as an interdisciplinary science incorporating artistic and cognitive aspects, so requiring elements such as creativity, knowledge of language and problem-solving abilities (Hassan 2014). Thus, although translation is not necessarily a mechanical process; it is an ever-changing process, which allows it to adapt to cultural and contextual variations. (Gambier 2018).

This new research emphasizes the use of translation as a step-based process that requires a systematic sequence of actions and mental activities to produce different types of written and spoken material by moving a document from one (source) language

(SL) to another (target) and creating an accurate translation that keeps the same meaning, style, and intent as the source document but has been modified to meet the linguistic requirements and cultural expectations for use in the target audience's environment.

The Process of Translation

The act of translation is regarded as either a technique product (the process of performing translation) or the ultimate outcome (the actual completed text). Scholars as Beeby (2002) along with Nord (2018), suggested that to be effective at translating requires specialized skills:

- Understanding of specific contexts, structure of texts , and standard translation primary objectives.
- Observing the semantic distinctions that exist between the target and source languages is sometimes classified as contrastive and standard competence in the language.
- Acceptance differences in logical structure and genre classification over spoken and written languages.
- Integrating the cultural and pragmatically variances between source and target dialects is an important aspect of additional linguistic competence. (Newmark, 1988,p.19).

The processes related to Translation are numerous and include both cognitive activity from the effort of translating (conscious and unconscious) along with the observable steps from the time a client contacts a Translation Agency until the client is satisfied with the results of their request. According to Pym (2020)"The processes we are interested in are as much social as they are cognitive" . Robinson (2020) emphasizes the conceptual and interpersonal aspects of the conventional translation process, whereas Yamada (2019) has identified three stages: the pre-translation phase, translation, and post-translation phase.

To summarize interpretation as a processing and response-based process. The primary element for achieving successful translation gains an understanding the material being translated as well as taking action to create a successful outcome. Therefore, translation consists of two major components: comprehension and interpretation. While the process is very much multidimensional and much more complicated than described here, there are several stages within the translation process; including, but not limited to evolution, synthesizing, corrections, as well as standard assurance.

2. The Function of Artificial Intelligence in Enhancing Translation Quality

Artificial Intelligence (AI) is growing increasingly significant in educational institutions, news media, and policymakers in response to the ensuing second revolution in industry. As more and more people use their smartphones and online translation programs to communicate across different languages, they are bridging many of the gaps that currently exist between different language systems and cultures. According to Yang (2022), as the quality of automated translation tools has improved, a new type of translation has emerged called artificial intelligence translation. While machine translation applications are providing many more opportunities for equivalence to human translators, their critics have pointed out that the performance gap between these two processes remains vast (Li, et al. 2020).

Automated translation is accomplished thanks to many forms of advanced technology such as machine learning (ML) and neural networks. Automated and semi-automated translations can be produced using new technologies to translate audio, visual and textual content from one language into another. **King, 2019; Liu, 2022,** indicate that AI-Enabled automated/transitional solutions improve translation efficiency, accuracy and availability to provide users with a means of communicating easily with people who speak different languages from different cultures through a single medium (i.e., via digitally-transmitted mediums).

AI's Significance in Translation

Companies, industry sectors, as well as people have the ability to benefit substantially through AI-powered interpretation since it:

- The concept of artificial intelligence (AI) methods improve translation speed by providing a fast transcription in huge volumes of written content. This refers to essential to multinational businesses (Wei, 2022; Wilss, 2014). Automated translations also provide multi-fold cost savings, as costs associated with human labour are diminished allowing for business resources to be allocated elsewhere (Tao & Wang, 2023). Additionally, AI's translation tools bridge the gap and will help facilitate forms of international collaboration and cultural exchange due to the interactions created through these language barriers (Liu, 2022).

- The use of AI has raised questions about whether humans will be displaced from their jobs as translators due to machine learning algorithms .Liebling et al.(2020) state that ethical issues are also raised about how data is handled and how well the results of translations will hold up in complicated situations like legal and medical documents.

- Machine learning revolutionizes the language translation service industry through the enhancement of interpretation accuracy, effectiveness, and general availability.

The use of artificial intelligence has drastically changed the world of translation with its ability to work faster and improve workflow efficiency. Through these improvements, we

can also communicate in real-time worldwide through easier communication options and new ways for translators to work with AI tools. These advancements have allowed people from all over the world to connect, as well as to have greater supply of bilingual resources. (Tao and Wang, 2023;Wei 2022).

Participants in the Research Design

A group of fifteen pupils from the faculty of arts at an Iraqi university are registered in standard interpreting and linguistic study courses .The participants had been chosen intentionally and were familiar with the fundamental principles of translation.

Methods for Collecting Data

This study will assess how AI translate tools can effect students translating accurately. First student translations will be measured via pre-test. Then students will take part in an orientation, and then participate in three translation sessions, during which they will use AI translate tools to practice translating several documents. Each of these sessions was four hours long. During the pre-translation phase of the sessions, students will use AI to build knowledge, create a glossary and term list, and clarify the idiomatic expression and contextual meaning of text being translated. The while-translation phase will consist of actually Translation with the aid of AI, while continually monitoring to confirm the accuracy and context of the translation. Once the translation is complete, it will be evaluated for its correctness and context applicability before students modify it in order to satisfy quality requirements that have been established. The original text will be examined thoroughly for correct grammar, style, and cultural appropriateness in the translation verification process. Additional tools to aid with proofreading are already available through AI-based technologies (i.e., Grammarly). After each class, learners use a rubric evaluation to assess their translated texts. The evaluation is based on rubrics that measure how well the translated text meets critical quality measurement criteria (i.e., accuracy and consistency; suitability of style). As long as a rater is the same, three different raters evaluate the same one for the learner's translation performance. The collection and analysis of quantitative data was conducted using a variety of statistical techniques.

Translation Quality Assessment Rubrics

To ascertain the quality of translation, a set of rubrics has been established, which include clearly defined performance indicators. Various key characteristics have been included in these rubrics, including accuracy, vocabulary, and consistency of style. For each characteristic, there are currently four categories of assessment grade levels: which are excellent (4), good (3), adequate (2), and weak (1). Utilizing the guidelines , an overall rating of 48 marks may be generated.

Data Collection and Evolution

Preceding applying artificial intelligence language processing machines ,users were offered an initial test evaluate their abilities, and the results seemed reported .The act of translating standard evaluation criteria subsequently were employed to gauge student performance on AI-powered stand linguistic translation tests .The scope of enhancement to the quality of the translation was calculated through keeping records and combining the results for all activities.

Results

The primary research question that was sought to be answered through this analysis was whether there will be an increase, or enhancement, in translation accuracy. A significant improvement to accurate translation was predicted via the initially proposed theory. The investigator studied the results of the statistical outcomes of the students' performances in the reliability component in an effort to validate this theory . test this hypothesis, the researcher analyzed the statistical results .The first table illustrates the descriptive statistic associated with the performance of learners computed using the One-Way based ANOVA assessment among each of the four tests.

Table one:The Descriptive Statistic

Accuracy	N.	Mean	StD
Task 4	15	13.93	4.447
Task 3	15	11.60	4.084
Task 2	15	10.20	5.583
Task 1	15	9.33	5.67

Table one illustrates it obvious that ,during the initial measurement to the last standardized evaluation tests, the mean average scores of the students' performances decreased.

Table two: Analysis of ANOVA Statistic

Dimension	Variance	Sum of Squares	DF	Mean Squares	F	Sig.
Accuracy	Between tasks	286.467	3	95.489	3.824	0.05
	Within tasks	1398.267	56	24.969		
	Total	1684.733	59			

The calculated F-value (3.824) for the learners' mean accuracy level scores is statistically significant at an alph level of 0.05 with degree of freedom (56).This indicates that there is significant distinction in the learners' accuracy level scores between different tasks, the Tukey test, which stands to supply post-hoc based comparison was employed in order to identify if learners' accurate level scores were different from other learners.

Table three: Comparative task tests

Tasks	Task 1	Task 2	Tasks 3	Tasks 4
Tasks 1		2.33	4.73	5.60*
Tasks 2	-2.33		2.40	3.267
Tasks 3	-4.73	-2.40		0.867
Tasks 4	-5.60*	-3.267	-0.867	

It could be revealed from The preceding table presented an increase of statistical significance in performance from the first task to the fourth task (average difference = 5.60, $p < 0.05$). These were notable differences between the first task and fourth (average difference = 4.73, $p < 0.05$)..

As stated by hypothesis two, lexical proficiency in English translation was supposed to greatly increase. To support this hypothesis, a One-Way ANOVA test was used by the researcher to analyze the students' performance statistical results for English translation in terms of their performance on tasks 1-4. Table 4 shows a statistical description of the learners' performance.

Table four: Statistical Description

Lexical	N.	Mean	Std
Task 4	15	14.0000	2.90320
Task 3	15	12.6667	4.74593
Task 2	15	9.6444	6.19293
Task 1	15	8.133	6.00952

The results shown in table four clearly indicate an increase in the mean scores of the students' performance across all three of the assessment tasks ,demonstrating that the AI-supported environment has positively affected the students' vocabulary and translation proficiency.

Table five: Statistical Analysis

Dimension	Variance	Sum of Squares	DF	Mean Squares	F	Sig.
lexical proficiency	Between tasks	640.133	3	213.378	8.096	0.05
	Within tasks	1475.867	56	26.355		
	Total	1475.867	59			

The data in table's five shows F-value of (8.096) at df of (56) for the level signification at 0.05 which indicates that there is a statistically significant difference between mean scores of the learners who exhibited lexical proficiency at a 0,05 level of signification. To establish the variation and their degree of significance among the assignments, the Tukey test for post-hoc comparative analyses was employed.

Table six: post-hoc comparative

Tasks	Task1	Task 2	Task 3	Task 4
Task 1		4.33	7.067*	8.600*
Task 2	-4.33		2.733	4.26667
Task 3	-7.067*	-2.733		1.533
Task 4	-8.600*	-4.267	-1.53	

Previous table shows improvements in Translation Lexical Proficiency between both the first task and fourth task (mean difference = 5.60, p <.005). Significant differences were seen between the first and third task (mean difference = 7.067,p <.005), as well as between the first task and fourth task (mean difference = 8.600, p < .005). All other task comparisons showed no statistically significant differences.

Hypothesis three predicted that there would be an increase in the consistency of student language style. To investigate this, the researcher used the One-Way ANOVA test to analyze and compare the statistical results from each of the four tasks across all

students in the consistency of style dimension. The statistical results describing the students' performance are provided in Table seven.

Table seven: Descriptive Statistics

Consistency	N.	Mean	Std
Task 4	15	15.0667	2.65198
Task 3	15	13.5333	2.76176
Task 2	15	11.1333	2.45312
Task 1	15	8.5333	2.60012

The data in table seven displays a substantial increase in the average scores of student achievement on the evaluation tasks throughout the particular time that is represented in the table, which indicates that the artificial intelligent productively supported a role in the advancement of a standardized linguistic manner in English translation performance.

Table eight: Statistical Analysis of ANOVA

Dimension	Source of Variance	Sum of Squares	DF	Mean Squares	F	Sig.
Consistency of language style	Between tasks	1807.6	3	602.53	5.856	0.05
	Within tasks	5762.133	56	102.895		
	Total	1475.867	59			

According to table eight, with an F-value of 5.856 tested for 56 degrees of freedom and a significance of .05, a statistically significant difference was determined at the.05 level among the average score of participants in terms of consistency of language style. To find out how the tasks differed in score from each other, as well as whether or not those differences were statistically significant, a Tukey test was performed for post hoc comparisons to evaluate the results of the analysis.

Table (9) post-hoc comparisons results

Tasks	Task1	Task 2	Task 3	Task 4
Task 1		9.533	11.933*	14.533*
Task 2	-9.533		2.40000	5.000
Task 3	-11.933*	-2.400		2.600
Task 4	-14.533*	-5.000	-2.600	

According to the previously mentioned table, there was a substantial improvement in terms of language structure accuracy among the explanations between task one and task four, that contributed to quantitatively notable differences whenever contrasting students performing tasks on both tasks one and three (average difference = 11.933. p (0.05); students doing task one compared to student doing task four (average difference = 14.533; $p < 0.05$)). Most performance contrasts failed to identify results considered to be significant for purposes. These results demonstrate that learners' consistency regarding style in translation increased with targeted practice within the AI supported environment.

Discussion of Study Results

According to results from this research study, employing AI as an assistant translation tool provides noticeable improvements in the quality of translated documents due to improvements in translation accuracy, lexical proficiency and language style consistency across multiple stages of the translation process. The results of this study support earlier research showing that AI translation tools are able to utilize great deal of information to determine the context associated with a particular language , thereby decreasing the possibility of using both literal and outside the text versions (Tao & Wang, 2022). Artificial intelligence offering immediate feedback suggestions and correcting errors capabilities to help the translators recognize and rectify errors throughout the translation process. It helps to ensure the translator continues to have an accurate document during the iterative review/refinement stage of the process. (Liu, 2022). The research findings regarding improvements correspond to many of the theoretical frameworks presented. Cognitive Load Theory suggests that AI use alleviates cognitive load on translators because they can automate many of the menial or repetitive aspects of the translation process and receive real-time suggestions, as such allowing translators to attend to the more complex decisions of expression, style, and so on (Sweller, 1988). Vygotsky's (1978) Zone of Proximal Development also supports AI as a medium that

assists the translator in successfully completing tasks that would otherwise be beyond their ability by furnishing them with additional resources and through automation. Finally, AI integration presents a complementary process for completing the analysis, transfer, and synthesis stages within the overall direct/indirect translation processes, as articulated by current translation process theorists such as Martin (2018).

In summary, AI is able to improve translation results greatly as an assistive tool through the enhancement of translation quality in terms of accuracy, lexical skill, and stylistic coherence. These results indicate the importance of AI applications being used in translation workflows while stressing the importance of human input to handle both culture-specific elements and complicated contexts. Further studies might offer into methods to optimize AI to human interaction in addition to the ongoing impact of AI can have regarding standard interpreting productivity.

Suggestions

Due to the results of this research, it is highly suggested that:

- Encourage students in translation to use AI tools for automating certain types of work, such as looking up terms or suggesting phrases, to decrease cognitive load on the learner and improve the accuracy of translation as well as reduce lexical errors in the target language. Design training workshops and create programs for “remedial” training of learners so that they improve their proficiency in translation and therefore improve their quality of translation by learning to use various types of AI-based tools in their translation programs; these would include developing technical skills with the use of these tools and developing language skills.

- Conduct additional inquiries into how human translators utilize their interpretative abilities while using an AI tool, in order to pinpoint places that AI may provide increased support for complex decision-making. - Research how AI may also act as a scaffolding mechanism to assist less experienced translators make progress on more difficult assignments..

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