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The Use of Information and Computer Technology in the Training of Translators and Interpreters

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Abstract: Over the past decade, the importance of information and communication technologies (ICT) in education has grown dramatically. Many experimental and theoretical studies are aimed at determining the effectiveness of using ICT as a means of forming competencies. The article reveals modern opportunities for training philologists-translators using information and communication technologies. The aim of the study is to consider the role of modern technologies in the formation of information and technological competence of future translators, their advantages, as well as the problems that both students and teachers face when teaching translation using ICT. The effectiveness of ICT depends on the methods and forms of application of these technologies and on how competent the teacher is in working with the electronic resources they use. The particular importance of the formation of information and technological competence in the professional education of a translator is noted. This article examines the integration of modern information and communication technologies (ICT) into the training of translators within the framework of modern higher education. The emphasis is on digital tools, interactive platforms and corpus resources that enhance linguistic competence, translation accuracy and student autonomy. A mixed-method empirical study was conducted among students of translation faculties in Ukraine, and revealed increased cognitive engagement, motivation and skill development through the integration of ICT.

Keywords: digital pedagogy; translator education; corpus linguistics; machine translation tools; educational platforms; artificial intelligence in linguistics; language technologies.

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1. Introduction

Education in the 21st century is a complex process that combines innovative communication technologies with new challenges. It represents a period of transformation and the emergence of new educational approaches, shaped by informatization and globalization. Undoubtedly, these developments lead to changes in the traditional teaching of foreign languages.

A modern approach to education is unthinkable without the integration of advanced computer technologies, as well as new and effective forms and methods of organizing the educational process. In the context of postmodern education, we are witnessing significant, even revolutionary, transformations. Distance education is becoming less prominent, while evening education is no longer widely supported in most institutions.

They are replaced by distance learning, which involves integration into the system of European and world universities (Malakhova & Oharenko, 2008). Creation of telecommunication infrastructure, provision of educational institutions with computer equipment and introduction of mass training programmes are an integral part of the implementation of the national programme of informatisation of the educational process. The use of information technologies and, in particular, the capabilities of the Internet should be available to the widest possible sections of the population of Ukraine, especially the younger generation. In addition, if our country is focused on building an open society, on integration into the world community, the stimulus for the development of information technology can be its active implementation, primarily in the field of science and education (Malakhova & Oharenko, 2008).

Thus, the informatisation of postmodern society as a whole, including the field of education, provides humanity with new opportunities to solve its main problems and support further development. However, it requires the active participation of the entire world community in understanding and implementing the new paradigm. Therefore, Ukraine must not lag behind these world processes and take full advantage of the benefits of twenty-first-century civilisation (Malakhova & Oharenko, 2008).

In recent years, the question of the use of new technologies in the teaching of foreign languages in higher education has arisen. These are not only new forms and means of obtaining information, but also new forms and methods of teaching and a new approach to the educational process. This requires a new way of thinking and a new attitude to the learning process in the era of computerisation of all spheres of human existence in postmodern society.

The processes of general globalisation and integration of postmodern society, characterised by the rapid expansion of international contacts, the accumulation of enormous amounts of information in various fields of human knowledge and the need for rapid mutual exchange of this information, cause researchers to pay close attention to the problems of professional training of future philologists-translators. They should be able to solve problems related to these processes and ensure effective intercultural communication (Nerubasska & Maksymchuk, 2020; Nerubasska et al., 2020).

At this stage, it is necessary to explore the role of translators and translations in the current wave of digital infatuation. As societies increasingly adopt new technology, will translators be “destroyed” by the revolution that is already inventing the so-called “real-time translation”? On the other hand, will their task be to contribute to this process of globalisation through new tools in response to the speed imposed by the new social order? If so, how will they accomplish this task in a high-tech postmodern society?

Psychological and pedagogical aspects of computerisation of the postmodern education are revealed in the scientific achievements of such researchers as Dyson (1997), Kubey (2000), Malakhova and Oharenko (2008), Oliinyk (2009), Sager (1994) et al.

The issue of using the latest computer technologies in teaching, namely in the training of translators, is covered in the works of such scholars as Borrás Giner and Belda Medina (2005), Melby (1992). Researchers claim that the introduction of computer technology into the practice of learning is one of the ways of improving the efficiency of the educational process. Next, the work

of the researchers will be analyzed, which will serve as the basis for determining the results. Today, computer-based learning technology is a novel way of transferring knowledge that corresponds to a qualitatively new content of learning and personal development. This method allows the student to study with interest, to find sources of information, to foster independence and responsibility while receiving new professional knowledge and to develop the discipline of intellectual activity (Oliynyk, 2009).

2. Methodology

The sample of $N = 74$ participants was created taking into account the availability of respondents within the study group and provides a sufficient amount to obtain representative descriptive data and basic statistical conclusions in the framework of a mixed design. The use of a mixed methods approach allowed quantitative survey results to be combined with qualitative observations and interpretations, providing a deeper understanding of the phenomenon under study validity and reliability of the instrument. The questionnaire was pretested through a pilot test on a small group of participants, which allowed for clarification of the wording of the questions and increased clarity of the instrument Content validity was ensured by adapting questions based on instruments already tested in previous studies (Google Translate, DeepL, Trados, Sketch Engine). Pre- and post- testing of translation accuracy, lexical variation, and digital tool usage over 8 weeks

Statistical processing was conducted using SPSS 27.0, with significance set at $p < 0.05$.

The purpose of our study is to consider the role of current technologies in the formation of information and technological competence of future translators, as well as to examine the problems faced by both students and teachers in teaching translation through information and communication technologies in postmodern education.

The study used a mixed-method approach that combines quantitative questionnaires, qualitative interviews, and pedagogical observation to assess the impact of ICT on the training of translators and interpreters.

2.1. Participants

The sample consisted of 74 undergraduate students studying Translation at three Ukrainian universities. The selected participants had experience using ICT in the educational process.

2.2. Instruments

Questionnaire: 25 questions on a Likert scale (1–5) assessing the level of ICT proficiency, frequency of use, and subjective usefulness (CAT tools, machine translation, corpora, speech recognition programmes).

Interviews: semi-structured conversations with 12 teachers regarding methodological approaches and difficulties in integrating ICT.

Observation protocol: standardised form for recording the use of ICT in practical classes (type of tool, student involvement, task complexity).

2.3. Procedure

Before the study began, observers were briefed.

Data collection lasted one academic semester.

Quantitative data were processed using SPSS 27.0 (descriptive statistics, paired t-test, correlation analysis).

Qualitative data were coded thematically using NVivo.

3. Discussion

It is widely acknowledged that technology has a significant impact on all facets of today's society, akin to the transformative effects experienced during the Industrial Revolution. Indeed, the introduction of electronic networks, digital technologies and multimedia is inducing radical changes in a range of economic activities, finance, trade, research, education and leisure. Moreover, the

amalgamation of technologies has given rise to novel products and services, redefining the ways one operates in the ongoing process of transformation and influencing societies globally. One can witness an era marked by information superhighways, high-speed data transmission, communication satellites, ubiquitous computer usage across production and services, as well as the miniaturisation of computers interconnected worldwide (Table 1).

Table 1. ICT Tools in Translator Training: Overview

Type of Tool	Example	Function in Training
CAT Tools	SDL Trados, MemoQ	Terminology management, TM reuse
AI-based MT Tools	DeepL, Google Translate	Drafting, post-editing practice
Concordancers/Corpora	Sketch Engine, BNC Web	Collocation analysis, frequency patterns
Learning Platforms	Moodle, Canvas	Task distribution, resource sharing
Interactive Applications	Quizlet, Mentimeter	Terminology drilling, real-time feedback

All industrial and professional sectors are experiencing this transformation in how they interact with each other, with customers and suppliers, and in how they do business. This affects the organisation of work, production processes and how markets are created. As a result of these changes, the world is seen as a unified entity, while globalisation has become a buzzword in this century's early years. This undeniably impacts industry, economy, society and politics – a wave of decentralisation aiming to eliminate barriers in both time and space, giving rise to a dispersed workforce operating globally from remote locations with their computers, printers, phones and modems in a worldwide interlinked workspace. The traditional notions of time and place have yielded to the concept of “here and now”.

In the 21st century, one cannot ignore the enormous impact of information technology on all levels of society and science, including translation. Therefore, considerable expectations are placed on computer technologies, which in the near future will significantly improve the lives of translators.

Currently, there are several classifications of modern information technologies used in the translation process. We propose a classification based on the following components:

- Hardware - scanner, card reader
- Reference database - terminological sources, online dictionaries, reference books
- Machine translation
- Data formatting software, applications for storing, archiving and searching for translations

Cloud technologies are developing rapidly today. Cloud translation memory systems are more convenient and easier to use than traditional desktop systems. Translators can choose from a wide range of professional cloud products. The characteristics of cloud translation memory systems are a turning point for freelance translators, as well as for small and medium-sized businesses providing translation services. Cloud-based systems offer several advantages over desktop-based solutions:

- Multiple translators can work on the same project and text
- Ability to work on any device, anywhere
- These programmes are constantly being improved
- The latest versions meet the needs of translators in terms of ease of use, accessibility and efficiency.
- Many cloud-based systems are free and can be used after registration
- Automatic software updates.

Cloud-based information technologies used in translation are very popular, and three main classes can be distinguished:

- Computer-assisted translation (CAT) systems
- Trados Studio Professional
- Machine translation (MT)

The most popular are computer-assisted translation (CAT) systems, which appeared almost 30 years ago and are constantly being improved. CAT technology is based on translation memory, which helps to ensure consistency of terminology in large projects. Words, phrases, and even entire sentences previously processed by a translator are stored in the system, eliminating the need to waste time re-checking the same terms in subsequent translations. These databases can be shared with clients or fellow translators to quickly make changes to the translation, correct inaccuracies, and harmonise terminology and style. Machine translation systems are particularly effective in the financial, legal, and technical fields, as they often contain repetitive text. However, while machine translation systems greatly simplify the work of translators, some tasks may still require human translation.

The direct impact is that companies prioritise innovation and creativity, seeking novel products, services, models and strategies, all while contemplating whether one can promptly meet the evolving demands of the market. According to Dyson (1997), it is a process of continuous innovation in the pursuit of maximum competitive advantage through speed, teamwork and real-time response, sometimes even neglecting time-consuming attention to detail.

Thus, two key factors directly related to technology affect translation: market growth and the need for a rapid response. Accordingly, translation, as an industrial process and a product that can support a service business (Nogueira, 1998), must meet new requirements and revise its modes of operation. In this sense, and as noted by Sager (1994), several indicators show that the change is already happening. These indicators suggest a boost in translation output, the establishment of substantial translation organisations to handle extensive datasets and the encouragement to assemble comprehensive teams of translators for information production and interpretation.

The introduction of the first computers in the previous century sparked the concept of employing them for translation purposes. In 1949, the Rockefeller Foundation proposed the mechanisation of the translation process through the use of cryptographic methods, statistics and universal language principles. Abstracts of scientific articles had already been represented using punched cards. In 1951, the first research group dedicated to developing machine translation was established in the United States. Subsequently, in 1954, the inaugural public demonstration of a machine translation system took place. According to Hutchins (1992), the objective of machine translation was to create fully automated, high-quality translation systems producing results indistinguishable from those of human translators. Concurrently, the prevailing notion among researchers was that machine translation was feasible as long as it adhered to a decoding model of the message, implying a word-for-word translation strategy, a tactic often met with limited success (Hutchins, 1992).

Faced with the complexity of languages, semantic and idiomatic barriers, and ambiguity, researchers became somewhat frustrated. In 1966, ALPAC (Advisory Language Processing Automatic Committee) published its famous report (National Research Council, 1966), which concluded that machine translation was slower, less accurate, and more expensive than human-to-human translation, and argued that there were no immediate or predictable prospects of making machine translation useful. Thus, the funding for such a project was decreased, and it was suggested to create practical tools only to support human translators.

Nevertheless, the aspiration to use computers for translation stayed concealed from the scientific community. This is unsurprising when considering that in the 17th century, scholars had already proposed the concept of using mechanical dictionaries to overcome language barriers (Kubey, 2000). They suggested the creation of such dictionaries based on universal numeric codes. Accordingly, it is not surprising that, despite the ALPAC report, research has continued, albeit slowly, outside the United States. This line of research has generated systems such as Météo (used in Canada to translate weather reports); Systran, currently used by the European Commission to translate hundreds of thousands of pages per year; and the Eurotra project, which during the 1980s brought together the efforts of many research groups across Europe to create a machine translation

system that could translate all the languages of the European Community (Shevchuk & Klymenko, 2011).

Machine translation is an attempt to use computers to model non-numerical human activities; it was never intended to eliminate human participation; and chance and accident are not among the aspects to consider when choosing a machine translation system (Pérez, 2001).

Empirical Findings

Table 2 shows the improvement in the quality of students' translations after eight months of ICT-based training. The bar chart compares the average translation scores before and after the integration of digital tools. The visualization clearly shows the improvement in results: after completing the ICT-based training, students demonstrated higher accuracy, better structured translations, and an overall improvement in language quality. Thus, the data in the table confirm the positive impact of ICT use on the development of translation skills.

*Table 2. Improvement in Student Translation Quality After ICT Integration
(Bar Chart depicting average translation scores before and after 8-week ICT-enhanced training)*

Metric	Pre-test Avg.	Post-test Avg.
Lexical Variation	3.4 / 5	4.2 / 5
Terminology Accuracy	3.1 / 5	4.5 / 5
Style and Register Adaptation	3.6 / 5	4.3 / 5
Overall Translation Score	67	84

Key takeaways: Students demonstrated increased terminology precision, improved stylistic adaptation, and better use of domain-specific language after consistent use of ICT tools in practice.

Thus, in the light of translator training courses, it is crucial to emphasise the importance of acquainting students with Internet resources and technologies related to the translation process.

4. Results

Contemporary translation activity requires a multidimensional skill set. Traditionally, the following competencies are distinguished in translator training: communicative (linguistic, pragmatic, and sociolinguistic), special (including subject-specific, discursive, socio-cultural, technological, and strategic), social, and personal (Melby, 1992) (Figure 1).

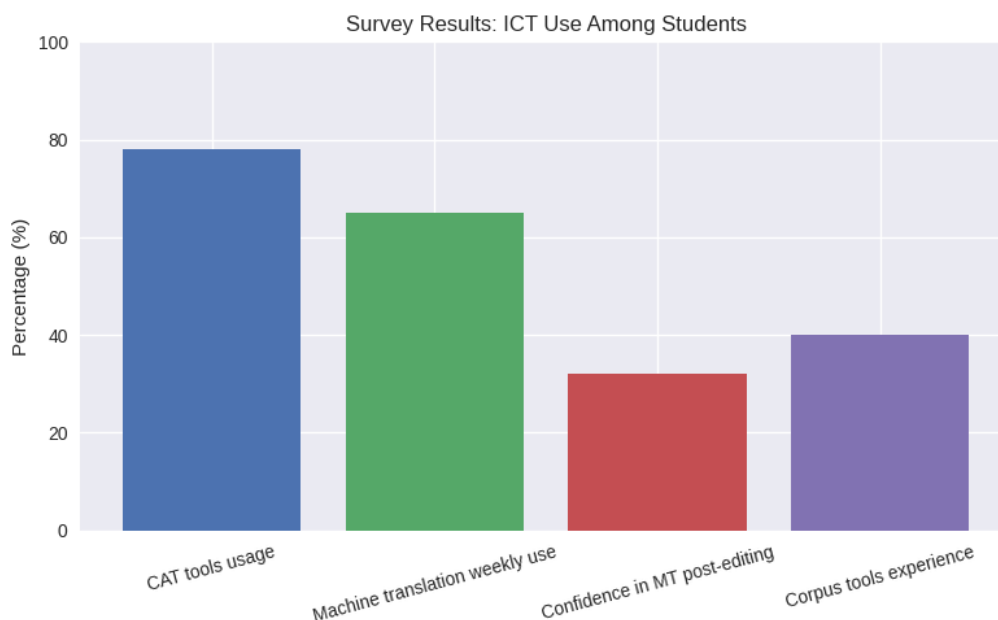


Figure 1. ICT usage indicators among students

1. Survey Results

CAT tools: 78% of students regularly use SDL Trados or MemoQ.

Machine translation: 65% use Google Translate or DeepL every week, but only 32% are confident in editing the results.

Corpus tools: Less than 40% have experience with Sketch Engine or IATE.

Motivation: The average motivation score is 4.3/5; students highly rate ICT, especially in real-world tasks.

2. Statistical analysis

A paired t-test showed a significant increase in confidence in using ICT after the course ($t = 4.87$; $p < 0.001$).

The correlation between the frequency of ICT use and translation accuracy is moderately positive ($r = 0.56$; $p < 0.01$).

3. Interviews with teachers

The need for gradual ICT training was emphasised.

Main difficulties: tool overload, limited access to licensed software, poor preparation for post-editing.

4. Observational data

In classes with interactive use of CAT tools, the level of student engagement was higher.

Speech recognition tasks stimulated collaboration and self-correction. Among these, the informational and technological component has become increasingly significant, especially in light of the digitalisation of society and education. Scholars and practitioners alike emphasise that professional translators must be equipped not only with linguistic expertise but also with digital literacy and technological adaptability. As Borrás Giner and Belda Medina (2005) note, success in professional translation is inseparable from the ability to work within human–computer technological environments, where information tools and methods serve as core mediators of workflow.

In modern translation pedagogy, technological competence is recognised as an essential subdomain of professional competence. It includes:

- Knowledge of information systems and computer-assisted translation (CAT) tools;
- Practical abilities to navigate online databases, multilingual corpora, termbases, and translation memories;
- Flexibility in choosing appropriate technologies for specific translation tasks.

Moreover, the exponential growth of accessible digital resources means that information is no longer limited by physical scarcity. On the contrary, information has become a renewable cognitive resource that can be reused, restructured, and redistributed to support professional learning.

Thus, the inclusion of information technology competence in the translator's competence model is not optional but essential. In this context, such competence refers to a comprehensive integration of knowledge, technical skills, and digital attitudes necessary for effectively performing computer-assisted translation. It also reflects the translator's readiness to self-develop and adapt to innovations in a technologically driven professional environment.

Key Components of Information Technology Competence in Translation:

1. Motivational Readiness – the translator's willingness to use digital tools and solve translation problems with the aid of ICT;
2. Technological Skills and Knowledge – practical mastery of software, platforms, and networks relevant to translation;
3. Self-Improvement Capacity – ability to autonomously enhance expertise and remain professionally relevant in a rapidly evolving information society.

In conclusion, strengthening ICT-based translation competence contributes directly to the professional maturity and digital agency of future translators. It enables them to navigate the informational complexity of the postmodern world, fulfill labour market demands, and contribute meaningfully to multilingual communication.

Table 3. ICT-Supported Competence Areas in Translator Training

Based on their functional focus, ICT-related translation skills can be categorised as follows:

Competence Area	Description
Translation Skills	Use of thesauri, terminology databases, electronic dictionaries
Digital Communication	Email, file exchange, participation in webinars and translation forums
Information Search	Navigation through online encyclopaedias, terminological banks, virtual libraries
Productivity and Automation	Use of scanners, speech input tools, word processors, CAT tools

These technological capacities are essential for meeting current labour market expectations in translation and localisation.

5. Pedagogical Tools and Digital Resources

Educational platforms and technological resources in the translator's digital toolkit include:

- Electronic learning environments (e.g., Moodle)
- Machine translation tools (e.g., Google Translate, DeepL)
- CAT tools using translation memory (e.g., SDL Trados)
- Contextual dictionaries (e.g., Oxford Dictionary, Reverso Context)
- Online collaboration platforms and instructor-led forums

Forums play an important pedagogical role by providing asynchronous communication spaces for assignments and instructor feedback, especially in written translation modules.

6. Implementation Challenges

Despite the widespread availability of digital tools, barriers persist:

- Lack of technical infrastructure: outdated computer labs, limited access to licensed software, insufficient bandwidth
- Gaps in faculty digital competence: instructors may lack training in modern ICT methodologies
- Curricular lag: formal curricula often do not integrate digital translation tools as core components

Negative perceptions: skepticism of machine translation persists due to inexperience or outdated software exposure

Addressing these challenges requires systematic investment and professional development programmes for translation educators.

6. Professional Application and Workplace Automation

Translator roles today are multifaceted, involving both linguistic and interdisciplinary problem-solving. ICT is vital for:

- Translation performance: MT tools, bilingual corpora, glossaries
- Project coordination: file versioning, quality assurance tools
- Terminology management: shared databases, automated consistency checks
- Freelancing: navigating digital marketplaces, avoiding fraud

Figure 1 (not shown) demonstrates how productivity doubles (from ~6–8 to 15–20 pages/day) when CAT tools are properly integrated and post-editing is employed. Modern systems like TRADOS enable terminology harmonisation, match retrieval, and pre-translation based on stored segments—cutting redundant work and increasing output.

5. Conclusion

The work of a translator in current conditions, against the background of widespread computerisation of society, is impossible without the use of information and communication technologies and electronic resources, and the development of information technology competence becomes a priority. Accordingly, for high-quality training of philologists-translators, the following problems require solution:

- a) equipping graduating departments with the necessary equipment and software;
- b) advanced training of teachers of translation disciplines in the field of the latest information and communication technologies;
- c) priority development and improvement of information technology competence of future translators;
- d) development of methods and techniques for training translators using innovative technologies;
- e) providing the translation teacher with the necessary educational and methodological literature.

Thus, the formation and development of information technology competence in both translation teacher and students remain a pressing issue. The main factors hindering the introduction of the latest technologies in teaching translation are the psychological unpreparedness of the translation teachers themselves and the lack of required software in universities.

Thus, the results obtained directly correspond to the research questions posed and demonstrate the original empirical and pedagogical contribution of the study to the study of the effectiveness of ICT in the development of translation skills.

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Authors 1 and 2 considered the role of current technologies in the formation of information technology competence in future translators. Authors 3 and 4 examined the problems faced by both students and teachers in teaching translation through information and communication technologies in postmodern education. Authors 5 and 6 conducted a detailed analysis of recent research and publications on the problem in question and compiled a list of references.

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