

IT technologies in the development of digital literacy

Ekaterina Miletova^{1*} and *Yuliya Chalaya*²

¹Pyatigorsk State University, 9 Kalinin Ave., 357532 Pyatigorsk, Russia

²Institute of Social Sciences and International Relations Sevastopol State University, 33, Universitetskaya St., 299053 Sevastopol, Russia

Abstract. The article is devoted to the study of the impact of IT-technologies on the development of digital literacy in modern society. It is noted that nowadays no sphere of social activity can function without IT-technologies, which leads to the need for the formation and development of digital literacy and digital competencies in modern man. The authors point out that the specifics of IT-technologies, their influence and prevalence today require a comprehensive interdisciplinary approach to study. This study of digital products, proves the effectiveness of IT-technologies in professional activities (mostly in translation practice) while solving a wide range of problems. On the example of Google Translate and PROMT services, the capabilities of IT-technologies that simplify and speed up the translator's work and ensure high quality of translation are shown. Based on the results of the study, the authors conclude that IT-technologies serve as a tool for realizing professionally significant goals and tasks, the solution of which is possible in the presence of digital competencies. The article emphasizes the importance of forming digital literacy of specialists in various industries on the basis of continuous introduction and improvement of IT skills through systematic work with IT technologies and programs.

1 Introduction

The rapid development of information technologies (IT), their widespread implementation in different aspects of modern life, including finance, healthcare, education, etc. [1; 2] emphasized the importance of mastering new competencies and skills in order to solve a wide range of practical problems and have led to the transition from the traditional model to a digital one, implying the active use of IT technologies and the formation of digital literacy in society [3; 4].

As the effectiveness of using IT technologies depends on the ability to work with technical and information tools, the degree of digital literacy of a person is essential here.

The lack of an adequate level of digital literacy is a problem today and entails difficulties both in the process of employment and in subsequent everyday life. Due to the fact that digital literacy accumulates competencies that are essential for life in a digital society, their formation and development should be systematic and logical, which will ultimately improve

* Corresponding author: katemiletova@rambler.ru

the quality of people's lives [5; 6].

2 Main part

2.1 The overview of IT technologies evolution: from the past to the present

When we are asked about IT technologies, we mostly think of computers and the Internet. Nevertheless, before computers and the Internet appeared, humanity went through a long stage of development, during which various inventions were created that laid the foundation for modern IT technologies. Let's go back through the evolution of IT technologies and take a look at the stages of IT development [7] (Table 1).

Table 1. Evolution of IT

<i>Stage of evolution</i>	<i>Description</i>
Pre-Mechanical Age	the usage of symbols and signs for communication and recording the information (cave paintings, hieroglyphics, the abacus)
Mechanical Age	began in the 1800s with the invention of the mechanical calculator, which could perform basic arithmetic operations; the development of the punched card to store and process information in the first digital computers
Electromechanical Age	began in the mid-20th century with the development of the first electronic computers to process information
Transistor Age	began in the late 1940s with the development of the transistor, which replaced vacuum tubes in electronic devices and enabled the development of smaller, more powerful computers
Integrated Circuit Age	began in the late 1950s with the development of the first integrated circuits, which allowed multiple transistors to be integrated onto a single chip. This enabled the development of smaller, faster, and more efficient computers, as well as other electronic devices such as smartphones, tablets, and digital cameras
Personal Computer Age	began in the 1970s with the development of the first personal computers (the Apple II and the IBM PC) and enabled widespread adoption of computing in homes and businesses
Internet Age	began in the 1990s with the widespread adoption of the World Wide Web and the development of the first web browsers which enabled people to communicate, share information, and conduct business on a global scale
Mobile Age	began in the 2000s with the widespread adoption of smartphones and other mobile devices which enabled people to access information and communicate on the go, and have transformed the way we live, work, and socialize
Cloud Age	began in the late 2000s with the widespread adoption of cloud computing which enabled users to access computing resources and services over the Internet, without the need for local infrastructure or hardware

As we can see, at the earliest stage of technology evolution human beings communicated with each other using simple picture drawings created on rock. Later on, there were some attempts to improve and enrich the ways of communication, so the alphabet was created and more and more recorded information appeared. As the time passed many revolutionary technologies were invented and finally modern information technology system emerged.

2.2 Application of IT technologies and the formation of digital literacy

At the present stage of development of society, it is difficult to imagine human life without IT technologies, computers and other devices which are designed to solve various kinds of problems [8; 9]. The activities of any socially significant sphere today are carried out thanks to IT technologies, which make it possible to process and store various types of information. The table below presents the leading areas of IT technologies application, as well as the main directions and methods of their use in each sphere (Table 2).

Table 2. Applications of IT technologies in different spheres of life

<i>Sphere</i>	<i>Description</i>
Healthcare	<ul style="list-style-type: none"> - sending patient's live health conditions to different specialists via the cloud and get suggestions; - comparing health data (X-rays, test results); - keeping a disease registry and publishing reports; - sending E-Prescriptions via email, WhatsApp, or text message; - communicating with doctors via the Internet
Education	<ul style="list-style-type: none"> - online e-libraries offering e-books and resources; - online exams and studies; - online ranking system allowing to compete with students from all over the world
Communications	<ul style="list-style-type: none"> - sharing data around the world regardless of geographical location; - transferring terabytes of data in seconds, increasing not only productivity but also saving a significant amount of time and manpower
Employment	- job openings from all over the world (software engineers, data scientists, cloud analysts, designers, and etc.)
Security	<ul style="list-style-type: none"> - secure reading and transfer of data via risk-free network channels; - data security through the use of passwords, facial recognition, and fingerprint recognition.
Governance	<ul style="list-style-type: none"> - digitalization of government activities; - providing all the necessary resources to the people
Entertainment	<ul style="list-style-type: none"> - watching shows and movies; - listening to music via cable or wirelessly; - special audio systems; - access to global radio channels
Finance:	<ul style="list-style-type: none"> - online banking services (checking account balances, transferring funds, paying bills, etc.); - investment in the stock market
Transportation:	<ul style="list-style-type: none"> - easier to navigate and plan travel; - easier to navigate unfamiliar roads and find the fastest route to the destination
Virtual and Augmented Reality:	<ul style="list-style-type: none"> - immersive learning experiences; - improving of the accuracy of medical procedures; - creating new forms of entertainment

According to the table, IT technologies are actively used within each significant sector of

society's life (finance, healthcare, education, etc.) which, on the one hand, ensures a high quality of implementation of the necessary tasks in all areas of activity, significantly reducing time costs and simplifying algorithms for solving the problem. On the other hand, the growing influence of IT technologies and their systematic implementation in practice expose technical and technological problems, indicate an insufficient level of digital competence of specialists in various fields when switching to electronic work format.

The realities of modern life dictate new conditions and place new demands on us. Evolving and continuously developing, each sphere of social life undergoes significant changes, the awareness of which contributes to a favorable restructuring of the individual, a fairly harmonious transformation and adaptation to the existing situation [10].

2.3 IT technologies and digital literacy (in translation practice): semiotic study

Digital literacy, which implies the basic knowledge, skills and attitudes required by a representative of the digital society, is an integral characteristic of specialists in various fields, including education, learning of foreign languages and translation practice [5].

Nowadays, the phenomenon of digitalization has also been implemented in the translation practice [11; 12; 13]. In order to improve the quality of translation through the introduction of new technologies into professional content, digitalization entails significant changes in translation practice, and requires the specialist to have new skills, creative abilities and computer competencies [14; 15].

A modern translator needs to look for new innovative methods, use various digital resources to save time and efforts and get better results in the end. That is why it is important for a translator to work on his digital literacy through various courses and webinars, self-study of information and, of course, applying the knowledge gained in practice with the help of different online services and programmes, forming certain skills (searching and working with information, Internet security, information and data management, organization of training and communication in a digital environment) [14].

Today a specialist engaged in translation practice must not only know the language and master translation competencies, but also have the skills necessary to work effectively in the information society. As a translator deals with different texts (symbolic information) generated and shared with the help of a computer, the device has become the most important and useful tool of the translator. Therefore, IT technologies such as translation programmes, online dictionaries and services significantly speed up and simplify the translation process.

It should be noted that in the translation process two large classes of technologies are used such as:

- 1) machine translation (MT);
- 2) computer-assisted translation (CAT) [11].

Our study focuses on machine translation which is constantly growing in popularity, this tendency is confirmed by statistical research data (Fig. 1) [16].

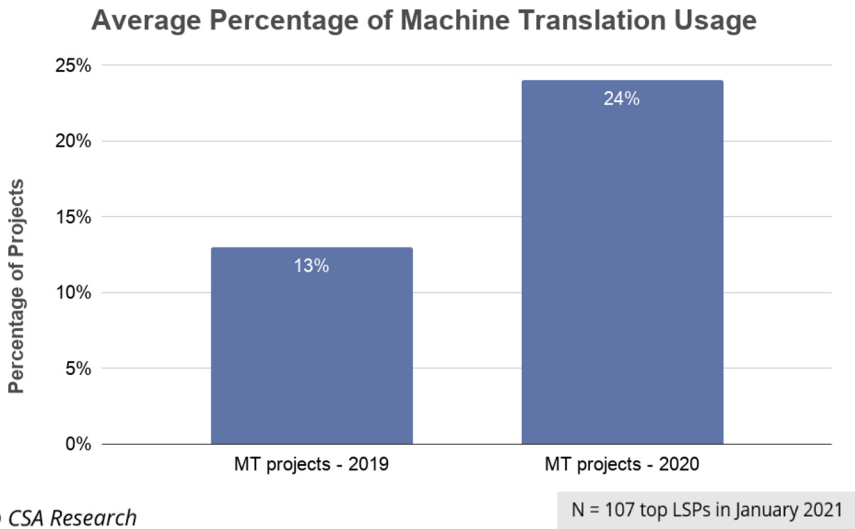


Fig. 1. Machine translation usage statistics

The diagram shows that over time, machine translation services are gaining popularity, as in 2019 the share of their use was 13%, in 2020 – 24%, then in 2023 – more than 40% [16].

In this regard, it is worth noting the results of studies affecting the US translation industry and key areas that use IT technologies to translate the necessary information, which, in addition to identifying the industries themselves, indicate an increase in the share of machine translation in each area (Fig. 2) [17].

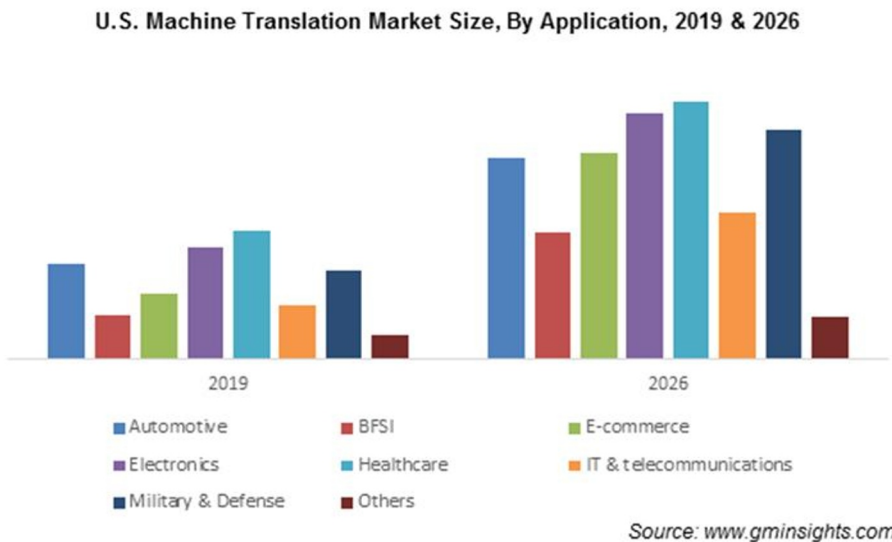


Fig. 2. Machine translation market size

These statistics demonstrate the effectiveness of various machine translation services and programs in solving a wide range of problems within a number of industries.

So, if asked about what machine translation is, it is believed that it is a specific tool aimed at replacing a human translator completely or partially. Among the most famous machine translation programmes Google Translate and PROMT are distinguished. Each programme has its own specifics, pros and cons. These aspects are to be discussed further [18].

The work of Google Translate program is based on statistical analysis of probable matches, according to which the system selects an equivalent for translation, taking into account the frequency uses, choosing the option that has the highest percentage of matches. While using the service, you enter the text in the appropriate field or provide a link to the page that needs to be translated, then select the necessary pair of languages and click the “Translate” button as shown below (Fig. 3) [19].

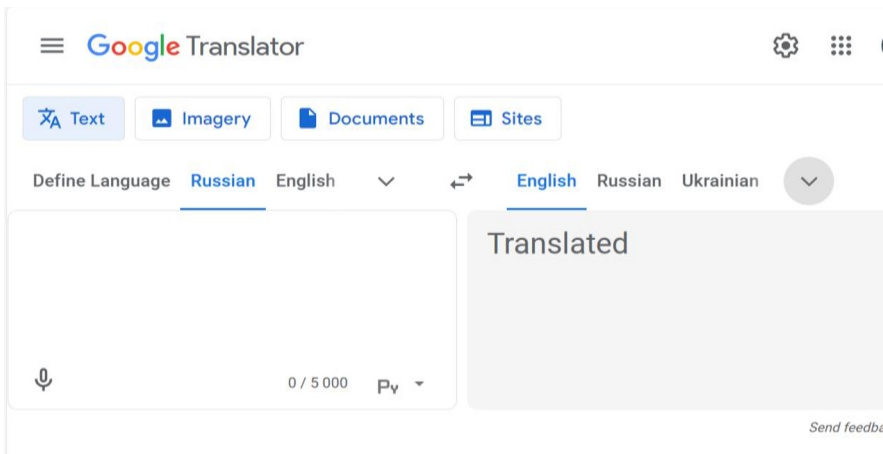


Fig. 3. The starting page of Google Translate online

In addition to translating texts on various topics, Google Translate allows you to translate entire documents and web pages into any language. To solve this problem, you need to select and attach the required document in the program or enter a specific link in the translation field (Fig. 4) [19].

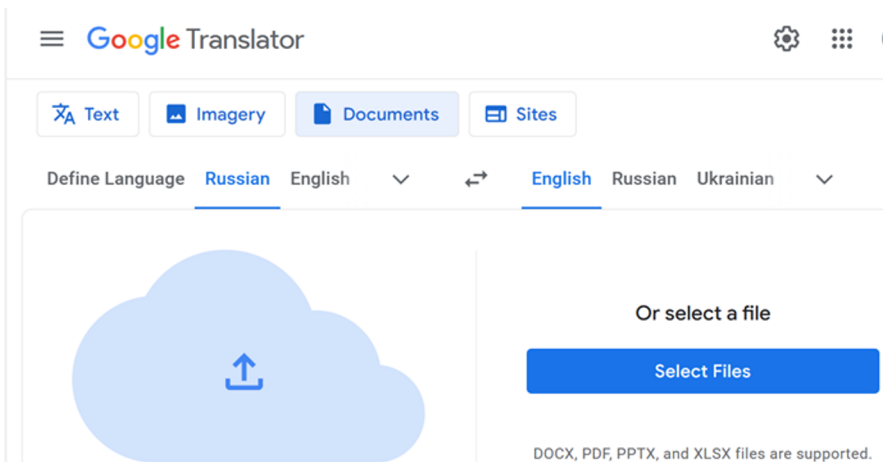


Fig. 4. Selecting a file in Google Translate

While translating large volumes of texts or the whole documents, it is important to take into account the peculiarities of the Google Translate program, namely, it is necessary to check the quality of the translation and make sure that it correctly conveys the meaning of the original message, moreover, translation time may increase.

Still among the main functions of Google Translate program we distinguish:

1. Text translation - allows you to translate text from one language to another.
2. Text translation from a picture - allows you to scan text from a picture or from a PDF file and translate it.

3. Voice translation - broadcasts the conversation into the desired language in real time.

4. Website translation - allows you to translate entire web pages into the desired language.

In comparison with other online translators, Google Translate has certain disadvantages. Firstly, the program does not recognize the context, which is why errors in translation and the selection of the wrong meaning of lexical units are possible. Secondly, the program often does not follow the rules of grammar and punctuation, and the lack of a clear algorithm for correcting errors complicates the process and distorts the result. Thirdly, the quality of translation depends on the language pair used, i.e. texts presented in common languages (English, French, Spanish) are translated more accurately and logically than in rare and little-known languages. Taking into account all that has been stated, we emphasize that the Google Translate program is unable to completely replace the translator, since it is the person who knows both the source and target translations who has the opportunity to evaluate the context, the meanings used and other linguistic phenomena that require a meaningful and conscious approach.

In general, characterizing the Google Translate program and relying on experience with it, we note that the interface of this resource is clear, visually and graphically marked, color solutions provide comfort and ease of use.

Let's move on to the analysis of the online translator PROMT, which is also used by many specialists and not only in translation practice. The PROMT program is a tool for machine translation of texts from one language to another. In addition to simple text translation, the PROMT program also provides the ability to correct and edit the translation. The user can make changes to the translated text, correct errors and improve the quality of the translation. This is especially useful when working with complex and specialized texts.

The PROMT program interface is simple and easy to use. There is a toolbar at the top of the window where you can select the language and direction of translation, as well as configure additional parameters. In the center of the window there is a text input field where the user can enter text for translation. The result of the translation is displayed in the main area of the window, where the user can view the translated text and make adjustments if necessary (Fig. 3) [20].

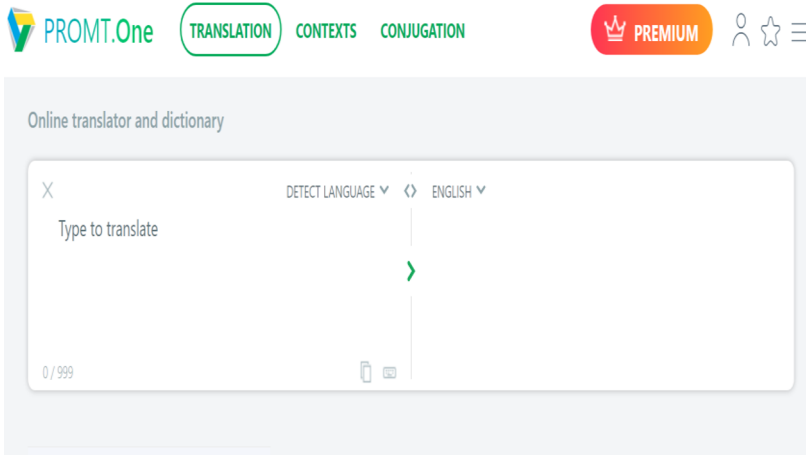


Fig. 5. The starting page of PROMT online

As for the main advantages of the program, we note the following positions:

1. The PROMT program supports a large number of languages and allows you to translate texts between different language pairs.
2. Due to the use of modern machine translation technologies, PROMT ensures high accuracy and quality of text translation.
3. The PROMT program has a simple and clear interface, which makes its use convenient even for non-professionals.
4. PROMT allows you to work without an Internet connection, which is convenient in cases where network access is limited or unavailable.
5. PROMT offers various translation modes, including translation of documents, web pages and text fragments.

At the same time, like the previous resource, the PROMT program has a number of disadvantages, such as:

1. The free version of PROMT has limited features and often contains advertising.
2. Translation of complex and specialized texts is not always accurate.
3. Limited user support especially for the free version.
4. The PROMT program interface may not be entirely convenient for use on mobile devices (e.g. on small screens).

In the table (Table 3) we present the comparative characteristics of the analyzed resources, taking into account the most significant criteria.

Table 3. Google Translate vs. PROMT: comparative analysis

<i>Programme</i>	<i>Main functions</i>	<i>Languages</i>	<i>Interface</i>	<i>Prices</i>	<i>Pros</i>	<i>Cons</i>
Google Translate	translation of texts, documents web pages and images	more than 100	simple interface, bright colours	free	free version, wide functionality	not always an accurate translation, limited offline translation options
PROMT	translation of texts, documents and web pages	more than 20	simple interface, plain colours	not free	high translation accuracy, fast text processing	paid version, limited free version

Summarizing our review concerning the use of IT technologies in translation practice and the development of digital literacy and computer competencies among translation professionals, we note their obligatory nature due to the prevalence of IT technologies and their growing influence in society. In addition, the realities of the present time require certain actions and a completely new approach to solving professional tasks, that is why a qualified specialist working in any industry, including translation, should realize the importance of digital literacy and the relevance of mastering digital competencies.

As for the application of IT technologies in the professional activities of a translator, the choice of available resources is quite wide and is determined solely by specific goals and tasks, individual preferences of a specialist and his/her skills in working with resources. We also emphasize that IT technologies and their use in translation practice will not replace humans in any way, since, as we have found out, all resources and programs are imperfect and allow for inaccuracies and errors, therefore, a specialist who knows languages well is still necessary and in demand.

3 Conclusion

At the present stage of society development and with popularity of IT technologies, their growing influence and intensive implementation in all significant sectors of social activity, people face new challenges and problems. Today for harmonious and full-fledged existence we need completely new competences, so digital literacy and skills of work with IT technologies are of great importance and our main priorities. In order to ensure the comfort and convenience of users, as well as to save time and effort, IT technologies developers improve their products, introducing innovations and developing the functionality of resources and programs. We believe that the consequence of such systematic work is an effective and prompt solution of problems, professionally significant goals and objectives, ensuring the sustainable development of all spheres of life of the society.

References

1. N. Abdulov The contours of the information society. Moscow, 162. (2005)
2. N. Danchenko, O. Litvishko, M. Volov *IT technologies in the digital transformation of separate branches of economy: semiotic perspective*, E3S Web of Conferences **460**, 04033 (2023) doi.org/10.1051/e3sconf/202346004033
3. D. Bawden Origins and Concepts of Digital Literacy. N.-Y.: Peter Lang Publ. (2008)
4. G. N. Dudeney, N. Hockly, M. Pegrum Digital Literacies. Harlow: Pearson (2013)
5. P. Gilster Digital Literacy. New York: Wiley (1997)
6. N. A. Seliverstova Digital literacy, Knowledge. Understanding. Ability, **3**, 220-224, (2021)
7. Applications of Information Technology <https://www.geeksforgeeks.org/applications-of-information-technology> (Last accessed 02.02.2024)
8. Z. S. Shovkhalova, I. A. Magomedov *The impact of information technologies on the transformation of demand for professions*. Economics: Yesterday, Today and Tomorrow, **10 (9A)**, 33-37. (2020) doi.org: 10.34670/AR.2020.86.69.003
9. V. A. Polyakova *Educating potential of virtual space*, Scientific opinion, **11**, 129-136 (2020) doi.org/10.25807/PBH.22224378.2020.11.129.136
10. O. M. Litvishko, T. A. Shiryaeva, E. V. Tikhonova, M. A. Kosycheva, *Professional discourse: the verbal and visual semiosis interplay*, *Research Result*. Theoretical and

- Applied Linguistics, **8 (1)**, 19-40 (2022) doi.org/10.18413/2313-8912-2022-8-1-0-2
11. R. Gaida Programming language and translation, Bulletin of the Baltic Federal University named after I. Kant. Philology, pedagogy, psychology, **1**, 42-48 (2016)
 12. N. K. Garbovsky "Digital translation". Modern realities and forecasts, Russian language and culture in the translation mirror, **1**, 65-72 (2019)
 13. R. K. Potapova New information technologies and linguistics. M.: LENAND (2016)
 14. N. N. Gavrilenko Digital competence is a key component of translator's professionalism PNRPU Linguistics and Pedagogy Bulletin, **3**, 139-150 (2018)
 15. E. A. Morozkina, N. R. Shakirova Using information technologies to optimize the translation process, Bulletin of Bashkir University, **1**, 544-546 (2012)
 16. The Language Sector in Eight Charts <https://csa-research.com/Blogs-Events/Blog/ArticleID/785/The-Language-Sector-in-Eight-Charts> (Last accessed 02.02.2024)
 17. Translation Industry Statistics <https://redokun.com/blog/translation-statistics#translation-industry-statistics> (Last accessed 02.02.2024)
 18. Best Computer-Assisted Translation Software <https://www.g2.com/categories/computer-assisted-translation> (Last accessed 02.02.2024)
 19. Google translate online <https://translate.google.com.pr/?hl=ru&tab=TT> (Last accessed 02.02.2024)
 20. PROMT online translator and dictionary <https://www.online-translator.com/translation> (Last accessed 02.02.2024)