University of Zawia - Faculty of Arts Journal (UZFAJ)
Volume 25, Issue 2, (2025), pp. 116 -125, ISSN: 2521-9235

Towards a Modern Curriculum in Translator Training: Integrating Machine Translation with Translation Memory and User Feedback

Mustafa Abdullah Abdulrahman Bashir

Faculty of Arts and Languages – Department of Translation and Arabization – University of Tripoli

Tripoli- Libya
Email: Mu.bashir@uot.edu.ly

Received 16./05./2025 | accepted 20./07./2025 | Available online 15./09./2025 | DOI: 10.26629/uzfaj.2025.08

ABSTRACT

This research paper examines how machine translation (MT) integrated with translation memory (TM) can help translators translate sentences that do not have equivalents in the translation memory database. Machine translation tools (CAT) currently provide a suitable environment for translation students by providing many of the necessary tools. Using MT integrated into translation tools can enhance translator productivity and improve the translation process. This research paper aims to shed light on the challenges students face in applying MT tools in English-to-Arabic translation and to gain their opinions about these integrated tools. The pilot study was conducted using the MT-assisted program (Mate CAT). The participants were students in their final semester at the Translation Department at the University of Tripoli. They were presented with a scientific text to translate from English to Arabic, and the advantages of using Mate CAT were recorded, as well as any problems that might hinder the process. A post-experimental questionnaire was conducted to gain students' opinions about the integration of MT and TM. The study concluded that more than 50% of participants revealed the usefulness of the CAT tool in training translators. Similarly, more than 50% of students found the integration of MT to be Machine translation and translation memory are very useful in the translation process**.**

Keywords: Translator Training, Teaching Translation, Translation Memory, Machine Translation.

نحو منهاج حديث في تدريب المترجمين: دمج الترجمة الآلية مع ذاكرة الترجمة وأراء المستخدمين

مصطفى عبد الله عبد الرحمن بشير

كلية الآداب واللغات –قسم الترجمة والتعريب – جامعة طرابلس
طرابلس –ليبيا
Email: Mu.bashir@uot.edu.ly

تاريخ الاستلام:2025/05/16 **تاريخ القبول:2025/07/20** **تاريخ النشر: 2025/09/15**

ملخَّص البحث:

تتناول هذه الورقة البحثية كيف يمكن للترجمة الآلية (MT) المدمجة مع ذاكرة الترجمة (TM) مساعدة المترجمين في ترجمة الجمل التي لا مقابل لها في قاعدة بيانات ذاكرة الترجمة، توفر أدوات الترجمة الآلية (Cat Tools) حاليًا بيئة مناسبة لطلاب الترجمة من خلال توفير العديد من الأدوات اللازمة للمترجم. كما يمكن أن يعزز استخدام الترجمة الآلية المدمجة في أدوات الترجمة إنتاجية المترجم ويحسن عملية الترجمة. تهدف هذه الورقة البحثية إلى تسليط الضوء على التحديات التي يواجها الطلاب في تطبيق أدوات الترجمة الالية في الترجمة من الإنجليزية إلى العربية ومعرفة أراءهم حول هذا الادوات المدمجة. أُجريت الدراسة التجريبية باستخدام برنامج (ميتكات) المدعوم بالترجمة الآلية. كان المشاركون طلابًا في الفصل الدراسي الأخير بقسم الترجمة بجامعة طرابلس. قُدِّم لهم نص علمي لترجمته من الإنجليزية إلى العربية، وسُجِّلت مزايا استخدام ميتكات، بالإضافة إلى أي مشكلات قد تعيق العملية. كما أُجري استبيان بعد التجربة لمعرفة آراء الطلاب حول دمج الترجمة الآلية وذاكرة الترجمة. وخلصت الدراسة إلى أن أكثر من 50% من المشاركين كشفوا عن مدى فائدة أداة الترجمة بمساعدة الحاسوب في تدريب المترجمين. وبالمثل، وجد أكثر من 50% من الطلاب أن دمج الترجمة الآلية وذاكرة الترجمة مفيد جدًا في عملية الترجمة.

الكلمات المفتاحية: تدريب المترجمين، تدريس الترجمة، ذاكرة الترجمة، الترجمة الآلية.

1. Introduction

Machine translation (MT) is the area of natural language processing (NLP) that focuses on obtaining a target language text from a source language text by means of automatic techniques Costa-jussà and Fonollosa(2014). Concerning this technology, What does technology offer for translators?. It increases their capacity by means of a collection of tools. Those tools have a great impact on communication and translation Gile and Pym (2002). Translation memory TM and machine translation MT are components of the same technology which was developed to assist the human translator in facilitating the process of translation and communication. The former, is a linguistic database that stores translated texts and the corresponding source language, While the latter, the process of translation is carried out fully by a machine. Webb (1998:5) emphasized that, TM is a multilingual database that comprises a segmented, aligned, parsed, and classified multilingual texts with option of saving and recalling of aligned multilingual text segments in various ways. Machine translation nowadays is applied in different technological soft wares like cat tools, subtitling and dubbing programs and video games localization applications, to support the work of translators in terms of speed, quality and price of the translated text Hence, incorporating machine translation in Cat Tools today is the state of the art in translation advancement. Complementing translation memory (TM) software with automatic translation appears to boost translators' productivity Zaretskaya and et al (2015).

This paper studies how MT combined with TM can help translators with new parts, which have no equivalent in TM database. Cat Tools nowadays offer a suitable environment for students of translation by providing many solutions that are necessary for translator. Using machine translation integrated in Cat Tools such as Wordfast anywhere and Matecat can boost the productivity of translator, and enhance the environment of translating, Bier (2012) cited in Zaretskay at al (2015). The issue is that TM provides either perfect match or fuzzy match and leave segments that have no ready translation in the database. So the researcher assumes that trainee translators would rely on MT to complete non-translated_parts in TM. It is also hypothesized that utilizing machine translation incorporated in Cat Tools boosts the experience of adopting TM in translator training and support the lack of any background on part of student regarding information technology in general. Incorporated machine translation in Cat Tool encourages students to use cat tools in translation process and facilitates any technical challenges that may rise. This paper aims at highlighting the issues that students encounter in applying the software in English Arabic translation in addition to finding out students' attitudes regarding this integration.

This is an experimental study where the researcher uses the Matecat application which is supported by machine translation. The MateCat Tool runs as a web-server accessible through Chrome, and Safari. TM server MyMemory, is powered by commercial Google Translate (GT) . Students at the department of translation of University of Tripoli were the population of the study. Students at the last semester were given a scientific text to render from English into Arabic and recorded the advantages of using MateCat powered by machine translation as well as reported any issues that might hinder the process. A questionnaire was administered after the experiment to investigate attitudes of users of TM and MT integration.

2. Overview of MT and CAT tools

Machine Translation (MT) has been evolving rapidly, drawing attention from other professionals. KANAVOS at al.(2010. p:11) Development of machine translation is supported by the need for faster and cheaper translation. Hutchins defines the MT as a computerized system responsible for the production of translations from one natural language to another,

with or without human assistance, (1994.p:4). Many researchers in the field have contributed to the discussion of the idea behind machine translation itself and came up with their own definitions. Machine translation (MT) is the application of computers to the task of translating texts from one natural (human) language to another. Okpor (2014. P: 159). The history of machine translation may go back to Warren Weaver‘s Memorandum on Translation on 1949. From that year upwards the computerized translation had seen a very sophisticated development. The idea of processing texts between languages by computer started by applying a linguistic rule. Based on direct approach, a word in source text is replaced by its equivalent a target text. The translation process here is facilitated with a morphological analysis, bilingual dictionary and some basic rules of reordering in target language. First generation of machine translation approaches that had begun from 50s up to 70s were called rule-based machine translation. Including direct, transfer and interlingua systems. It was also known by knowledge based approaches since the system relies heavily on lexical and syntactic information prepared and designed by linguists. The second generation which entered the arena since 1989, was known as Corps-Based Machine Translation. It resulted from first, IBM research group's appeared in western world, that followed a statistical method in MT. Second, Japanese researchers who carried en example-based method based on corpora, Hutchins (1994). Both methods had abandoned the rule based ideas of syntactic or semantic analysis. The distinctive feature of corpus-based machine translation is that the analysis of ST and generation of TT is based solely on statistical approach. "The essence of the method is first to align phrases, word groups and individual words of the parallel texts, and then to calculate the probabilities that any one word in a sentence of one language corresponds to a word or words in the translated sentence with which it is aligned in the other language. Hutchins(1994: p4). But the example based machine translation (EBMT) is "The basis for the existence of a large volume of translated texts (i.e., parallel bilingual texts), which have been translated by professionals with not only language proficiency but also specialist expertise. In this sense, bilingual texts encode knowledge that can be extracted to facilitate the automatic translation. Chunyu Kit and et al (2002.p:59). On the other hand, CAT is an acronym that refers to Computer-assisted Translation and/or Computer-aided Translation. Which is also called Translation Memory (TM) since its main purpose is to save a translated text with its original for future reuse according to Garcia(2014), Austermühl(2001), and Pym(2011). CAT tool is a linguistic database which is constituted of source text and target text that is built by translator. CAT software recycles previous translations to facilitate the acceleration of human translation while maintaining the quality and consistency of final product. Thus, reducing the overall costs of translation projects. Nowadays there is an increase of applying this technology in different ways and CAT Tool is just a part of upgrading technology. Other scholars like Jost (2010,p 187) recently suggested another name which encompasses all sorts of technology that assists the translator in anyway. Translation Environment Tools "TEnTs" is a wider and inclusive name to these kinds of technology. MateCat is an open source and free online translation memory. This TM is designed with all features that assist the translator in dealing with all text types and different formats. MateCat, like all Cat Tools today, is developed with translation memory, term base, concordance search, quality assurance feature and lately enhanced by machine translation to support the work of translator with automatic translation. MateCat aims to improve the integration of machine translation (MT) and human translation within the so-called computer aided translation (CAT) framework. CAT Tools represent nowadays the dominant technology in the translation industry. Federico et al., (2014).

3. Methods of Combing MT and TM

CAT systems are evolving and upgrading in many ways. Companies started designing better functionalities for translators by adding more than one translation memory plus glossaries as well as incorporating machine translation lately. Machine Translation option is very popular during the present time among all well-known CAT Tools on the market. SDL trados, Déjà vu, MemoQ , Wordfast, MateCat and other companies on the market. Many researchers haveas shown certain directions and practices in MT integration. Federico et al (2014) discussed how machine translation can be applied to Cat tools by first training statistical machine translation for specific domains which can enhance the output quality. Second by adopting statistical machine translation users' corrections and feedback. Finally, supply more information to develop users' productivity. Similarly, Zaretskaya and et al (2015) were investigating how MT suggestions should be present in CAT Tool to a translator. Thus, researchers classified two different ways of how MT and TM can be integrated. Some TM systems employed example based machine translation to provide sentences in TM database. The idea is to search for fragments of the source segment in the translation memory repository, extract their translations and combine them together to obtain a translation for the whole source segment (2015: P77). This method is already adopted by Déjà vu x, Swordfish II and MemoQ3. Another technique is to combine MT and CAT Tool to use statistical machine translation to get better results in the end. By retrieving the fuzzy matches, identify the elements of the source sentence that are not covered by the match, and translate them using SMT techniques (2015: p78). On the other hand, it's also possible to translate source segments that have no equivalents in TM and add them later to translation project which is known as offline or batch processing or allow the translator to see MT suggestions on the interface directly available for him in translating the current segment through a Plugin or API online. Similarly, Shuttleworth (2002), carried a research on how to integrate MT and CAT Tools in training translator. Research focused on combing TRADOS Translator's Workbench 3 with machine translation engine MT system SYSTRAN PROfessional Premium 3.0. Data of the study is a medical document. Since TRADOS xml files are compatible with SYSTRAN file format, so the integration is done by extracting the non-translated segments from TM and translate these sentences by machine translation. After the translation process, the resulted sentences are imported to TM again and presented to translator for post editing before storing them in cat tool database. The result was impressive as trainee translators are properly introduced to the two technologies and their capabilities. students also reported the fast way of rendering the text. Chelghoum (2016) has investigated integrating MT and TM technologies to enhance English to Arabic technical translation quality and speed. The idea is to go beyond classical translation approach and use the technological method to boost translation outcomes. To find an answer to first, can the combination of machine translation and translation memory improve the translation quality? Second does this combination enhance the translation speed? finally, how effective is MT and TM approach for technical translation students? A researcher conducted an empirical research focusing on two groups of second year students of the English Department at Constantine University. Students in second year of masters' degree were divided into two groups. He found out that the control group followed a traditional method of translation with assistance of MT or TM. While, the experimental group rendered the text by employing MT from Google and Omega CAT tool as it is a free tool. The data of the research was a technical text that the students had rendered from English to Arabic. The researcher reported the increase of the quality and speed by the group which used the TM and MT combination compared with the second group that followed the classical method. Therefore, the researcher highly recommends of adopting the integration of MT and TM in teaching translation nowadays. In the same context, Rocio Quintana (2021) researched

how the integration of TM and MT would decrease the post-editing efforts in translating technical texts. This study aims to find out if translating with only TM or MT and translating with the combination of TM and MT reduces post-editing efforts in terms of temporal, technical and cognitive efforts. Roico Quintana tries to answer the following research questions: First: Will the translator save time using a system that integrates TM and MT? Second: Will the translator invest less cognitive efforts when using TM and MT? Finally: Will the quality of the translation not be deteriorated when using TM systems with integrated MT?. An experimental study is carried out. It utilizes TM and MT first separately. Then, he combined them to see the beneficial side of integration. Professional translators and Translation students are asked to translate three short texts (around 300 words) with a CAT tool from English into Spanish. The first text is translated using TM, the second text is rendered with MT, and the third text is handled by using TM and MT . Participants carried out the task first remotely as pilot study then translated the texts in the presence of the researcher using an eye-tracking device that records the eye movements and the size of the pupil of the translators. The study also included two questionnaires: one before the translation task and one after the translation task.

4.Methodology

Researcher carried out an experimental study that combines machine translation (MT) in translation memory (TM) for translator training. Matecat software is designed and produced for academic purposes with integrating MT that's free accessible online. Hence, it's suitable for training translation students. Thus it is chosen as the frame of this study. Data was collected by two tools. The first is a translated text from English into Arabic. The second tool is a questionnaire that was administered after the translation task. The objective of the study is to find out how integrating machine translation in translation memory can assist translators in translation process and to measure students' attitude regarding the integration. Therefore, an experiment is carried out by the help from students in translating a scientific medical text from English to Arabic using TM software called (Matecat.). Medical texts are considered technical texts that are suitable for TM. Matecat is enhanced by machine translation system namely Google Translate (GT). The participants were informed about how Matecat works before answering the survey**.** The population of the study is the fourth year students of the Translation Department at Tripoli University - Libya. The students have already studied CAT Tools Course at the fourth year of the BA program. As for the analysis of quantitative data, descriptive statistics are often used as illustrated by Saladana and O'brien (2014). The data is categorized into three groups for analysis. The first section reveals the answers of the first item. The second category deals with response of the second item. Finally, the statements that related to the third one. The data analysis is processed by Excel software to obtain the results. Items of the questionnaire are judged by percentage scale

. **CAT tools provide a suitable environment for translators.**

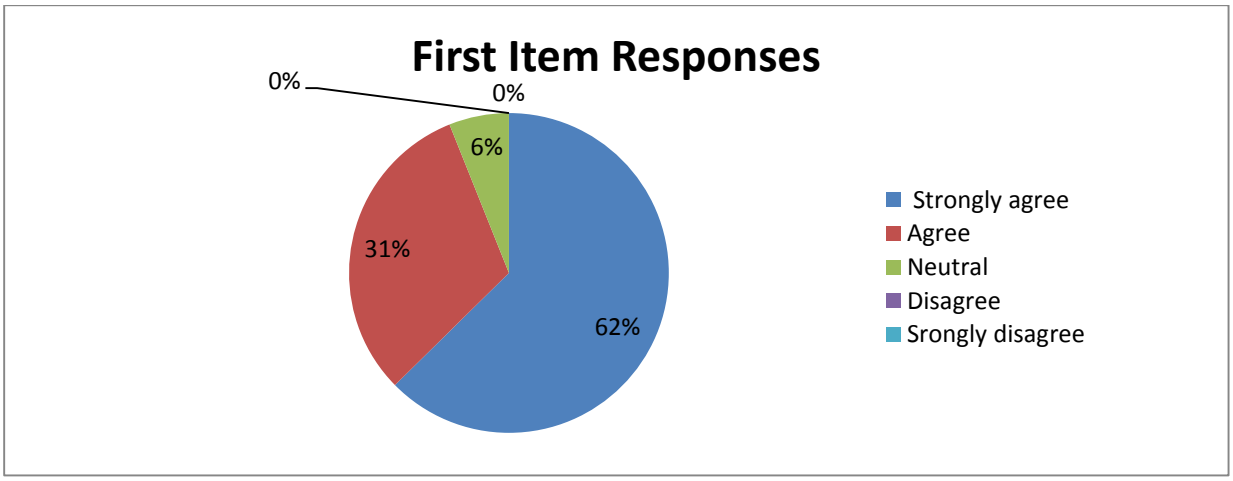

Figure 1.

"As Figure 1 illustrates, participants responded variably to the statement about employing CAT tools as a valuable training tool for translators. A significant majority, 62%, strongly agreed that CAT tools are effective for translator training, while 31% agreed. Only 6% of the survey respondents remained neutral. Clearly, a large proportion of participants viewed working with CAT tools as a positive step in training. This suggests that students who experienced the benefits of Translation Memory (TM) technology and supported its use in translation had higher technology literacy levels. They gained knowledge from experiencing the advantages of CAT tools, such as format conversion, consulting multiple databases for source text equivalents, and terminology consistency. As a result, they were more willing to adopt new translation software and quickly utilize it. In contrast, the smaller group of participants who found it less convenient had limited technological background, struggled to understand various software functions, and faced challenges in using them effectively.

Integrating MT in TM enhances the experience of using CAT tool.

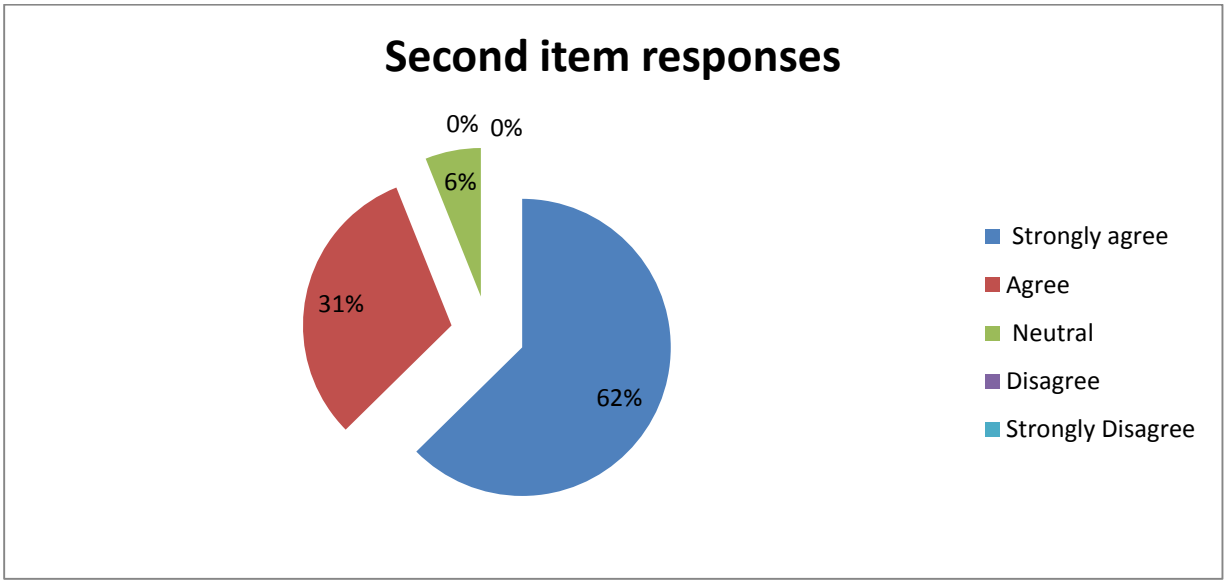

Figure 2..

"Regarding the user survey, participants were asked whether integrating Machine Translation (MT) into Translation Memory (TM) enhances the experience of using Computer-Assisted Translation (CAT) tools. As illustrated in Figure 2, 62% of respondents strongly agreed with this statement, while 31% agreed. Only 6% of participants remained neutral. These findings indicate that the majority of trainee translators endorse the integration of TM and MT software, recognizing the enhanced functionality it provides. CAT tools already offer numerous benefits, including formatting, consistency, and reduced job submission time. The addition of MT further empowers translators by providing multiple translation options within a single interface, allowing them to choose, modify, or accept suggestions. Trainee translators' familiarity with Google Translate Toolkit likely contributed to their appreciation for this integration. However, a small portion of participants expressed concerns about the quality of MT output and the potential overwhelm of having multiple translation suggestions on one screen. Nonetheless, trainee translators generally value the integration of MT in translation tools, having utilized MT-powered applications in their training and daily practice."

By combining MT with TM, translators can efficiently handle segments that lack matches in the TM database.

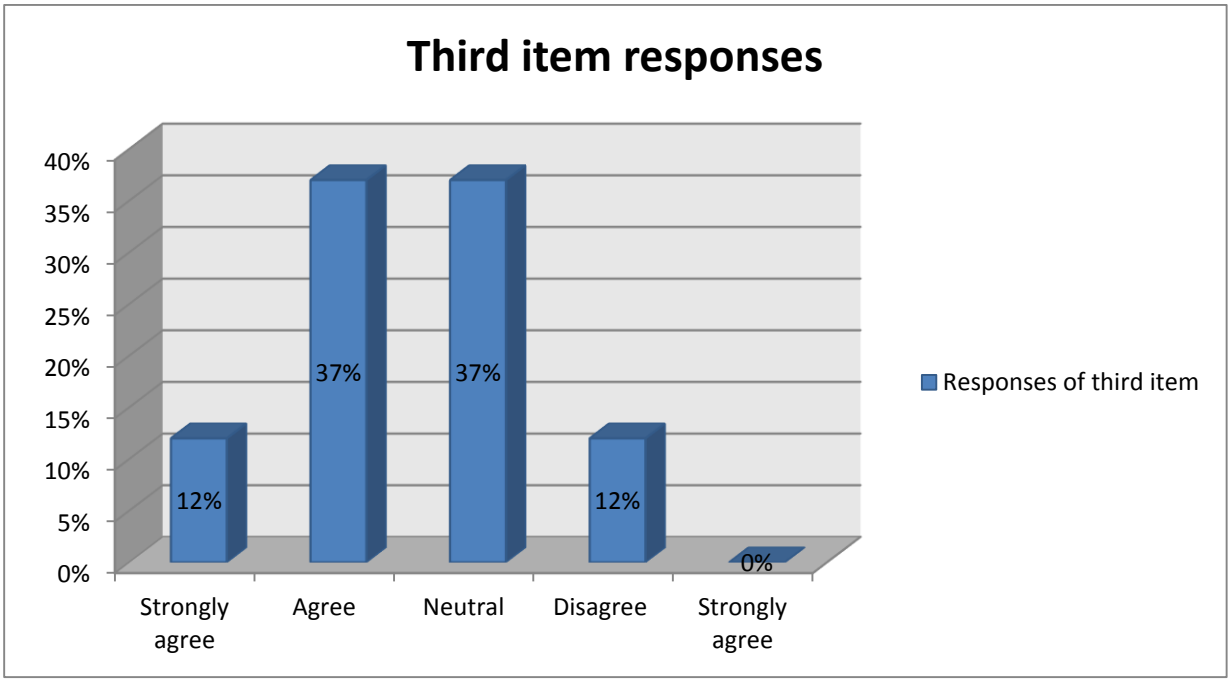

Figure 3.

"The participants' experience with translating a text prior to completing the questionnaire enabled them to empirically assess the efficacy of integrating Machine Translation (MT) and Translation Memory (TM) in addressing non-translated segments. The results, as depicted in Figure 3, indicate that 12% of respondents strongly concurred that MT provides an effective solution for handling segments not rendered in TM, whilst 37% agreed. Notably, 37% of respondents adopted a neutral stance, and 12% disagreed with the proposition. The participants who perceived value in the MT option recognized its supplementary function in expediting the translation process and providing multiple translation matches for selection or modification. Conversely, those who did not find MT suggestions beneficial likely prioritized

human translation, emphasizing quality over expediency, and did not consider temporal constraints to be a significant concern."

5. Summary

This study explores the potential benefits of combining Machine Translation (MT) with Translation Memory (TM) to assist translators with segments lacking equivalents in TM databases. Computer-Assisted Translation (CAT) tools, such as Wordfast and MateCat, provide a conducive environment for translation students by offering essential solutions. However, TM's limitation in providing only perfect or fuzzy matches leaves segments without ready translations. This study assumes that trainee translators will rely on MT to complete these segments and hypothesizes that incorporating MT into CAT tools will boost the adoption of TM in translator training, bridging potential gaps in students' information technology background. This paper investigates the challenges students face when applying this software to English-Arabic translation and their attitudes toward this integration. Using an experimental design, students from the University of Tripoli's Department of Translation used the Matecat application, powered by Google Translate, to translate a scientific text from English to Arabic. A questionnaire was administered afterward to gauge their attitudes toward the TM-MT integration."

This experimental study carried out by using Matecat application which supported by machine translation. Matecat Tool runs on web-server accessible through Chrome, Firefox and Safari. CAT tool is a web-server connects with other services via open APIs. TM includes server My Memory and commercial Google Translate (GT). Trainee translators of the department of translation at the University of Tripoli, rendered a scientific text from English into Arabic by CAT Tool. Matecat is powered by machine translation from Google so trainee translators utilize MT in rendering the text and later they reported the experience by answering the questionnaire .

6. Conclusion

The results indicate that over 50% of participants found MateCat highly beneficial for translator training and future translation work. Similarly, more than 50% of students considered the integration of MT and TM as a valuable new methodology for translation. However, opinions were divided regarding the usefulness of third matches from Machine Translation, with half finding them supplementary and useful, while the other half found them distracting and lacking a positive impact on the translation process.

References:

Austermühl, F. (2001). *Electronic Tools for Translators.* Manchester: St. Jerome.

Costa-jussà MR and Fonollosa JAR (2015) Latest trends in hybrid machine translation and its applications. *Computer Speech & Language* 32(1). Elsevier: 3–10.

CHELGHOUM, A. (2016) 'Combining Machine Translation and Translation Memory RML10, 2016 Tools: Implications for English-to-Arabic Technical Translation,' [Preprint].

Federico, M. *et al.* (2014) *THE MATECAT TOOL, Proceedings of COLIN2014,the 25th International Conference on Computational Linguistics: System Demonstrations*, pp. 129–132. https://www.matecat.com.

Gile, J and Pym, A.(2002) Technology and translation: (a pedagogical overview) Ministerio de Ciencia y Tecnología, Madrid.

Garcia, I. (2014). A computer-aided translation from: The Routledge Encyclopedia of Translation Technology London and New York

29(5), pp.30-31.
Gabriela Saldanha and Sharon O'Brien.(2014) Research methodologies in translation studies / Routledge. New York, NY, 10017, USA
Hutchins, J. (1994). Research methods and system designs in machine translation: a ten-year review, 1984-1994. University of East Anglia, UK. *https://aclanthology.org/1994.bcs-1.4.pdf*
Kit, C. et al. (2002) Example-Based Machine Translation: a new paradigm, Introduction - Why EBMT? Translation and information technology.pp.57-78
Kanavos, P. and Kartsaklis, D. (2010) *Integrating Machine Translation withTranslation Memory: A Practical Approach, Proceedings of the Second Joint EM+/CNGL Workshop "Bringing MT to the User: Research on Integrating MT in the Translation Industry" (JEC '10)*, pp. 11–20.
Okpor M. D. (2014) Machine Translation Approaches: Issues and Challenges IJCSI International Journal of Computer Science Issues, Vol. 11, Issue 5, No 2, Nigieria
Pym, A.(2011).'What technology does to translating', Translating and interpreting research,Vol.3,no.(1), pp. 1-9.
Quintana, R.C. (2021) Integration of Machine Translation and Translation Memory: Post-editing efforts, Proceedings of the Translation and *Interpreting Technology Online Conference. INCOMA Ltd., pp. 161–166.* *https://doi.org/10.26615/978-954-452-071-7_018*.
Shuttleworth, M.(2002). Combining MT and TM on a technology-oriented translation masters: aims and perspectives. In Proceedings of the 6th EAMT Workshop: Teaching Machine Translation, Manchester, England. European Association for Machine Translation.
Webb, l. (1998). *advantages and disadvantages of translation memory: A cost/Benefit Analysis*. MA Thesis. BA, San Francisco State University, California
Zetzsche, J. (2010) A Translators Tool Box for the 21st Century. A Computer Primer for Translators, International Writers Group .
Zaretskaya, A., Pastor, G. C., & Seghiri, M. (2015). Integration of Machine Translation in CAT tools: State of the art, evaluation and user attitudes. Skase Journal of Translation and Interpretation, 8(1), 76-89.