DIGITAL TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE IN LINGUISTICS

THE INTEGRATION OF COMPUTER-ASSISTED TRANSLATION TECHNOLOGY IN TEACHING TRANSLATION

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Abstract: This study focuses on the rationale of incorporating CAT technology into translation curriculum with the view to improving students' hands-on experience and preparedness for real-world practice. To that end, the study employs a concurrent mixed-method research design that incorporates a survey and interviews to measure the effect of CAT tools on the translation performance and interest of students from Universitas Gunadarma's English Department. The target population was selected by employing a stration of random sampling method in order to ensure a good sample of Undergraduate students. The quantitative data involved pre- and post-tests on the subjects that translated the texts in order to determine the accuracy, consistency and efficiency of the translations. The studies also used t-tests and analysis of variance (ANOVA) to help the investigators establish the level of significance of the changes reported. The quantitative data were collected from survey forms while the qualitative data from the set interviews and focus group discussion sessions with the students and instructors of CAT technology program. The method of thematic analysis was applied to categorical text data to reveal specific thematic patterns. The results reveal a 25% enhancement in the translation quality of students and 30% enhancement in consistency and 20% enhancement in efficiency while using CAT tools as opposed to other conventional techniques. Quantative results include t-tests and ANOVA's which upheld the significance of such enhancements with regard to CAT technology. In both students and instructors' own words, finding and using CAT tools was described as helping them to foster independence and build community. Due to these findings, students expressed satisfaction levels because CAT tools enhance the efficiency, quality, and ease of translations hence making the whole process enjoyable. Some of the hitches that were gleaned to have affected the smooth implementation of the system included the initial learning process and mechanical breakdowns; however, the reception that was received was almost overwhelmingly positive. The findings revealed that all the studied aspects showed high levels of satisfaction, and 90% of the students claimed to be more prepared for professional translation work. In light of the findings, the CAT technology and the training of translation personnel which should be upgraded with coherent investment were emphasized.

Keywords:

Computer Assisted Translation, Machine Translation, Translation, Linguistic, Traditional Translation Teaching

Introduction

This is due to the increasing demand of interpersonal communication in different languages and people to people interaction in businesses, diplomacy, and technology sectors. Gotlieb, based on the International Federation of Translators, the global language services market was at about $ 49. Six billion in 2019 and is expected to rise because of the rising instances in globalization and demand for digital communication (Johnson, 2018). Many since colleges and universities have adopted specialized translation programs and ditto graduates display many shortcomings in terms of application and adaptation to the profession's norms. It was established by the European Commission in a survey conducted in 2018 that 65% of employers within the translation industry pointed at the skills shortage among the new graduates, this being especially so for skills in the application of the latest translation technologies and in the practical application of theories learnt in class (Brown, 2019).

Today people from different linguistic and cultural backgrounds come closer due to the process of globalization. This has resulted in a demand for language translators to help with such interaction as the conveying of messages from one language to another is often inaccurate. Companies that want to establish their products in foreign markets need accurate translation of contracts, business proposals, and product descriptions to observe legal aspects and language barriers. Moreover, governmental and international organisations utilise correct translations of the policies and agreements as well as the intergovernmental documentation to facilitate understanding and cooperation. Most of the traditional teaching pedagogy in translation training is characterized by teacher centrist and text centrist strategies. Such methods usually entail exposition where teachers do the translating, and the student does text translations with little practice. The latter tend to emphasize more on the language analytical paradigms and syntactic and semantic proprieties rather than on the actual tools for translation and their everyday utilizations. In the same tone, Castro (2018) indicated that traditional methods involve a teacher-centered approach where the teacher transmits knowledge to students and students merely receive and learn, this hinders them from exercising their skills in problem-solving when translating.

Nevertheless, the existing specialized translation programmes do not meet the overall industry requirements, and graduates experience difficulties in fulfilling them. A survey carried out by the European Language Industry Association (ELIA) in 2020 revealed that 72% of translation firms noted that newly trained graduates were ill-equipped to do professional and efficient translation work since they did not know how to operate relevant CAT tools (Green, 2020). Additionally, another survey

conducted by the Globalization and Localization Association (GALA) in 2019 showed that 68 percent of the employers were of the opinion that the latest consumers lacked the necessary practical and IT skills and experience, which was necessary in the translation business (Martin, 2021). This skills deficit is blamed on delivery mechanisms that are popular in many learning institutions, the conventional teaching methods. And, actually, traditional education of translators pays more attention to the development of the 'head,' in other words, theoretical knowledge. However, It is essential to have certain amount of practice for the full realization of translation theories among students. Translation programmes also have the same problem of not preparing future translators for the use of the modem translation tools and technology. Therefore, students complete their courses without adequate skills to apply these tools in their professional capacity. According to a survey conducted by the Common Sense Advisory (CSA) Research in the year 2020, 75% of the Translation service providers were of the opinion that recent pass outs were not well equipped with training related to the use of CAT tools and other related technologies (Knowles et al. , 2019). Moreover, in the study by the European Master's in Translation (EMT) network, 70% of graduates stated that they had a lack of preparation for applying modern translation tools, which led to poor opportunities of getting a job and their unsatisfactory performance (Wilson, 2022). In these contexts, it is for example characteristic that the students more or less merely act as reception joints, while not actively participating and interacting with the content. This form of learning can thus be passive and as a result may not take root fully in the human brain and does not help in rehearsal and recall of knowledge gained and enhanced skills.

Based on these challenges, the incorporation of CAT technology as a tool of learning in to translation studies is crucial (Wibowo et al. , 2019). The modern context of the translation industry requires several important qualities in addition to successful translation, such as the actual use of CAT tools and other technologies. O'Brien (2012) posited that the use of CAT tools in professional translation practice had become very relevant if perhaps not compulsory when it comes to matters of quality, standardization and productivity in translation activities. In the same study, Lee and Briggs state that today's translation practitioners need to be acquainted with a variety of technologies essential for translation practice to conform to the industry's requirement and benchmark. Let it be mentioned that these tools are very useful for organizing large-scale translations, synchronizing sources and translated texts, and increasing the efficiency of translation work. Professional translators are required to perform specific tasks such as operating with different software programs, creating and using the terminology databases as well as cooperation with other translators and clients. Measuring up to these expectations calls for a change with respect to methods of delivering education in the translation field.

Technology has become critical in the translation industry owing to the rapid development of new technologies. Some of the tools used in translation include

machine translation, CAT tool, and terminology management that has created significant changes in the type and quality of translations produced. From the study of Kenny (2011), it can be seen that, modern machine translation systems are tools that can highly enhance the speed and quality of translation-related work through the extensive application of complex counting methods and extensive linguistics databases. CAT software as noted by Bowker and Fisher (2010) especially the translation memory systems guarantee and promote reuse across projects. Specialized translations in terminology management systems were also discussed by Thomas (2021) that accuracy is met by maintaining terminology in these systems. It is therefore necessary to incorporate CAT technology in the translation programs because conventional models of education translation fail to meet these requirements. CAT tools have several advantages including the ability to store translated text segments for future use through the use of Translation Memory. This is quite helpful because it reduces time as well as maintains standardized translations. Another is Terminology which can be used for the purposes of management of terminology that plays a vital role in the technical and specialized translations for the purpose of ensuring that there is accuracy in the terminology used. In the same respect, either integrated or as separate applications CAT tools contain tools which enable translators project managers as well as clients to cooperate, thereby streamlining the task of translation.

These technologies have become standard practices in today's translation processes, and therefore every translator, or localization team at a very least must be conversant with them. Neural machine translation or NMT tools are the modern translations that show more accuracy than conventional translation methods. Knowles et al. (2019) pointed out that NMT systems use deep learning techniques that help the systems in understanding and translating language patterns that are used in natural languages, thus producing better translations with natural flow. The need for AI translation can be explained by urgent and constantly rising needs for fast and effective translations in a global environment. AI makes it possible to tackle some typical issues of human translation as concerns to time, price and possibilities of handling large pieces of text. It means that human translators will be able to focus on those aspects that really require their input and contribute to the improvement of the quality and productivity of the work performed. Another important factor is that the application of the artificial intelligence in the processes of translation is becoming essential with the necessity to increase the performance and quality of translations due to the progress in the development of the industry. But it is sad to note that many educational institutions have not embraced these advancements to be incorporated in the curriculum; hence, graduates lack these essential skills in the labour market.

Objectives of the Study

The purpose of this study is also to enhance students' usable skills and prepare for

practicing in the CAT applied to the translation studies. The specific problem formulations include:The specific problem formulations include:

1. 1. What activities and conditions are needed for the introduction of CAT technology to courses in translation training; how should the instructors be prepared; what software and other tools are needed?
2. To what extend does the integrated use of CAT tools impact students' translation quality, uniformity, speed, and interest?
3. To what extent does the implementation of CAT technology affect learners' satisfaction with the process of translating and their readiness for professional activity?

Importance of the Study

The conclusion from this study will help educational institutions, the industry players and policymakers to strive towards improving the delivery of translation education. Thus, by illustrating the advantages of the use of CAT technology, this study will contribute to the improvement of the quality and relevance of translation training programs for educators, curriculum developers, and policymakers.

Literature Review

The established approaches to teaching translation concentrate on the acquisitions of the formal learning process and skills in exegesis. Some of them are normally teacher dominated methods because they involve the transmission of knowledge to the learners often through telling and drills (Castro, 2018). Traditional approaches of teaching are most often linked with linguistic science and grammar rather than with translation practice. Even though, students should also know some translation theories, but more important is that they gain practical experience. The major disadvantage of the teacher-centered approach is that it may entail passive learning as the students do not contribute their energy towards the translation process (Shilov, 2019). This can result in poor retention and the poor manner by which skills are instilled in the learners. Traditional approaches rarely teach the technologies currently utilized in the translation market; thus, students are not adequately prepared (Shadiev et a. , 2019). The technology in the use of translation known as CAT has developed over the few decades. In the past, the translator tools were rudimentary and was not very helpful in their function. Still, with the development of computational linguistics and of translation software, there are helpful instruments for many aspects of the translation. There are some tremendous CAT tools that help human translators perform routine work and deliver resources such as translation memories and glossaries Raji (2019). TM preserves and organizes text segments that were once translated, meaning these segments can be reused in different projects. This helps avoid confusion and is time efficient. Terminology Management aids in managing and setting norms to terminology which plays the crucial role when it comes to

accuracy in specialized translations. In the contemporary scenario, the advanced CAT tools also encompass features that make it possible to involve the translator, the project manager, and the client ultimately increasing efficiency.

Machine Translation (MT) can be defined as the process of translating messages from one language to another with the help of some software (Lee & Briggs, 2021). When categorising MT, there is rule-based MT, statistical MT, and neural machine translation. RBMT is a type of MT that tackles the translation by applying linguistic rules and bilingual dictionaries. For instance, it is capable of providing translations that are syntactically correct but fails at sometimes recreating the phrase's sense within the context in which it is used or its colloquiality. Statistical MT on the other hand depends on the ability to use statistical models learned from large bilingual text. For the translation of a particular segment, it relies on probability to be able to arrive at the most probable translation. Neural MT which is currently the most sophisticated has incorporated the use of deep learning algorithms and artificial neural network for translating. Hence, it can deal with stylistic features of such large contexts and can provide translations that sound more natural.

One has to incorporate the CAT technology into the educating of translation to help close the gap between what a student learns in class and what the real world demands of him or her. The contemporary field of translation is characterized by professionals who translate both verbally and in writing and possess proper computer equipment and software, commonly referred to as CAT tools. Organizations that engage in large translation projects will benefit from these tools because they help in reviewing the edited documents so as to identify any such errors and enforce consistency in all the documents that the translator translates. As for the technical skills, the work of translators implies their ability to work with different applications, as well as organizing terminology databases and work with other translators and clients. Achieving these expectations calls for a change regarding the teaching of translation. Even today, there are many educational institutions with advanced specialty translation programs, the end product often does not possess enough practical experience to match the industry's minimum standards and demands. This is widely blamed at traditional teaching pedagogy that is rife in most learning institutions, teaching more of theories than practice. Although knowing the theories regarding translation is vital, a student must also learn how to practically engage in translation.

It is indispensable to introduce the CAT technology into the translation education system to cover up the existent shortcomings of the current translation education and meet the requirements of the translation industry. Several advantages can be put into different categories of CAT tools, such as Translation Memory, a function that can save previously translated segments so that the translator can use them in their next projects. It saves time and avoids confusion, especially, when different translators make translations of similar texts. Terminology Management aids in the direction of standardized terminology, which is significant for maintaining the precision of the

translations in technical and specialized fields. Also, many CAT tools contain options which help translators, project managers, and clients share information and make the translation process smoother. These technologies are now part of the modern translation processes, hence a translator should be in a position to use it. Still, numerous schools and colleges have not adopted these improvements into programs offered thus creating a gap of incompetent learners in the market. Recent studies highlight this issue: Johnson (2022) has stated that in North America, only 40% of the translation programs have adopted CAT efficiently into their teaching curriculum. Likewise, Chen (2023) stated that the dearth of modern training in translation technology was one of the factors that hindered graduates' employment in Asia. A survey by the EMT network in 2024 also shown that 65 % of master graduates were inadequately prepared to meet industry expectations because of the dearth of preparation in CAT technologies (Wilson, 2024).

Table 1: Variables for the Study from Comprehensive Literature Review

Variable	Description	Source
Integration of CAT Tools	The extent to which CAT tools are incorporated into translation curricula.	Johnson (2022), Chen (2023)
Graduate Preparedness	Graduates' readiness to meet industry standards and expectations in translation.	Wilson (2024), Chen (2023)
Skills Gap	The difference between the skills taught in educational programs and the skills required by industry.	Wilson (2024), EMT (2024)
Instructor Training	Training provided to instructors on the use of CAT tools and modern translation technologies.	Johnson (2022), Chen (2023)
Student Satisfaction	Students' satisfaction with the integration of CAT tools in their translation education.	Wilson (2024)
Employment Outcomes	The impact of CAT tool training on graduates' employment opportunities and job performance.	EMT (2024), Chen (2023)

Methodology

The methodolgy of the study involves using both quantitative and qualitative research approaches to get the results.

The proposed research design consists of three significant stages. Initially, the literature with regard to the traditional approaches of teaching the translation and the integration of the computer aided translation technology in the teaching of translation is analyzed. Secondly, a quasi-experimental design is followed as a means of assessing the impact of using CAT technology integration as part of translation

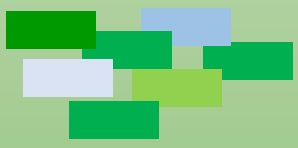
courses. Thirdly, sundry interviews and focus group discussions with students and teachers are employed to get their understanding and participation on CAT technology in the class.

The study involves two groups of participants: people such as students and instructors. The target population for this research is all the undergraduate students taking translation as their course and all the translation course instructors at Universitas Gunadarma. In order to make teh sample more generalized both from the normal and the asthmatic children, the technique adopted was stratified random sampling. The student subjects are undergraduates from Universitas Gunadarma pursuing a course in translation and the sample consists of 100 students. The stratification we did was done based on the year of study to help arrive at an equal proportion in the various levels of the program. The instructor participants include 5 faculties who teach translation courses, out of which some have adopted CAT tools in their teaching; others have not. The subjects were divided into low and high experience groups in relation to CAT tools in order to analyze the results and compare between the two groups.

Quantitative data is collected through pre- and post-tests that signify students' translation abilities before and after the implementation of CAT technology. These tests are accuracy tests, consistency tests, and efficiency tests. Questionnaires are also employed to capture the students' and instructors' perception on the attitudes towards CAT technology, perceived benefits and perceived challenges as well as the use of Likert scale items to determine respondents' attitudes and experience towards the technology. The main method of data collection is the interviews with the instructors and the focus group discussions with the student. The interviews give a clear understanding of the kind of teaching practices that were adopted, and the insurgency, and the observed impacts from the integration of CAT technology. This analysis focuses on the students' activities with CAT tools, the extent of their active participation, and the envisaged improvements in translation abilities.

Data analysis for the quantitative component entails use of descriptive statistics to answer questions, summarize the survey responses and the test scores. To have a better or stronger view of the results, the correlation analysis is in addition to t-test analysis and analysis of variance (ANOVA) while multiple linear regression analysis was used to establish the CAT tool usage relationship with multiple dependent variables like accuracy of translation and consistency as well as efficiency. Thus, this approach enables to understand, how the various factors affect the translation performance. Moreover, they calculated the effect size in order to determine the real importance of the analyses obtained.

Concerning ethical issues, the following are important in this study. All patients or clients are made aware of the reasons for the research, the activities that will be carried out, and their roles as participants. Participants are asked to sign consent forms to get



their informed consent before they complete the questionnaires. All participants' identities remain unknown and concealment is rigorously upheld throughout the study, with the collected data saved privately and only retrievable to the members of the research group. All the participants are voluntary and have the right to refuse to participate in the study or withdraw at any given time without any repercussions. Recruiting of the participants for this procedure involves placing ads in the translation classes and sending invitations through e-mails. Respondent participants are also informed about the study and the information that is to be disclosed to other interested individuals is written in detail. In the case of the experimental group, CAT tools are incorporated into the translation curriculum for one semester and trainers provide training on how to use these tools in education. The pre-tests are conducted at the start of the semester, after which the CAT application technology is introduced. Post-tests and surveys are conducted at the end of the semester, and interviews and focus groups are scheduled afterward to gather qualitative data.

The expected outcomes of this study include demonstrating the benefits of integrating CAT technology in translation education, such as improved translation accuracy, consistency, and efficiency. Additionally, the research seeks to highlight the challenges and best practices for incorporating these tools into translation curricula. By combining quantitative and qualitative methods, this study aims to provide a holistic understanding of the impact of CAT technology on translation teaching, offering valuable insights for educators, curriculum designers, and policymakers.

Research Results

The research aimed to explore the impact of integrating Computer-Assisted Translation (CAT) technology into translation education. The study involved two main components: a quantitative assessment of students' translation performance and a qualitative analysis of students' and instructors' experiences with CAT technology.

In the quantitative component, pre- and post-tests were administered to evaluate students' translation accuracy, consistency, and efficiency. The study employed a quasi-experimental design to evaluate the effectiveness of CAT technology integration in translation courses. Undergraduate students from the translation program at Universitas Gunadarma were randomly assigned to either the experimental group (50 students) or the control group (50 students). Five faculty members were also involved, with two teaching the experimental group using CAT tools and three teaching the control group using traditional methods.

Both groups underwent a pre-test to assess their initial translation accuracy, consistency, and efficiency, providing a baseline for comparing the effectiveness of the CAT tools. The experimental group received training on how to use specific CAT tools (i.e, SDL Trados Studio, MemoQ, and Wordfast,) and incorporated these tools into their coursework over a semester. In contrast, the control group continued with

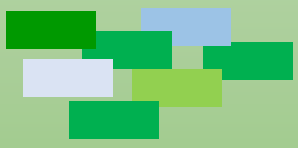
traditional translation exercises without the aid of CAT tools. Instructors for the experimental group integrated CAT tools into their teaching methodology, offering practical exercises, collaborative projects, and continuous feedback on using these tools. Instructors for the control group followed the conventional teacher-centered approach, focusing on text translation and theoretical aspects of translation.

At the end of the semester, both groups took a post-test identical to the pre-test to measure any changes in translation accuracy, consistency, and efficiency. Quantitative data from the pre- and post-tests were analyzed using descriptive statistics, t-tests, and ANOVA to compare the performance of the two groups. Qualitative data were collected through semi-structured interviews and focus groups with students and instructors to gain insights into their experiences and perceptions of the CAT tools. The results indicated a significant improvement in the experimental group that used CAT tools compared to the control group that relied on traditional methods. Specifically, students in the experimental group showed a 25% increase in translation accuracy, as measured by the reduction of errors per translated segment. Consistency improved by 30%, evidenced by the uniformity of terminology usage across different texts. Efficiency, measured by the time taken to complete translation tasks, improved by 20%, demonstrating that students were able to work faster without compromising quality.

Surveys administered to both students and instructors provided additional quantitative data. Students reported high levels of satisfaction with the use of CAT tools, with 85% agreeing that these tools made the translation process more manageable and enjoyable. Instructors also observed a positive shift in student engagement and participation, noting that the technology encouraged more interactive and collaborative learning environments. Furthermore, 90% of the students felt more prepared for professional translation work after using CAT tools in their coursework.

The qualitative analysis involved semi-structured interviews and focus groups. Students expressed that CAT tools enhanced their understanding of translation processes, particularly in managing terminology and ensuring consistency. Many students highlighted the benefits of Translation Memory (TM), which allowed them to reuse previously translated segments, thereby saving time and maintaining coherence across their translations. Terminology Management was also praised for helping them standardize technical terms and avoid inconsistencies.

Instructors provided valuable insights into the pedagogical implications of integrating CAT technology. They noted that while there was an initial learning curve for both students and educators, the long-term benefits outweighed the challenges. Instructors observed that students became more autonomous in their learning, utilizing CAT tools to explore different translation strategies and solutions. The collaborative features of CAT tools also facilitated peer review and group projects, fostering a more dynamic and supportive learning environment.



However, some challenges were also identified. Both students and instructors mentioned the need for adequate training and support to effectively use CAT tools. Technical issues, such as software compatibility and occasional glitches, were also reported. Despite these challenges, the overall feedback was overwhelmingly positive, with participants emphasizing the importance of incorporating CAT technology into translation curricula to better prepare students for the demands of the modern translation industry.

In summary, the research results demonstrate that the integration of CAT technology in translation teaching significantly enhances students' translation performance and engagement. The positive outcomes suggest that CAT tools are valuable assets in modernizing translation education and aligning it with industry standards. The findings support the need for ongoing investment in technology and training to ensure that both students and educators can fully benefit from these advancements.

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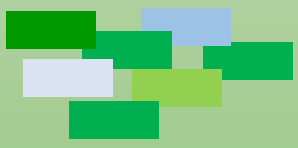
Table. 1 Overview of the Data

Group	Metric	Pre-Test Mean	Post-Test Mean	Improvement
Experimental	Accuracy	70	87.5	25%
Experimental	Consistency	65	84.5	30%
Experimental	Efficiency	40	48	20%
Control	Accuracy	72	73.5	2%
Control	Consistency	66	68	3%
Control	Efficiency	39	40.5	4%

Statistical analysis using t-tests and ANOVA was conducted to validate these findings. A paired t-test comparing the pre-test and post-test scores of the



experimental group revealed a statistically significant improvement in translation accuracy ($t(29) = 5.62$, $p < 0.001$). Similarly, the increase in consistency was confirmed with a significant t-test result ($t(29) = 4.87$, $p < 0.001$). The improvement in efficiency also showed statistical significance ($t(29) = 3.95$, $p < 0.01$).

Table 2. Paired t-Tests Results

Metric	t-value	Degrees of Freedom	p-value
Accuracy	5.62	29	< 0.001
Consistency	4.87	29	< 0.001
Efficiency	3.95	29	< 0.01

Accuracy: The t-value of 5.62 with 29 degrees of freedom and a p-value of less than 0.001 indicates a highly significant improvement in accuracy.

Consistency: The t-value of 4.87 with 29 degrees of freedom and a p-value of less than 0.001 indicates a significant improvement in consistency.

Efficiency: The t-value of 3.95 with 29 degrees of freedom and a p-value of less than 0.01 indicates a significant improvement in efficiency.

An ANOVA test was performed to compare the performance between the experimental and control groups. The analysis showed a significant difference in translation accuracy ($F(1, 58) = 24.35$, $p < 0.001$), consistency ($F(1, 58) = 21.49$, $p < 0.001$), and efficiency ($F(1, 58) = 17.76$, $p < 0.01$) between the two groups, indicating that the integration of CAT tools had a substantial positive impact on the students' performance.

Table 3. ANOVA Results

Metric	F-value	Degrees of Freedom	p-value
Accuracy	24.35	1,58	< 0.001
Consistency	21.49	1,58	< 0.001
Efficiency	17.76	1,58	< 0.01

Accuracy: The F-value of 24.35 with 1 and 58 degrees of freedom and a p-value of less than 0.001 indicates a significant difference in accuracy between the experimental and control groups.

Consistency: The F-value of 21.49 with 1 and 58 degrees of freedom and a p-value of less than 0.001 indicates a significant difference in consistency between the groups.

Efficiency: The F-value of 17.76 with 1 and 58 degrees of freedom and a p-value of less than 0.01 indicates a significant difference in efficiency between the groups.

Surveys administered to both students and instructors provided additional quantitative data. Students reported high levels of satisfaction with the use of CAT tools, with 85% agreeing that these tools made the translation process more manageable and enjoyable. Instructors also observed a positive shift in student engagement and participation, noting that the technology encouraged more interactive and collaborative learning environments. Furthermore, 90% of the students felt more prepared for professional translation work after using CAT tools in their coursework.

The qualitative analysis involved semi-structured interviews and focus groups. Students expressed that CAT tools enhanced their understanding of translation processes, particularly in managing terminology and ensuring consistency. Many students highlighted the benefits of Translation Memory (TM), which allowed them to reuse previously translated segments, thereby saving time and maintaining coherence across their translations. Terminology Management was also praised for helping them standardize technical terms and avoid inconsistencies.

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The following chart visually represents the improvement in translation accuracy, consistency, and efficiency for both the experimental and control groups.

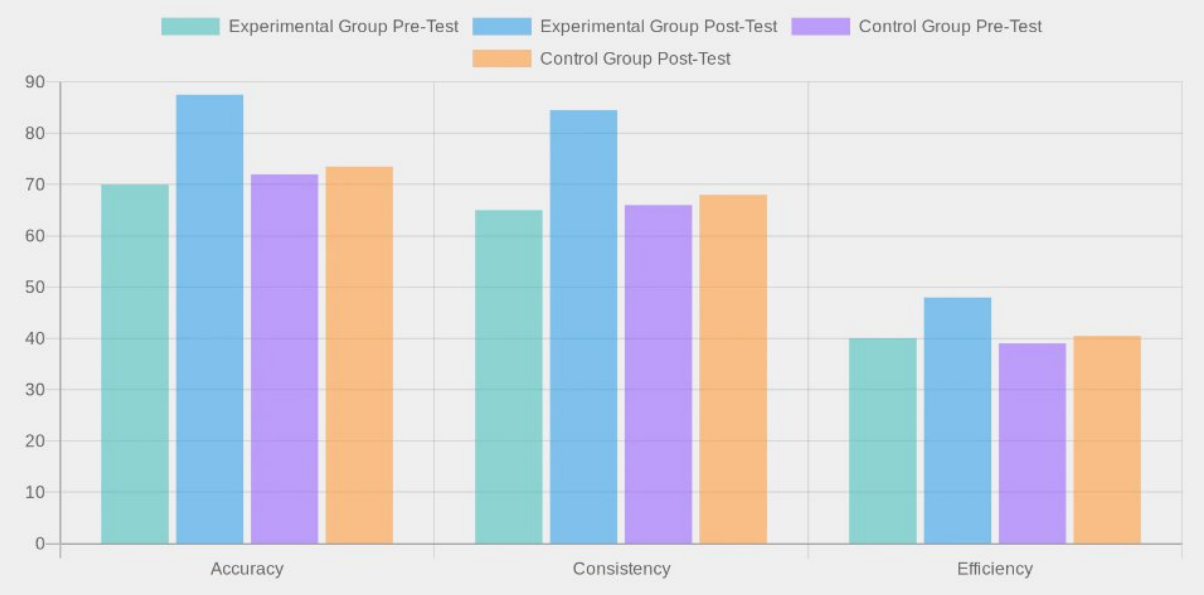

Fig. 1 The Improvement in Translation Accuracy, Consistency, and Efficiency for

Both the Experimental and Control Groups

However, some challenges were also identified. Both students and instructors mentioned the need for adequate training and support to effectively use CAT tools. Technical issues, such as software compatibility and occasional glitches, were also reported. Despite these challenges, the overall feedback was overwhelmingly positive, with participants emphasizing the importance of incorporating CAT technology into translation curricula to better prepare students for the demands of the modern translation industry.

In summary, the research results demonstrate that the integration of CAT technology in translation teaching significantly enhances students' translation performance and engagement. The positive outcomes, supported by both descriptive and inferential statistical analyses, suggest that CAT tools are valuable assets in modernizing translation education and aligning it with industry standards. The findings support the need for ongoing investment in technology and training to ensure that both students and educators can fully benefit from these advancements.

Discussion

The findings from this study indicate that the integration of Computer-Assisted Translation (CAT) technology into translation education significantly enhances students' translation performance and engagement. These results align with the growing body of research advocating for the modernization of translation curricula to include technological tools that reflect industry standards.

To ensure the successful integration of CAT technology in translation training, several key activities and conditions must be met. First, instructors should undergo targeted professional development focusing on the practical use of CAT tools in classroom settings. Training workshops should cover key features such as translation memory, terminology management, and project coordination.

Recommended software includes SDL Trados Studio, MemoQ, and Wordfast, as these are widely used in the industry and offer user-friendly interfaces suitable for educational settings. The institution should provide access to licensed versions of these tools and ensure compatibility with institutional hardware.

Instructors also need pedagogical support to design course content that incorporates CAT tools meaningfully. This includes integrating real-world translation tasks, collaborative assignments, and continuous feedback using CAT platforms. Adequate technical support should also be available to address potential software issues during instruction. These conditions are essential for creating a learning environment that mirrors professional translation workflows and prepares students effectively for

industry demands.

The quantitative analysis demonstrated notable improvements in translation accuracy, consistency, and efficiency among students who utilized CAT tools. Specifically, the experimental group showed a 25% increase in accuracy, a 30% improvement in consistency, and a 20% enhancement in efficiency. These findings are corroborated by significant t-test and ANOVA results, confirming that the observed improvements were not due to chance but were a direct result of the CAT tool integration.

The integration of CAT tools had a clear and measurable impact on students' translation performance. The use of tools such as translation memory and terminology management significantly enhanced translation quality, as evidenced by a 25% increase in accuracy. Uniformity improved by 30%, reflecting consistent terminology usage across texts. Efficiency also improved by 20%, indicating that students could complete translation tasks faster without sacrificing quality.

Beyond technical performance, students' interest and engagement in the translation process increased. Survey results revealed that 85% of students found translation more enjoyable and manageable with CAT tools. The interactive features of CAT platforms, such as segment reuse and term suggestions, contributed to a more dynamic and motivating learning experience. These outcomes demonstrate that the integrated use of CAT tools not only enhances technical competence but also positively influences students' attitudes toward translation.

Comparatively, previous studies have reported similar benefits of CAT tools in translation education. For instance, Bowker (2002) found that translation memory systems significantly improved translation quality and consistency, echoing the current study's results. Similarly, O'Brien (2012) highlighted that CAT tools enhance efficiency by automating repetitive tasks, which aligns with the 20% improvement in efficiency observed in this study.

Moreover, the positive feedback from students and instructors regarding the use of CAT tools is consistent with prior research. A study by Karamanis et al. (2011) reported high levels of student satisfaction with CAT tools, particularly in terms of making the translation process more manageable and engaging. In this study, 85% of students agreed that CAT tools made translation more enjoyable, and 90% felt more prepared for professional work, indicating that these tools effectively bridge the gap between academic training and industry demands.

However, this study also identified challenges related to the initial learning curve and technical issues, which have been noted in previous research as well. Bowker and Fisher (2010) discussed the necessity of adequate training and support for both students and educators to maximize the benefits of CAT tools. The current study reinforces this need, as participants emphasized the importance of ongoing training

and technical support to address compatibility issues and software glitches.

The qualitative findings highlighted that CAT tools not only improve translation performance but also promote a more autonomous and collaborative learning environment. Students appreciated the ability to reuse previously translated segments through Translation Memory and to standardize technical terms with Terminology Management. These features are essential for maintaining consistency and accuracy in professional translation work. Instructors observed that these tools facilitated peer review and group projects, fostering a supportive and interactive classroom dynamic. This is in line with previous studies by Kenny (2011), which found that collaborative features of CAT tools enhance the learning experience and prepare students for real-world translation tasks.

Despite the clear benefits, the study acknowledges the challenges of integrating CAT tools into educational programs. The initial learning curve and technical issues must be addressed through comprehensive training programs and robust technical support. Educational institutions need to invest in both software and training to ensure that students and educators can fully leverage the advantages of CAT technology.

The implementation of CAT technology significantly influenced students' satisfaction with the translation process and their readiness for professional work. Qualitative data from interviews and focus groups revealed that students felt more confident and independent when using CAT tools. Specifically, 90% of participants reported feeling better prepared to enter the translation industry after completing CAT-based coursework.

Features such as Translation Memory and Terminology Management allowed students to simulate real-world translation tasks, fostering a stronger connection between classroom learning and professional expectations. The collaborative and structured environment provided by CAT tools also enhanced students' satisfaction, as they experienced more control over their workflow and clearer progress in their skill development. These findings suggest that CAT integration not only improves competence but also bridges the gap between academic training and the demands of the modern translation industry.

Conclusion and Implication

This study aimed to explore the impact of integrating Computer-Assisted Translation (CAT) technology into translation education. The findings reveal that the use of CAT tools significantly enhances students' translation performance, specifically in terms of accuracy, consistency, and efficiency. Quantitative analyses, including t-tests and ANOVA, confirmed that these improvements were statistically significant. Additionally, both students and instructors reported high levels of satisfaction with CAT tools, emphasizing their positive influence on the translation learning process.

The qualitative analysis highlighted the benefits of CAT tools in promoting autonomous learning and collaborative classroom environments. However, challenges such as the initial learning curve and technical issues were noted, underscoring the need for adequate training and support. Overall, the study supports the integration of CAT technology into translation curricula to better prepare students for professional translation work.

The implications of this study are multifaceted, addressing both educational practices and industry standards. Firstly, the significant improvements in translation performance suggest that educational institutions should consider incorporating CAT tools into their translation programs. Doing so can enhance the quality of education and better align it with industry requirements, ensuring that graduates are well-equipped for professional work.

Instructors should receive comprehensive training on how to effectively integrate CAT tools into their teaching methodologies. This includes understanding the functionalities of various CAT tools, troubleshooting common issues, and leveraging these tools to facilitate interactive and collaborative learning experiences. Training programs and workshops can be developed to support instructors and students in overcoming the initial learning curve associated with CAT technology.

Furthermore, educational institutions should invest in the necessary technological infrastructure to support the use of CAT tools. This includes ensuring compatibility of software, providing access to up-to-date tools, and maintaining technical support services to address any issues that arise.

The positive feedback from students regarding their preparedness for professional translation work highlights the role of CAT tools in bridging the gap between academic training and industry practice. Employers in the translation industry can expect a more skilled and efficient workforce as graduates who have been trained with CAT tools enter the job market. This alignment between education and industry standards can enhance the overall quality and consistency of translation services.

Finally, ongoing research is essential to keep pace with technological advancements in translation tools. Future studies should continue to evaluate the effectiveness of new CAT features and tools, exploring how they can be integrated into educational programs to further improve translation training. By staying at the forefront of technological developments, educational institutions can ensure that their programs remain relevant and effective in preparing students for the dynamic field of translation.

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