# PRINCIPLES OF DIGITALIZATION IN PHILOLOGICAL EDUCATION AT HIGHER EDUCATION INSTITUTIONS IN POLAND AND UKRAINE

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## INTRODUCTION

Education and training of future specialists for the modern globalized world are defined in international documents as an integral component of national security in every state[1].

Valuable for the development of education are the practices of European countries regarding the European Higher Education Area (EHEA). In the documents of the Ministers of Education Summit (2020) [2] on the formation of the EHEA by 2030, the EHEA is characterized as *an innovative space* with new effective methods and practices of learning, teaching, and research; *inclusive*, with equal access for all participants in the educational process to higher education; and *partnership-oriented*, with common tools for international cooperation between educational institutions, and mobility for staff and students.

In this context, international scientific and educational cooperation and interpersonal interaction between Ukraine and the Republic of Poland play an important role.

Both the Ukrainian and Polish educational spheres are actively seeking optimal structures and content. Slavic context, geographical proximity, linguistic and cultural affinities, and the similarity of folk traditions are considered by Ukrainian and Polish researchers as defining features of cooperation with Ukraine and as factors that highlight the valuable context,

[1] Report of Commission of the European Communities. *Memorandum on Lifelong Learning*. Brussels, 2018. URL: http://arhiv.acs.si/dokumenti/Memorandum_on_Lifelong_Learning.pdf (дата звернення: 19.06.2024).

[2] *Rome Ministerial Communiqué*. 2020. URL: https://www.enqa.eu/wp-content/uploads/2020/09/Preview-of-the-2020-Rome-Ministerial-Communiqu%C3%A9.pdf (дата звернення: 19.06.2024).

particularly in educational cooperation in the field of philology and philological education[3,4].

For both the Polish and Ukrainian educational communities, addressing issues such as the excess of knowledge and its rapid obsolescence, and the often insufficient applicability of acquired educational qualifications to the changing social, economic, and cultural realities is highly relevant. Additionally, trends such as the processes of European integration and the formation of European identity, proficiency in English alongside the state and native languages, digitalization of all spheres of life, and readiness for professional activities in the context of the integration of artificial intelligence into all areas of life are also of great importance[5].

In European countries, there is an increasing emphasis on the growing role of the authoritative International Programme for Student Assessment (PISA), conducted in 2018 and 2022, particularly in terms of reading literacy. In educational institutions, there is a focus on developing competent readers and the importance of training philologists who are adept at working with various texts/media texts in both paper and digital formats.

Philological education in Ukraine and Poland continues to actively develop and transform under the influence of modern digital technologies, including various types of artificial intelligence. Universities and other higher education institutions in Poland and Ukraine are actively integrating these technologies to not only achieve their educational and scientific goals but also to meet European trends and standards. Currently, students of philological faculties in Poland and Ukraine have access to numerous digital tools (from presentation creation programs like Canva and Microsoft PowerPoint to applications like ChatGPT), which make learning more interactive and effective.

These trends of digitalization and reading as a life strategy have highlighted the need to explore the application of key principles of digitalization in philological education in higher education institutions in Poland and Ukraine. To enhance the level of media culture and the use of digital tools, from 2020 to 2024, researchers from the University of

[3] Семеног О. Концептосфера *освіта* в українському та польському дискурсах: міждисциплінарний підхід: монографія: наук. ред. Ю.Громик. Суми : Видавництво СумДПУ імені А. С. Макаренка, 2019. 246 с.

[4] Кремень В. Освіта як запорука миру: шлях до людини. Освіта для миру = Edukacja dla pokoju : зб. наук. пр. / Міністерство освіти і науки України, НАПН України ; [редкол.: В. Г. Кремень, В. П. Коцур, Н.Г.Ничкало, Ф. Шльосек та ін.]. Київ : ТОВ «Юрка Любченка», 2019. Т. 1. С. 6.

[5] Кремень В. Г. (2023). Підготовка вчителя: виклики і відповіді: За результатами наукової доповіді на засіданні Стратегічної сесії керівників закладів вищої освіти, 1 березня 2023 р. *Вісник Національної академії педагогічних наук України*, *5*(1), 1-6. https://doi.org/10.37472/v.naes.2023.5104

Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical University named after A. S. Makarenko (Ukraine) initiated a series of joint projects. These projects are increasingly spreading in the educational and pedagogical fields amidst modern challenges and, as analysis shows, contribute to the formation of information and digital competence among philology students in various institutions.

**Materials and Methods**

The European integration vector of the educational development of countries, the geopolitical conditions of their location, and the "closeness in mentality, history, modern national goals, and interpersonal interaction of peoples" are reflected, in particular, in the Laws of Ukraine "On Higher Education" (2014)[6], "On Education" (2017) [7], and the Polish law "Prawo o szkolnictwie wyższym"[8].

European and Euro-Atlantic integration, the development of human capital, modernization, including the higher education system, and aligning educational standards with the needs of societal development and the best global models (p. 57) are identified as priorities in the National Security Strategy of Ukraine (2020) [9].

A broad thematic spectrum of educational and pedagogical discourse concerning the multi-faceted analysis of the education systems in Poland and Ukraine is offered by Ukrainian scholars (I. Androshchuk, A. Vasylyuk, N. Nychkalo, S. Sysoeva, and others) and Polish scholars (M. Kwiek, R. Grzegorczykowa, K. Denek, B. Sitarska, M. Tonas, and others).

The issues of comparative analysis of higher philological education systems in Ukraine and European countries are the focus of A. Mitkina, A. Samelyuk, and N.Strelok[10]. Philological education in Ukraine under the

[6] Закон України «Про вищу освіту». *Відомості Верховної Ради*. 2014. № 37–38. Ст. 2004. URL: http://zakon2.rada.gov.ua/laws/show/1556-18 (дата звернення: 19.06.2024).

[7] Закон України «Про освіту». *Відомості Верховної Ради*. 2017. № 38–39. URL: http://zakon5.rada.gov.ua/laws/show/2145-19 (дата звернення: 19.06.2024).

[8] *U S T AWA z dnia 20 lipca 2018 r. Prawo o szkolnictwie wyższym i nauce*. URL: http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20180001668/U/D20181668Lj.pdf (дата звернення: 19.06.2024).

[9] Стратегія національної безпеки України. Безпека людини – безпека країни. URL: https://www.president.gov.ua/documents/3922020-35037 (дата звернення: 19.06.2024).

[10] Стрелок Н.В., Самелюк А.В., Мітькіна Є.М. Відмінність і подібність систем вищої філологічної освіти України та європейських держав. *Академічні візії*. 2023. Вип. 18. URL: https://academy-vision.org/index.php/av/article/view/220 (дата звернення: 19.06.2024).

conditions of war and global development challenges is the focus of scientific analysis by I. Berkeshtuk, O.Kuzmenko, and V. Lipych[11].

In previous articles by the authors, the features of training a Ukrainian philology teacher under wartime conditions have been outlined[12], the application of digital methods in teaching philological disciplines [13], innovative platforms for the development of media culture and media literacy among youth[14].

**Aim**

The aim of this study is to characterize the application of key principles of digitalization in philological education at higher education institutions in Poland and Ukraine.

**Objectives**

Based on the analysis of lexicographical and scientific sources, to clarify the understanding of the concept of "digitalization" in the context of higher philological education;

To describe the regulatory framework for digitalization in higher education institutions in Poland and Ukraine within the triad ‘EU level – Poland level – Ukraine level’;

To outline the principles of digitalization in philological education at higher education institutions in Poland and Ukraine;

To present the adherence to the principles of digitalization in philological education at higher education institutions in Poland and Ukraine using the example of courses at the University of Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical

[11] Ліпич В.М., Кузьменко О.Ю., Беркещук І.С. Філологічна наука й освіта України в умовах війни та глобальних викликів розвитку. *Академічні візії.* 2023. Випуск 16. URL: https://academy-vision.org/index.php/av/article/view/152 (дата звернення: 19.06.2024).

[12] Семеног О.М. Підготовка вчителя української філології в умовах війни: європейські пріоритети та національний досвід. *Trends in the development of philological education in the era of digitalization: European and national contexts* : scientific monograph. Riga, Latvia : «Baltija Publishing», 2023. URL: http://surl.li/njdjw (дата звернення: 19.06.2024).

[13] Надутенко М., Надутенко М., Семеног О. Застосування цифрового методу у викладанні філологічних дисциплін (на прикладі віртуальної лексикографічної лабораторії). *Волинь філологічна: текст і контекст.* 2022. Вип. 34, 7–26. URL: https://volyntext.vnu.edu.ua/index.php/volyntext/article/view/1039 (дата звернення: 19.06.2024).

[14] Семеног О.М. Іноваційні платформи для розвитку медіакультури та медіаграмотності молоді. *Інновації і трансфер технологій: методи, моделі та механізми управління* : колективна монографія / Інститут стратегій інноваційного розвитку і трансферу знань ; за ред. д-ра економ. наук В. А. Омельяненка. Суми : Інститут стратегій інноваційного розвитку і трансферу знань, 2023. С.319–337.

University named after A. S. Makarenko (Ukraine) at the first (bachelor's) level of higher education;

To provide examples of grant activities of faculty at the University of Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical University named after A. S. Makarenko (Ukraine), which have an advantage in ensuring the principles of digitalization.

**Methods**

To achieve the goal, general scientific methods of analysis, synthesis, comparison, and generalization were used. The descriptive method and analysis of dictionary definitions were applied in processing linguistic material. The comparative method allowed for the comparison of specific aspects of philological education in Ukraine and Poland; the interpretative-analytical method was used to study official and regulatory documents, scientific works, higher education standards, and educational-professional programs/work programs for philology training; the prognostic method was used to identify possibilities for the effective implementation of elements of European experience in the training of future philologists; presentation and generalization of the experience of cooperation between the University of Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical University named after A. S. Makarenko (Ukraine).

**Axiological Approach.** An important role is assigned to the axiological approach. Polish researcher Kazimierz Denek[15] emphasizes that for education and science, fundamental values include the values of cognition and universal (human) values such as novelty, truth, creativity, responsibility, authenticity, dialogue, openness, and respect.

To analyze educational innovations, we also apply a linguopraxological approach, which is based on the principles of praxeology: quality, success, productivity, effectiveness, and efficiency.

## 1. Theoretical and Methodological Concept of the Term "Digitalization" in the Context of Higher Education

I. Kozubtsov[16] emphasizes the importance of the correct use of phrases involving the word *"digital"* and provides examples such as "education with the use of digital technologies," "learning with the use of digital technologies," and "competence in the use of digital learning technologies."

[15] Denek K. Aksjologiczne aspekty edukacji szkolnej. Torun: Wydawnictwo Adam Marszalek, 1999. 196 s. URL: https://repozytorium.amu.edu.pl/items/719797dd-149c-43af-ae68-c7c9587fa972

[16] Козубцов І.М. Цифрова культура, цифрова грамотність, цифрова компетентність як сучасні освітні феномени. Розвиток професійної культури майбутніх фахівців: виклики, досвід, стратегії, перспективи: збірник V Всеукраїнської науково-практичної конференції (Ірпінь, 24-25 листопада 2022 р.) / ІПООД ім. І.Зязюна НАПН України. 2022. С. 153–156.

In the report by specialists at the General Meeting of the National Academy of Pedagogical Sciences of Ukraine (2022), the concept of "digitalization" is presented as "the saturation of the physical world with electronic-digital devices, means, systems, and the establishment of electronic-communication information exchange between them, which effectively enables the integral interaction of the virtual and physical, thus creating a cyber-physical space." Digital transformation of education (digitalization of education) is presented as an imperative of societal digitalization[17].

***Digitalization*** in higher education institutions (HEIs) is the process of integrating modern digital technologies into all aspects of the educational process. This involves the implementation of electronic resources, online courses, virtual laboratories, and other digital tools to enhance the quality of learning and expand access to educational resources. This process contributes to the transformation of traditional educational models to ensure their flexibility and adaptability to the needs of contemporary students[18] .

The main components of digitalization include: (**A**) *E-learning*: Utilizing online platforms to provide access to learning materials and facilitate distance learning[19]; (**B**) *Blended learning*: Combining traditional learning with online components to enhance the effectiveness of the educational process [20]; (**C**) *Massive Open Online Courses* (MOOCs): Providing access to high-quality education for a wide audience around the world[21].

As shown by our analysis of scientific sources and research conducted at the University of Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical University named after A. S. Makarenko

[17] Кремень В.Г., Биков В.Ю., Ляшенко О.І., Литвинова С.Г., Луговий В.І., Мальований Ю.І., Пінчук О.П., Топузов О.М. Науково-методичне забезпечення цифровізації освіти України: стан, проблеми, перспективи: наукова доповідь загальним зборам НАПН України «Науково-методичне забезпечення цифровізації освіти України: стан, проблеми, перспективи», 18-19 листопада 2022 р. *Вісник Національної академії педагогічних наук України*. 2022. Т. 4, № 2. С. 1–49. DOI: 10.37472/v.naes.2022.4223.

[18] Stanford University. Copyright Protection: What it Is, How it Works. 2021. URL: https://fairuse.stanford.edu/overview/faqs/copyright-basics/ (дата звернення: 19.06.2024).

[19] Garrison D.R., Kanuka H. Blended Learning: Uncovering Its Transformative Potential in Higher Education. *The Internet and Higher Education*. 2004. Vol. 7, No. 2, pp. 95–105.

[20] Bernacki M.L., Walkington C. A systematic review of research on personalized learning. *Journal of Educational Psychology*. 2018. Vol. 110, No. 6, pp. 864–881. DOI: 10.1037/edu0000300

[21] Voogt J., Roblin N.P. A Comparative Analysis of International Frameworks for 21st Century Competences: Implications for National Curriculum Policies. *Journal of Curriculum Studies*. 2012. Vol. 44, No. 3, pp. 299–321.

(Ukraine), the process of digitalization is associated with *the development of digital literacy*. Experts define this term as:

– a necessary skill for future specialists, the ability to effectively use digital technologies to search for, evaluate, and use information, as well as to communicate and collaborate in virtual environments[22];

– a set of skills required for the effective use of digital technologies to search, evaluate, create, and communicate information. It includes technical, cognitive, and socio-emotional components [23]. Age, gender, family socioeconomic status, and parents' education level are key factors influencing students' digital literacy levels. A high level of digital literacy correlates with higher self-control, less technostress, and greater engagement in learning.

Different approaches are used to assess digital literacy, including the application of existing scales, combining various scales, and creating new scales. These methods help teachers and educational policymakers develop strategies to enhance students' digital literacy [24].

In the educational spheres of Ukraine and Poland, the development of *a methodological concept of digitalization* in education continues, focusing on teaching methods and the use of digital tools that support these methods to enhance the effectiveness of the learning process. An important aspect is interactivity and collaboration between students and teachers, facilitated by the use of digital platforms and technologies[25].

Among *the teaching methods* receiving significant attention from educational process participants are: (**A**) Interactive Methods: Interactive lectures, virtual laboratories, and simulations[26,27]; (**B**) Collaborative Technologies: Joint online projects and group assignments to develop

[22] World Intellectual Property Organization (WIPO). *Copyright Basics*. 2021. URL: https://www.wipo.int/copyright/en/ (дата звернення: 19.06.2024).

[23] Hague C., Payton S. A systematic review on digital literacy. *Smart Learning Environments*. 2021. URL: https://slejournal.springeropen.com/articles/10.1186/s40561-021-00158-0 (дата звернення: 19.06.2024).

[24] Hague, C., & Payton, S. (2021). A systematic review on digital literacy. *Smart Learning Environments*. URL: https://slejournal.springeropen.com/articles/10.1186/s40561-021-00158-0 (дата звернення: 19.06.2024).

[25] Zheng, R., & Scavarelli, A. (2021). Virtual reality and collaborative learning: A systematic literature review. *Frontiers in Education*. DOI: 10.3389/feduc.2021.624569

[26] Borge M., Johnson J. Interaction in computer supported collaborative learning: An analysis of the implementation phase. *International Journal of Educational Technology in Higher Education*. 2018. DOI: 10.1186/s41239-018-0096-9

[27] Lee J., Hannafin M.J. A design framework for enhancing engagement in student-centered learning: Own it, learn it, and share it. *Educational Technology Research and Development*. 2016. Vol. 64, No. 4, pp. 707-734. DOI: 10.1007/s11423-015-9422-5

communication and teamwork skills[28,29]; (**C**) Personalized Learning: When instructors use adaptive learning systems and tailor educational content to the individual needs and knowledge levels of students[30].

To implement any of these methods, instructors need to utilize digital tools, among which the most commonly used are: (**A**) *Electronic Platforms*: For example, Moodle and Blackboard, which provide access to learning materials, assignments, and discussion forums[31,32]; (**B**) *Multimedia Resources*: The use of video, audio, graphs, and other multimedia materials to enhance the perception and assimilation of information[33,34]; (**C**) *Virtual Reality* (VR): Implementing VR technologies to create immersive learning environments where students can interact with 3D models and simulations[35,36].

Digitalization also involves the continuous updating of knowledge for both instructors and students, which is critically important in the context of rapid technological changes. This includes ongoing training in new technologies, teaching methods, and management of digital resources[37].

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[28] Liu J., Slater M. Authenticity, interactivity, and collaboration in virtual reality games: Best practices and lessons learned. *Frontiers in Education*. 2020. DOI: 10.3389/feduc.2020.573716

[29] Castañeda L., Selwyn N. Personalisation in educational technology: the absence of underlying pedagogies. *International Journal of Educational Technology in Higher Education*. 2018. Vol. 15, p. 3. DOI: 10.1186/s41239-018-0087-0

[30] Bernacki M.L., Walkington C. A systematic review of research on personalized learning. *Journal of Educational Psychology*. 2018. Vol. 110, No. 6, pp. 864–881. DOI: 10.1037/edu0000300.

[31] World Intellectual Property Organization (WIPO). *Understanding Copyright and Related Rights*. 2016. URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_909_2016.pdf (дата звернення: 19.06.2024).

[32] Dong L., Hou J. (J.), Huang L., Liu Y., Zhang J. Impacts of normative and hedonic motivations on continuous knowledge contribution in virtual community: The moderating effect of past contribution experience. *Information Technology & People*. 2024. Vol. 37, No. 1, pp. 502-520. DOI: 10.1108/ITP-07-2022-0529

[33] Stanford University. Copyright Protection: What it Is, How it Works. 2021. URL: https://fairuse.stanford.edu/overview/faqs/copyright-basics/ (дата звернення: 19.06.2024).

[34] Garrison D.R., Kanuka H. Blended Learning: Uncovering Its Transformative Potential in Higher Education. *The Internet and Higher Education*. 2004. Vol. 7, No. 2, pp. 95–105.

[35] Liu J., Slater M. Authenticity, interactivity, and collaboration in virtual reality games: Best practices and lessons learned. *Frontiers in Education*. 2020. DOI: 10.3389/feduc.2020.573716

[36] Zheng R., Scavarelli A. Virtual reality and collaborative learning: A systematic literature review. *Frontiers in Education*. 2021. DOI: 10.3389/feduc.2021.624569

[37] UNESCO. *Media and Information Literacy, a critical approach to literacy in the digital world*. 2017. URL: https://www.unesco.org/en/media-and-information-literacy (дата звернення: 19.06.2024).

Digitalization of education and science in higher education institutions ensures a more efficient, flexible, and accessible educational process and contributes to the development of digital literacy among future philology specialists. It enables the creation of new forms of learning that meet the needs of students and instructors, support their continuous professional development, and facilitate their integration into the global educational space.

**Regulatory Framework for the Digitalization of Education and Science: From the European Union Level to the Ukrainian Level**

Currently, the digitalization of education and science is regulated by a number of documents and initiatives, which we will present in the triad 'EU level – Poland level – Ukraine level'.

**EU Level**

In the modern world, the digital transformation of education is a necessary condition for the development of effective and inclusive educational systems. The strategic priorities for digital education in the European Union are outlined in the *Digital Education Action Plan 2021-2027*[38], which includes two key aspects: (A) improving the educational process through digital technologies and (B) ensuring digital competencies for all participants in the educational process.

The COVID-19 pandemic revealed the need for rapid adaptation to digital technologies, which allowed for the continuation of education during lockdowns, stimulated the mass use of digital tools, and exposed significant gaps, particularly the uneven access to digital technologies among different segments of the population. Consequently, there has been an increased need to ensure high-quality and inclusive digital education, resulting in significant investments in digital infrastructure, professional training, and the creation of accessible digital content[39].

The primary direction of action, as stated in the documents, is the development of digital skills and literacy at all levels of education. It is assumed that this will help increase economic growth, innovation, and create a more equitable and sustainable society. Ensuring basic digital skills for all citizens is a key element of this strategy, as digital literacy has become essential for everyday life[40].

To support this transformation, the Action Plan envisages the use of EU tools such as the Erasmus, Horizon Europe, and Digital Europe programs to improve digital infrastructure, train teachers, and develop high-quality

[38] *Digital Education Action Plan 2021–2027*. pp. 3–4. URL: https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf (дата звернення: 19.06.2024).

[39] Ibid. p. 9.

[40] *Digital Education Action Plan 2021–2027*. pp. 3–4. URL: https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf (дата звернення: 19.06.2024).

digital educational content[41]. Additionally, the European Commission plans to develop guidelines for the successful digitalization of education, including measures to close gaps in connectivity and equipment, support educational institutions in adapting to digital technologies, and develop ethical guidelines for the use of artificial intelligence in education (Ibid.).

A key aspect of digital education is inclusivity, ensuring equal access to digital technologies for all participants in the educational process regardless of their socio-economic status or place of residence. This requires significant investments in digital infrastructure and professional development of teachers, which will create an inclusive educational environment for all[42].

To support scientific activities, the document emphasizes the need to develop advanced digital skills and competencies through initiatives such as digital internships for students and teachers, and encouraging women's participation in STEM disciplines. This will help create a more inclusive and equitable environment in science and technology[43].

Therefore, the use of modern digital technologies in education and science is necessary to create a high-quality, accessible, and inclusive educational ecosystem. This will enhance the EU's competitiveness on the global stage and ensure sustainable development of society in the digital age.

**Poland Level**

Digitalization of education is an important aspect of the development of modern society and economy. In Poland, this process is actively regulated through the Digital Competence Development Program (PRKC), approved by the Council of Ministers on February 21, 2023. The document outlines strategies and measures aimed at integrating digital technologies into educational processes, improving digital skills among the population, and ensuring equal access to digital resources.

**Priority I: Development of Digital Education**

This priority focuses on integrating digital technologies into the educational processes at all levels. The main measures include:

(A) Equipping educational institutions with modern computer equipment and high-speed internet, which ensures access to digital resources (pp. 62–71);

(B) Developing digital educational materials and platforms for online learning that meet modern educational standards (pp. 62–71);

[41] *Digital Education Action Plan 2021–2027*. pp. 10–11. URL: https://education.ec.europa.eu/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf (дата звернення: 19.06.2024).

[42] Ibid. p. 13.

[43] Ibid. p. 14.

(C) Training teachers to use the latest technologies in education, including training sessions and professional development courses (p. 71).

**Priority II: Ensuring the Development of Digital Competencies for All Citizens**

This priority aims to create conditions for the continuous development of digital skills among various population groups, including students, teachers, and the elderly. The main measures include:

(A) Supporting digital literacy programs for all age groups, particularly children, the elderly, and people with disabilities (pp. 78–83);

(B) Organizing online courses and providing access to digital resources for self-study (pp. 78–83);

(C) Promoting digital integration by reducing barriers to technology access for vulnerable groups (p. 83).

**Priority III: Supporting Digital Competencies of Working Individuals**

This priority focuses on improving digital skills among the working population, including public sector employees and entrepreneurs. The main measures include:

(A) Organizing training and seminars to teach workers the digital skills necessary for the modern labor market (pp. 87–94);

(B) Supporting small and medium-sized businesses in implementing digital technologies to enhance their competitiveness (p. 92);

(C) Collaborating with the business community to identify digital competency needs and develop relevant educational programs (p. 94).

**Priority IV: Development of Advanced Digital Competencies**

This priority focuses on supporting highly qualified specialists in the field of information technology. The main measures include:

(A) Supporting educational programs for the development of IT specialists, including artificial intelligence and big data processing (pp. 103–109);

(B) Stimulating innovation through scientific research and the implementation of the latest technologies in educational programs (p. 109);

(C) Providing access to advanced learning resources for students and teachers (p. 109).

**Priority V: Strengthening the Management of Digital Competence Development**

This priority involves coordinating the actions of various stakeholders in the process of developing digital competencies. The main measures include:

(A) Establishing a management and coordination system at the national level (pp. 109–112);

(B) Monitoring and evaluating the effectiveness of the measures outlined in the program (pp. 112–119);

(C) Ensuring stable funding for digital competence development programs (pp. 119–124).

The Digital Competence Development Program (PRKC) in Poland is a strategic document that defines key directions and measures for the digitalization of education. It covers all aspects of digital skill development, from the basic needs of students to specialized programs for IT professionals. The implementation of this program will contribute to the creation of a modern education system that meets the requirements of the digital economy and society.

**Ukraine Level**

In the modern world, the digitalization of education and science is critically important for national development. In Ukraine, this process is regulated by the "Concept of Digital Transformation of Education and Science for the Period Until 2026" (KCTON-2026)[44], which outlines the main directions and goals that contribute to the modernization of the educational system in the digital age.

The current education and science system in Ukraine requires fundamental changes to align with global digital development trends. The COVID-19 pandemic has further emphasized the need for the development of digital technologies to ensure citizens' right to quality education under uncertain conditions. Consequently, digital competencies have become a basic need for every citizen, and the education system must ensure their development for both students and educational and scientific staff[45].

The concept identifies several key issues for successful digital transformation:

(A) Low level of digital competencies among educational process participants;

(B) Outdated content of educational programs in information and communication technologies (ICT);

(C) Lack of modern equipment and sufficient internet coverage in educational institutions;

(D) Insufficient quality of digital educational content;

(E) Bureaucratic processes in document management in educational institutions[46].

[44] Концепція цифрової трансформації освіти і науки на період до 2026 року. *Урядовий портал.* URL: https://www.kmu.gov.ua/news/koncepciya-cifrovoyi-transformaciyi-osviti-i-nauki-mon-zaproshuye-do-gromadskogo-obgovorennya (дата звернення: 19.06.2024).

[45] Ibid.

[46] Ibid.

To address these issues, the Concept outlines several strategic goals:

(A) Creating an accessible and modern digital educational environment by equipping educational institutions with necessary technology and broadband internet access;

(B) Developing digital competencies among education staff by incorporating this requirement into professional education standards and regular professional development;

(C) Updating educational content by revising ICT curricula and implementing distance learning courses;

(D) Optimizing and automating management processes through the introduction of electronic platforms for managing educational processes;

(E) Ensuring access to reliable data by creating a unified system for collecting and processing data in the field of education and science[47].

The measures to achieve these goals include:

(A) Providing educational institutions with computer equipment and software;

(B) Organizing regular professional development courses for educational staff;

(C) Updating educational programs to meet modern ICT requirements;

(D) Implementing interactive and distance learning platforms;

(E) Creating electronic systems for managing educational processes and accessing data[48].

The implementation of the Concept will contribute to:

(A) Improving the level of digital competencies among educational process participants;

(B) Creating a modern digital educational environment;

(C) Optimizing and automating management processes in the education and science system;

(D) Increasing the transparency and efficiency of using digital technologies in the educational process[49].

The funding for the implementation of the measures will come from the State Budget of Ukraine and other sources not prohibited by law. The expenditure amounts will be clarified annually, considering the capabilities of the state budget (КСТОN-2026, p. 6).

This approach will ensure the effective use of digital technologies to improve the quality of education and science, increase the country's

[47] Концепція цифрової трансформації освіти і науки на період до 2026 року. *Урядовий портал.* С. 9. URL: https://www.kmu.gov.ua/news/koncepciya-cifrovoyi-transformaciyi-osviti-i-nauki-mon-zaproshuye-do-gromadskogo-obgovorennya (дата звернення: 19.06.2024).

[48] Ibid.

[49] Ibid. С. 5–6.

competitiveness, and adapt specialists, particularly in philology and philological education, to the modern challenges of the digital world.

## 2. Principles of Digitalization in Philological Education at Higher Education Institutions in Poland and Ukraine

An analysis of legislative, regulatory, and scientific sources from Poland and Ukraine provides grounds for considering the concept of "digitalization of philological education" as the process of integrating modern digital technologies into the educational process to enhance education quality, accessibility to learning materials, and the efficiency of the educational process. In both countries, this process has its characteristics shaped by national educational traditions, state programs, and infrastructure.

In Poland, the digitalization of philological education is actively developed through state initiatives and support from the European Union. One of the key programs is "Cyfrowa Szkoła" (Digital School), aimed at developing infrastructure and training teachers. Polish universities implement distance learning platforms such as Moodle and Blackboard, which allow students to access lectures, materials, and interactive sessions online. An important element is also the use of electronic libraries and databases that provide students with access to world-class scientific resources.

In Ukraine, the digitalization of philological education has significant achievements thanks to initiatives by the Ministry of Education and Science of Ukraine and international cooperation programs. In particular, Ukrainian universities actively use distance learning platforms such as Google Classroom and Zoom. Thanks to digital education projects, electronic textbooks and teaching aids have been developed and made available. Ukrainian higher education institutions are actively involved in European exchange programs such as Erasmus+, which promotes the exchange of experience and the implementation of best digitalization practices.

In both countries, the digitalization of philological education enhances the accessibility of learning resources, the flexibility of the learning process, and the integration of students into the global educational space. However, challenges such as the need to improve the digital literacy of teachers and students, ensure high-quality technical infrastructure, and adapt traditional teaching methods to digital realities remain relevant.

**Experience of Implementing Key Digitalization Principles in Selected Courses at the Bachelor's Level**

*University of Economics and Human Sciences in Warsaw (Poland) – "A Philologist's Workshop: Modern Technologies and Career Paths"*

Course Objectives:

**The course aims** to provide students with the knowledge and practical skills necessary for a successful career in philology. It focuses on developing professional competencies, familiarizing with modern tools and

methods, and understanding challenges related to copyright and technological progress.

Course Tasks:

– Introduce the main directions for a philologist's career development, stages of education, and labor market analysis;

– Study issues related to copyright in the work of a philologist;

– Teach the use of tools for finding scholarly materials (Google Scholar, JSTOR, EBSCO);

– Master methodologies for searching various types of content and proper use of search engines;

– Solve linguistic and stylistic dilemmas using tools like Proz and Ngram Viewer;

– Familiarize with qualitative analysis methods in humanities and social sciences (content analysis, focus groups);

– Study challenges related to technological development, particularly machine translation;

– Master software used in philology, including office suites, CAT systems, and programs for processing audiovisual materials;

– Practical training in using CAT systems, translation memory programs, and document processing tools;

– Use specialized software for language and pronunciation analysis, including SIL packages, UCL Phonetics Department programs, and PRAAT;

– Train in creating audio and video materials (Audacity) and programs for creating documents and bibliographies (LaTeX, Zotero, Mendeley);

– Master tools for teaching translation studies (OmegaT) and online dictionaries (Freelang);

– Use language corpora (AntConc, Колокатор, Wmatrix) in research work.

A deep analysis of syllabi indicates that *digitalization of the educational process remains a key factor in training specialists*. In the field of philology, we observe adherence to digitalization principles, which we will attempt to formulate considering the latest trends in information technology and their impact on the educational and professional activities of philologists.

*Principle 1: Integration of Modern Digital Tools*

Using the latest software tools enhances the efficiency of the educational process[50,51,52,53]. This involves the implementation of tools such as

[50] Boholano H.B. Smart Social Networking: 21st Century Teaching and Learning Skills. *Research in Pedagogy*. 2017. Vol. 7, No. 1, pp. 21–29. DOI: 10.17810/2015.45

[51] Chai C.S., Koh J.H.L., Tsai C.-C. A Review of Technological Pedagogical Content Knowledge. *Educational Technology & Society*. 2013. Vol. 16, No. 2, pp. 31–51.

computer-assisted translation (CAT) systems, text and language data analysis programs (e.g., PRAAT, AntConc), and online resources for finding scholarly publications (Google Scholar, JSTOR, EBSCO). Such integration familiarizes students with advanced technologies essential for their professional activities as philologists.

*Principle 2: Accessibility and Flexibility of Learning*

Digital technologies provide access to educational materials and tools anytime and anywhere, fostering flexibility in the learning process[54,55,56,57,58]). This allows students to manage their time and studies more effectively. The use of online platforms for distance learning and electronic libraries expands opportunities for gaining knowledge and increases overall educational accessibility.

*Principle 3: Personalization of the Educational Process*

Digital technologies enable the creation of individual learning trajectories that consider each student's needs and interests ([59,60,61,62]). This

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[52] Ertmer P.A., Ottenbreit-Leftwich A.T. Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect. *Journal of Research on Technology in Education*. 2010. Vol. 42, No. 3, pp. 255–284.

[53] Gil-Flores J., Rodríguez-Santero J., Torres-Gordillo J.-J. Factors that Explain the Use of ICT in Secondary Education Classrooms: The Role of Teacher Characteristics and School Infrastructure. *Computers in Human Behavior*. 2017. Vol. 68, pp. 441–449.

[54] Al-Azawei A., Parslow P., Lundqvist K. Barriers and Opportunities of E-Learning Implementation in Iraq: A Case of Public Universities. *International Review of Research in Open and Distributed Learning*. 2017. Vol. 18, No. 1, pp. 221–240. DOI: 10.19173/irrodl.v18i1.2711

[55] Garrison D.R., Kanuka H. Blended Learning: Uncovering Its Transformative Potential in Higher Education. *The Internet and Higher Education*. 2004. Vol. 7, No. 2, pp. 95–105.

[56] Moore M.G. *Handbook of Distance Education* (3rd ed.). New York: Routledge, 2013.

[57] Seale J. E-learning and Disability in Higher Education: Accessibility Research and Practice. New York : Routledge, 2013.

[58] West R.E., Graham C.R. Benefits and Challenges of Blended Learning Environments: The Student Perspective. *The Internet and Higher Education*. 2007. Vol. 10, No. 3, pp. 179-188.

[59] Castañeda L., Selwyn N. Personalisation in educational technology: the absence of underlying pedagogies. *International Journal of Educational Technology in Higher Education*. 2018. Vol. 15, p. 3. DOI: 10.1186/s41239-018-0087-0

[60] Bernacki M.L., Walkington C. A systematic review of research on personalized learning. *Journal of Educational Psychology*. 2018. Vol. 110, No. 6, pp. 864–881. DOI: 10.1037/edu0000300

[61] Murphy R.F., Mushayandebvu M.F. Personalized learning in digital environments. *Computers & Education*. 2020. Vol. 152, Article 103877. DOI: 10.1016/j.compedu.2020.103877

leads to deeper material comprehension and development of professional competencies. Personalized education adapts the learning process to students' individual abilities and learning paces.

*Principle 4: Development of Digital Literacy*

A key goal of the course is to teach students to use various digital tools and resources, thereby enhancing their overall digital competence and preparing them for the demands of the modern labor market [63,64,65]. Learning to use software for processing audio and video materials (Audacity), creating documents and bibliographies (LaTeX, Zotero, Mendeley), and other specialized programs provides comprehensive training for future philologists.

*Principle 5: Interactivity and Collaboration*

Using interactive platforms and tools for collaborative work actively engages students in the educational process and develops their communication skills[66,67,68,69,70]. Interactive teaching methods, including group projects and discussions, increase motivation and help students better understand the material.

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[62] Lee J., Hannafin M.J. A design framework for enhancing engagement in student-centered learning: Own it, learn it, and share it. *Educational Technology Research and Development*. 2016. Vol. 64, No. 4, pp. 707–734. DOI: 10.1007/s11423-015-9422-5

[63] Xie H., Chu H.C., Hwang G.J., Wang C.C. A systematic literature review of personalized learning terms. *Smart Learning Environments*. 2019. Vol. 6, pp. 1–16. DOI: 10.1186/s40561-019-0096-9

[64] Krelova, K. K., Berkova, K., Krpalek, P., & Kubisova, A. (2021). Attitudes of Czech college students toward digital literacy and their technical aids in times of COVID-19. *International Journal of Engineering Pedagogy (iJEP*, *11*(4), 130–147. DOI: 10.3991/ijep.v11i4.21033

[65] Prior, D. D., Mazanov, J., Meacheam, D., Heaslip, G., & Hanson, J. (2016). Attitude, digital literacy and self efficacy: Flow-on effects for online learning behavior. *The Internet and Higher Education*, *29*, 91–97. DOI: 10.1016/j.iheduc.2016.01.001

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[68] Liu J., Slater M. Authenticity, interactivity, and collaboration in virtual reality games: Best practices and lessons learned. *Frontiers in Education*. 2020. DOI: 10.3389/feduc.2020.573716

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[70] Bernard R.M., Abrami P.C., Lou Y. Interaction in distance education and online learning: Using evidence and theory to improve practice. *Springer*. 2010. DOI: 10.1007/978-1-4419-1534-0

*Principle 6: Continuous Knowledge Update*

Digital technologies ensure constant access to current information and new research through digital libraries and databases[71,72,73]. This allows students to stay informed about the latest trends and developments in philology, which is crucial for maintaining a high level of professional competence.

*Principle 7: Protection of Copyright*

The use of digital tools also ensures adherence to copyright laws. Students learn proper citation and the use of licensed materials, which is an important aspect of professional ethics for philologists[74,75,76].

Application of Digital Tools in Philological Education

A positive practice is the use of various computer programs by students to meet different professional needs according to the main linguistic levels, from phonological to syntactic. Below, we will discuss the main programs and examples of their application.

*Example: Phonetic and Phonological Analysis Using PRAAT*

One of the effective tools for conducting ***phonetic and phonological analysis***, which has proven its efficacy among UEHS students, is PRAAT. This program allows students to analyze the acoustic characteristics of sounds, create spectrograms, visualize data, and more (see Figure 1). The work with this program involves several stages:

1. **Recording Speech Samples**: Students record speech samples for analysis, including words and phrases in English and Polish containing various phonemes.

2. **Uploading Audio Files**: Students upload the recorded audio files into PRAAT for analysis.

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[71] Dong L., Hou J. (J.), Huang L., Liu Y., Zhang J. Impacts of normative and hedonic motivations on continuous knowledge contribution in virtual community: The moderating effect of past contribution experience. *Information Technology & People*. 2024. Vol. 37, No. 1, pp. 502-520. DOI: 10.1108/ITP-07-2022-0529

[72] UNESCO. *Continuous assessment for improved teaching and learning: A critical review to inform policy and practice*. 2017. URL: https://unesdoc.unesco.org/ark:/48223/pf0000255511 (дата звернення: 19.06.2024).

[73] UNESCO. *Media and Information Literacy, a critical approach to literacy in the digital world*. 2017. URL: https://www.unesco.org/en/media-and-information-literacy (дата звернення: 19.06.2024).

[74] Stanford University. Copyright Protection: What it Is, How it Works. 2021. URL: https://fairuse.stanford.edu/overview/faqs/copyright-basics/ (дата звернення: 19.06.2024).

[75] World Intellectual Property Organization (WIPO). *Understanding Copyright and Related Rights*. 2016. URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_909_2016.pdf (дата звернення: 19.06.2024).

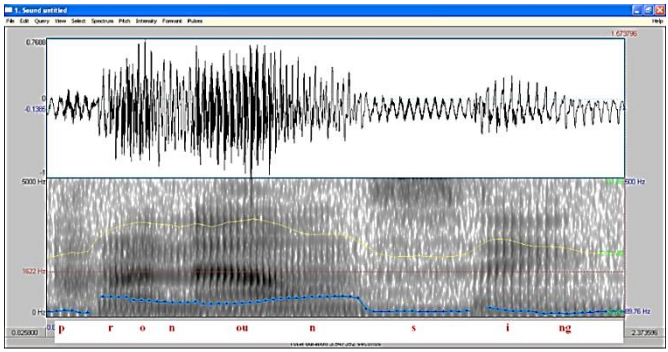
[76] World Intellectual Property Organization (WIPO). *Copyright Basics*. 2021. URL: https://www.wipo.int/copyright/en/ (дата звернення: 19.06.2024).

3. **Spectral Analysis**: Performing spectral analysis to visualize the acoustic characteristics of sounds.

4. **Adding Transcriptions and Annotations**: Students add transcriptions and other annotations for each sound fragment.

5. **Comparing Acoustic Characteristics**: Comparing the acoustic characteristics of sounds in English and Polish.

This practical approach not only helps students understand theoretical concepts but also equips them with hands-on skills necessary for professional work in philology.




**Pic. 1. PRAAT. Example of Pronouncing**[77]

Students at the University of Economics and Human Sciences (UEHS) successfully applied digital tools to analyze phonetic and phonological aspects of English and Polish. This practical use of software such as PRAAT allowed them to delve into detailed acoustic analyses, demonstrating the software's efficacy in highlighting significant linguistic differences. In studying English, students focused on analyzing sounds such as short and long vowels. They examined the sound /i:/ in the word "beet" and the sound /ɪ/ in the word "bit." Spectrogram creation for each sound revealed differences in the formants F1 and F2, responsible for the height and position of the sound. Measurements of F1 and F2 values for /i:/ and /ɪ/ showed that /i:/ has a lower F1 and higher F2 compared to /ɪ/. For Polish, students analyzed nasal vowels, characteristic of the language. For instance, they studied the sounds /ɔ̃/ in "kąt" and /ɛ̃/ in "męża." Spectrogram analysis showed the presence of nasal formants indicating nasal articulation, and measuring F1, F2, and nasal formants helped identify the specific acoustic characteristics of these nasal vowels.

[77] https://upload.wikimedia.org/wikipedia/commons/3/30/Pronouncing.PNG; Rjanag, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons

The PRAAT analysis not only confirmed its effectiveness but also allowed students to uncover important phonetic and phonological differences between English and Polish. Spectral analysis and formant measurements provided precise acoustic characteristics for each sound. For example, students found that English short and long vowels have significant formant differences, while Polish nasal vowels exhibit distinct nasal formants unique to this group of sounds.

Using PRAAT significantly improved students' understanding of the acoustic characteristics of language sounds. This research demonstrated that PRAAT is an indispensable tool for linguistic analysis, helping to identify subtle phonetic differences between languages. Working with PRAAT also developed students' analytical skills and prepared them for further phonological research.

Students then focused on tools for conducting ***morphological text analysis***. TreeTagger emerged as an effective tool, providing accurate part-of-speech tagging and morphological analysis of words. TreeTagger supports multiple languages, including English and Polish, making it a versatile tool for linguistic analysis. UEHS students followed three stages to effectively use TreeTagger in their educational process.

**The first stage** is working with TreeTagger, which consists of three steps: *in the first step*, it is necessary to download the program from the official website and install it on a local computer, as well as download the models for analyzing English and Polish languages; *in the second step*, students prepared text files containing texts for analysis (these were usually excerpts from literary works, scientific articles, or other sources); *in the third step*, TreeTagger was launched.

**The second stage** is the independent determination of morphological characteristics, meaning that initially, students must independently determine the morphological characteristics of the words in the given texts, allowing the instructor, as well as the students themselves, to gain a deeper understanding of the morphological analysis process and develop critical thinking and analysis skills.

Students were first provided with an English text for analysis: *"TreeTagger is a tool for annotating text with part-of-speech and lemma information,"* in which they were required to give characteristics for each element, starting from "TreeTagger" and ending with "information." As a result, it was determined that *TreeTagger* – Noun (Proper Noun), *is* – Verb (Third person singular present), *a* – Determiner (Article), *tool* – Noun (Singular), *for* – Preposition, *annotating* – Verb (Gerund/Participle), *text* – Noun (Singular), *with* – Preposition, *part-of-speech* – Noun (Compound Noun), *and* – Conjunction, *lemma* – Noun (Singular), *information* – Noun (Singular).

The next text fragment was provided in Polish: *"TreeTagger jest narzędziem do anotacji tekstu z informacją o częściach mowy i lematach,"* in which students gave the following characteristics: *TreeTagger* – Rzeczownik (Nazwiją własną), *jest* – Czasownik (Trzecia osoba liczby pojedynczej czasu teraźniejszego), *narzędziem* – Rzeczownik (Instrumental singular), *do* – Przyimek (Genitive), *anotacji* – Rzeczownik (Genitive singular), *tekstu* – Rzeczownik (Genitive singular), *z* – Przyimek (Instrumental), *informacją* – Rzeczownik (Instrumental singular), *o* – Przyimek (Locative), *częściach* – Rzeczownik (Locative plural), *mowy* – Rzeczownik (Genitive singular), *i* – Spójnik, *lematach* – Rzeczownik (Locative plural).

**The third stage** is *the direct work with TreeTagger*, the main steps of which we will try to demonstrate using examples in English and Polish.

Subsequently, UEHS students needed to verify their results using TreeTagger. Initially, the work was conducted with the English text, and then with the Polish text.

Thus, the use of TreeTagger in the educational process allows students to gain valuable practical skills in morphological text analysis, enhance their digital literacy, and expand their knowledge of the structure of different languages. Integrating this tool into educational programs contributes to the preparation of specialists capable of effectively using modern technologies in their professional activities.

An innovative tool that enables lexico-semantic, syntactic, textual, and sometimes even discourse analysis is the **corpus manager AntConc** (see Fig. 1). We will try to demonstrate the work of UEHS students with this tool.

Students began working with AntConc by selecting texts for analysis. To ensure diversity and comprehensive analysis, they chose texts from various genres, including legal documents, scientific articles, fiction, news materials, and others. This approach allowed them to study the linguistic features of different genres and conduct comparative analysis. After selecting the texts, students uploaded them to AntConc. The uploading process included preliminary text processing to ensure correct analysis: removing unnecessary characters, checking formatting, etc. The uploaded texts were stored as separate files grouped by genre, allowing for genre analysis and comparison.

One of the key stages of the work was identifying keywords for each genre. Students used AntConc's functionality to generate a list of frequent words and then manually selected those most characteristic of the respective genre. For example, for legal texts, the keywords were "contract," "obligation," "law," "act," while for fiction, they were "hero," "landscape," "emotion," "story."

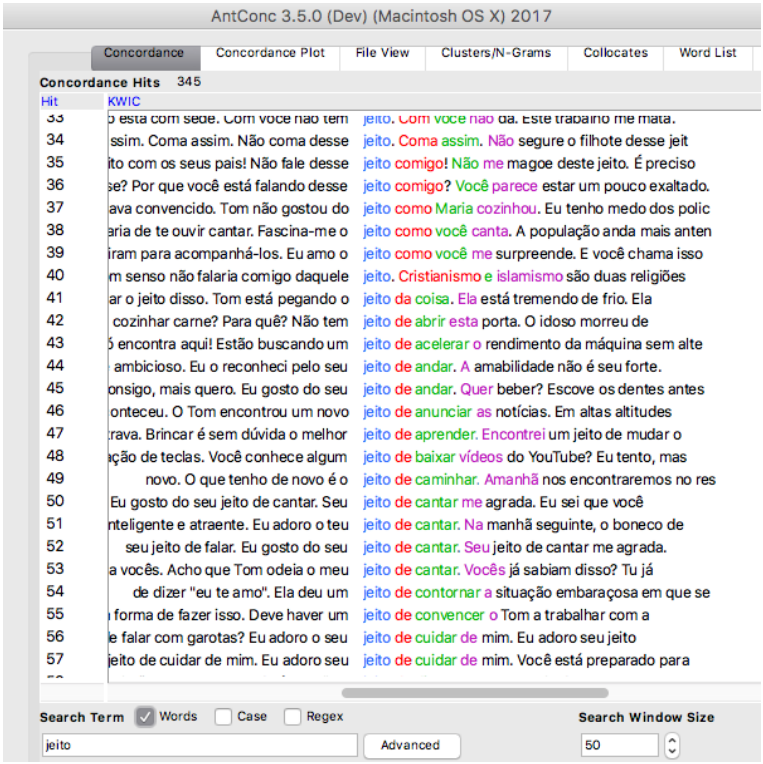



**Fig. 1. Interface of the corpus manager AntConc[78]**

Using the KeyWord List function, students created lists of keywords and analyzed their contextual usage in texts using the Concordance Tool. This allowed them to study not only the frequency of certain words but also their surrounding context, syntactic, and semantic connections. For example, in legal texts, the word "contract" often appeared with "conclusion," "parties," "duty," whereas in fiction, the word "hero" appeared with "feeling," "journey," "fate."

Applying AntConc allowed students to obtain significant results that reflected the specifics of language use in different genres. For instance, in legal texts, there was a high frequency of formal terms and specific constructions, reflecting the strictness and formality of this genre. In fiction,

[78] https://upload.wikimedia.org/wikipedia/commons/0/01/AntConc-ConcordanceView.png; Jberkel, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons

on the other hand, there was a high variability of vocabulary, with many descriptive and emotional elements.

The analysis of news texts showed that they have their own specificity, including the high frequency of current events, proper names, and geographical names. Scientific articles were characterized by a large amount of terminology and terms specific to certain scientific fields.

It should be noted that the syllabus includes Translation Memory programs, which are actively integrated into the educational process, allowing students to develop their translation competency skills[79,80,81,82,83]. Let's focus on **SDL Trados Studio**, which has not only proven its effectiveness but also become popular among UEHS students. We will demonstrate the three stages of working with it.

**The first stage** – *working with SDL Trados Studio* – step one, consists of three steps: *in the first step*, a project is created, meaning students open SDL Trados Studio and create a new project, specifying the source and target languages, and uploading the file for translation; *in the second step*, a Translation Memory (TM) is created or connected, meaning students create a new translation memory or connect an existing one (thus TM stores all translated text segments, allowing them to be reused in future projects); *in the third step*, the text is translated, meaning students translate text segments one by one (each segment is saved in TM), and the program occasionally suggests possible translations from TM for identical or similar segments.

**The second stage** – *working with SDL Trados Studio* – step two, consists of three steps: *in the first step*, terminology management is used, meaning students add new terms to the glossary and use it to ensure consistency in terminology; *in the second step*, quality assurance is performed, meaning students conduct an automated quality assurance (QA) check to find and correct errors; *in the third step*, the translated text is exported in the desired format.

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[79] Adab B. Assessing Translation Competence. In Schäffner C., Adab B. (Eds.), *Developing Translation Competence*. Amsterdam/Philadelphia: John Benjamins, 2000. pp. 215–228.

[80] Orozco M., Hurtado Albir A. Measuring Translation Competence Acquisition. *Meta: Journal des traducteurs*. 2002. Vol. 47, No. 3, pp. 375-402.

[81] Hurtado Albir A. The Acquisition of Translation Competence: Competences, Tasks, and Assessment in Translator Training. *Meta: Journal des traducteurs*. 2015. Vol. 60, No. 2, pp. 256–280.

[82] Göpferich S. Towards a Model of Translation Competence and its Acquisition: The Longitudinal Study TransComp. *Translation and Interpreting Studies*. 2009. Vol. 4, No. 2, pp. 9–37.

[83] Presas M. Translation Competence: A Complex and Multifaceted Phenomenon. *The Interpreter and Translator Trainer*. 2012. Vol. 6, No. 1, pp. 3–19.

**The third stage** involves discussing the translations performed by both the machine and the students to identify translation transformations, which we will demonstrate using completed translations by UEHS students. The main focus will be on two language pairs: English-Polish and Polish-Ukrainian.

English *Global warming is one of the most pressing issues facing our planet today. It is caused by the increase in greenhouse gases in the atmosphere, primarily due to human activities.* – Polish *Globalne ocieplenie jest jednym z najpilniejszych problemów, przed którymi stoi nasza planeta dzisiaj. Jest ono spowodowane wzrostem gazów cieplarnianych w atmosferze, głównie z powodu działalności człowieka.*

In the given example, **grammatical transformations** can be observed: (A) *Syntactic structure of sentences*: In the English sentence "Global warming is one of the most pressing issues facing our planet today," the relative clause "facing our planet today" transforms into a relative clause in the Polish translation "przed którymi stoi nasza planeta dzisiaj." This change in syntactic structure aligns with the Polish style; (B) *Use of inverted word order*: In the sentence "Jest ono spowodowane wzrostem gazów cieplarnianych w atmosferze, głównie z powodu działalności człowieka," there is an inversion where the Polish sentence starts with the verb "jest" (is) and the pronoun "ono" (it), whereas the English sentence starts with the pronoun "It" and the verb "is caused."

Additionally, **lexical transformations** can be observed, including: (A) *Equivalents of lexical units*: The English "global warming" is translated as "globalne ocieplenie," which is a direct lexical match where both terms are equivalents in both languages; (B) *Use of synonyms and specification*: The English phrase "the increase in greenhouse gases" is translated as "wzrostem gazów cieplarnianych," where "increase" is translated as "wzrostem," a more precise synonym in this context; "primarily due to human activities" is translated as "głównie z powodu działalności człowieka," where "primarily" is translated as "głównie" (mainly), and "human activities" is specified as "działalności człowieka."

Students manage to make a preliminary conclusion that if grammatical transformations were carried out to ensure grammatical and syntactic correctness and naturalness of the translation in Polish, using relative clauses and word inversion reflects the structure of Polish sentences, which differ from English, then lexical transformations include the use of precise synonyms and term specification to ensure clarity and accuracy of the translation. This allows conveying the same meaning using more precise or established terms in Polish, making the text more comprehensible to the Polish reader. Such transformations are necessary to maintain the semantic load, stylistic consistency, and grammatical correctness of the translation, ultimately ensuring a high-quality and clear translation from English to Polish.

Polish *Polska jest krajem o bogatej historii i kulturze. Jest znana z pięknych krajobrazów, zabytków oraz gościnności mieszkańców.* – English *Poland is a country with a rich history and culture. It is known for its beautiful landscapes, monuments, and the hospitality of its inhabitants.*

First, let's focus on **grammatical transformations**: (A) *sentence structure*: the Polish sentence "Polska jest krajem o bogatej historii i kulturze" is translated as "Poland is a country with a rich history and culture," where the syntactic structure of the sentence is preserved since both languages use a direct word order in simple sentences; (B) *use of articles*: the English translation includes the definite article "a" before "country," which is a mandatory grammatical requirement in English, whereas Polish lacks articles, so this element is added during translation.

Among the **lexical transformations**, students were able to observe the following: (A) *equivalents of lexical units*, where the Polish word "Polska" is translated as "Poland," which is a direct lexical match, and the phrase "bogatej historii i kulturze" is translated as "a rich history and culture," where "bogatej" (rich) becomes "rich," which is an exact match; (B) *use of synonyms and alignment*: the Polish "znana z pięknych krajobrazów, zabytków oraz gościnności mieszkańców" is translated as "known for its beautiful landscapes, monuments, and the hospitality of its inhabitants," in this case: "znana z" (known for) is translated as "known for," which is a direct match; "pięknych krajobrazów" is translated as "beautiful landscapes," where "pięknych" (beautiful) is translated as "beautiful;" "zabytków" is translated as "monuments," which is an exact lexical match; "gościnności mieszkańców" is translated as "the hospitality of its inhabitants." In this case, "gościnności" (hospitality) is translated as "hospitality," and "mieszkańców" (inhabitants) is translated as "inhabitants." Adding the pronoun "its" before "inhabitants" is necessary to align the English sentence.

From the example of the Polish-English language pair, students can conclude the following. Grammatical transformations were made to adhere to the grammatical rules of the English language. Adding the article "a" before "country" reflects the requirements of English grammar regarding the use of definite articles, which are absent in Polish. Lexical transformations include the use of precise synonyms and term alignment to ensure clarity and accuracy in translation. Adding the pronoun "its" before "inhabitants" in the English translation is necessary to conform to English style and grammar, where the use of pronouns for possession is mandatory. These transformations ensure the preservation of semantic load, stylistic consistency, and grammatical correctness of the translation, which are key aspects of a quality translation from Polish to English.

**The course "Information and Communication Technologies," offered at the first (bachelor's) level of higher education at Sumy State Pedagogical University named after A. S. Makarenko (Ukraine), and the principles of its digitalization.**

At Sumy State Pedagogical University named after A. S. Makarenko (Ukraine), the course "Information and Communication Technologies" is offered at the first (bachelor's) level of higher education for future philologists according to the educational-professional program 014 Secondary Education (Ukrainian Language and Literature) [84].

**The aim of the course** is to develop information and digital competence in future specialists, specifically the ability to navigate the information space, search for and critically evaluate information, and utilize it in professional activities; to effectively use existing and create (as needed) new electronic (digital) educational resources; and to use digital technologies in the educational process.

**The objectives** of the course include:

– Familiarization with modern educational resources;

– Development of skills in preparing and designing presentations;

– Formatting text documents and digital data analysis;

– Using information and communication technologies in professional activities;

– Practical application of information and communication technologies;

– Development of general and specific competencies.

Based on the syllabus analysis, we outline the principles of digitalization in philological training.

The first principle is ***the accessibility of information resources*** [85,86,87]; [88,89]. The course program emphasizes the importance of searching for and

[84] Освітня програма 014 Середня освіта (Українська мова і література). Сумський державний педагогічний університет імені А.С. Макаренка. URL: https://sspu.edu.ua/images/2024/docs/opp/programa/ukrmova_angl_mova_bak_50846.pdf (дата звернення: 19.06.2024).

[85] Marangunić N., Granić A. Accessibility within open educational resources and practices for disabled learners: A systematic literature review. *Smart Learning Environments*. 2015. URL: https://slejournal.springeropen.com/articles/10.1186/s40561-015-0018-2 (дата звернення: 19.06.2024).

[86] Nusbaum A.T., Thomas J.G., Zhang X. Promoting access to diverse learning opportunities through open resources, equity, and accessibility. *Faculty Focus*. 2020. URL: https://www.facultyfocus.com/articles/teaching-and-learning/promoting-access-to-diverse-learning-opportunities-through-open-resources-equity-and-accessibility/ (дата звернення: 19.06.2024).

[87] Okoli C., Schabram K. Access and accessibility in online learning. *ED Tech Research*. 2010. URL: https://files.eric.ed.gov/fulltext/ED593920.pdf (дата звернення: 19.06.2024).

using modern educational platforms and resources such as Coursera, Edx, and Prometheus. This principle ensures students have access to a wide range of learning materials, promoting their continuous learning and self-development.

The second principle is ***information security*** (Oxford Academic, n.d.), which is of particular importance. The program includes the study of network security aspects, personal data protection, and avoiding information threats. The acquired experience, knowledge, and skills are crucial for the safe use of IT in educational and professional contexts.

The third principle is ***digital literacy***[90,91,92], which is one of the key goals of the program. It involves teaching students to work with text editors, spreadsheets, and presentation tools. Mastering digital literacy skills allows students to effectively use ICT to solve educational and professional tasks.

The fourth principle is ***interactivity and multimedia***[93,94]. The modern educational process requires an interactive approach. The program includes the use of video conferences, webinars, and other synchronous and asynchronous interaction tools. Including multimedia elements in educational materials enhances student engagement and improves material retention.

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[88] Wiley D. Developing preservice teachers' equity consciousness and equity literacy. *Frontiers in Education*. 2021. Retrieved from https://files.eric.ed.gov/fulltext/ED545198.pdf (дата звернення: 19.06.2024).

[89] UNESCO. The accessibility of learning content for all students, including disabled learners. *ED Tech Research*. 2020. URL: https://files.eric.ed.gov/fulltext/ED593920.pdf (дата звернення: 19.06.2024).

[90] Hague C., Payton S. A systematic review on digital literacy. *Smart Learning Environments*. 2021. URL: https://slejournal.springeropen.com/articles/10.1186/s40561-021-00158-0 (дата звернення: 19.06.2024).

[91] Ng W. Digital literacies, social media, and undergraduate learning: What do students think they need to know? *International Journal of Educational Technology in Higher Education*. 2012. URL: https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-021-00262-4 (дата звернення: 19.06.2024).

[92] Spante M., Hashemi S.S., Lundin M., Algers A. Digital literacy and digital competence in higher education: What do students need to know? *International Journal of Educational Technology in Higher Education*. 2018. URL: https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-018-0080-8 (дата звернення: 19.06.2024).

[93] Atasoy E., Temizkan M. Smart multimedia learning of ICT: Role and impact on language learners' writing fluency. *Smart Learning Environments*. 2016. URL: https://slejournal.springeropen.com/articles/10.1186/s40561-016-0028-8 (дата звернення: 19.06.2024).

[94] Kobayashi K. Interactivity: A potential determinant of learning by preparing to teach and teaching. *Frontiers in Psychology*. 2019. Vol. 9, Article 2755. https://doi.org/10.3389/fpsyg.2018.02755 (дата звернення: 19.06.2024).

The fifth important principle is ***information literacy***[95,96,97,98,99], which involves the ability to critically analyze information, especially from social networks and video hosting platforms. The program aims to develop the information literacy of future professionals, enabling students to effectively assess the reliability and quality of information, avoid information threats and manipulations. Adherence to this principle has allowed Sumy State Pedagogical University named after A. S. Makarenko to implement several grant projects on information literacy (see p.).

The sixth principle is ***continuous knowledge and skills updating***. Given the rapid development of information technology, it is important to teach students the skills of independent information search and self-education. The program emphasizes the need for continuous knowledge updating, which ensures professional growth and adaptation to new challenges in the ICT field.

The seventh principle is ***practical orientation***. The program includes laboratory work using modern office programs and other ICT. This ensures that future professionals are prepared to perform real professional tasks, develop practical skills, and increase their competitiveness in the labor market.

The course "Information and Communication Technologies" is taught in close connection with linguistic disciplines. A positive practice at Sumy State Pedagogical University named after A. S. Makarenko (Ukraine) is the use of various computer programs by students to meet different professional needs according to the main linguistic levels, from phonological to syntactic. We will discuss the main programs and examples of their application below.

First of all, it is appropriate to demonstrate one of the tools for conducting ***phonetic and phonological analysis*** – **Phon**, which is a

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[95] Grizzle A., Wilson C. Critical Media Literacy in Teacher Education, Theory, and Practice. *Oxford Research Encyclopedia of Education*. 2011. URL: https://oxfordre.com/education/view/10.1093/acrefore/9780190264093.001.0001/acrefore-9780190264093-e-262 (дата звернення: 19.06.2024).

[96] UNESCO. *Continuous assessment for improved teaching and learning: A critical review to inform policy and practice*. 2017. URL: https://unesdoc.unesco.org/ark:/48223/pf0000255511 (дата звернення: 19.06.2024).

[97] UNESCO. *Media and Information Literacy, a critical approach to literacy in the digital world*. 2017. URL: https://www.unesco.org/en/media-and-information-literacy (дата звернення: 19.06.2024).

[98] Koltay T. Untangling media literacy, information literacy, and digital literacy. *ERIC*. 2011. URL: https://files.eric.ed.gov/fulltext/EJ1344751.pdf (дата звернення: 19.06.2024).

[99] Schmidt H.C. Media Literacy in a Post-Pandemic World. *Faculty Focus*. 2021. URL: https://www.facultyfocus.com/articles/media-literacy-in-a-post-pandemic-world (дата звернення: 19.06.2024).

specialized program that allows for the analysis of speech data, including pronunciation, intonation, and articulation. Students completed tasks by following five stages: *in the first stage*, they downloaded and installed Phon (see Fig. 2) from the official website, and then each user created a new project; *in the second stage*, the user uploaded audio recordings of speech data that needed to be analyzed (these recordings typically included both individual words and entire sentences or texts); *the third stage* involved creating annotations for the audio recordings, which included segmenting the speech data into phonemes, syllables, or words and marking them in the program; *in the fourth stage*, data analysis took place, where each user could analyze spectral characteristics, formants, intonation contours, etc.; *in the fifth stage*, the interpretation of results and their presentation in the form of reports was carried out (this typically included data visualization, statistical analysis, and conclusions about phonetic or phonological phenomena).

For example, students needed to analyze **the pronunciation of the English word "butter"** using the Phon program. This process included several key stages. The first step involved importing an audio recording of the pronunciation of the word "butter" into the Phon program. It is important to ensure that the audio recording is of high quality to ensure accurate analysis. The second step was annotating the audio recording. This included segmenting the phonemes that make up the word "butter," namely [bʌtər].

Each phoneme is segmented and marked for further analysis. After annotation, spectral analysis is conducted. This includes identifying the formants for each phoneme, which allows for the examination of the acoustic characteristics of speech. The first (F1) and second (F2) order formants are particularly important for identifying vowel sounds. The final step involves comparing the pronunciation of the word "butter" by different speakers. This allows for the identification of dialectal differences and variability in pronunciation, particularly in the pronunciation of the phoneme /t/, which can be realized as [t] or as a flap [ɾ] in American English.

Later, students needed to analyze the pronunciation of the Ukrainian word "молоко" using the Phon program. This process also included several key stages. The first step involved importing an audio recording of the pronunciation of the word "молоко" into the Phon program. As in the previous example, it is important to ensure high recording quality. In the next stage, the audio recording was annotated, segmenting the phonemes [moɫoˈkɔ]. Each phoneme is segmented and marked for further analysis. After annotation, an analysis of the intonation contour was conducted. This primarily involves examining the impact of stress on the pronunciation of the word.

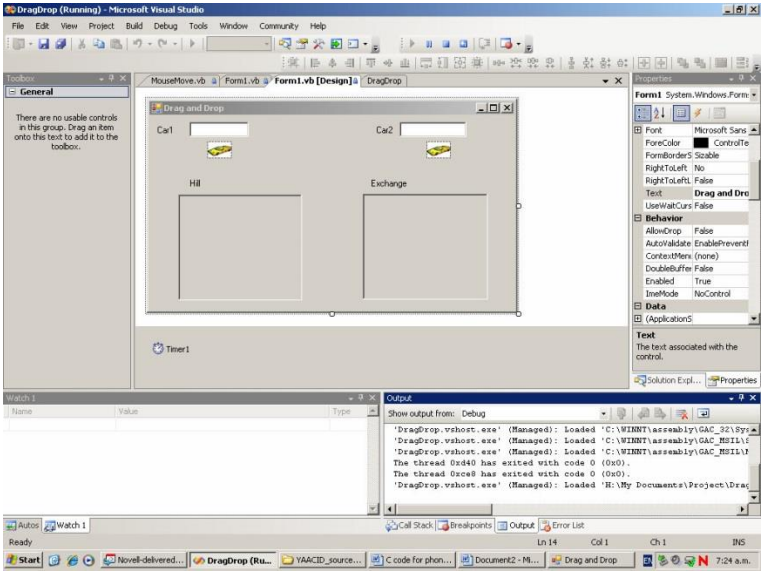


**Fig. 2. Specialized program Phon**[100]

For instance, stress on the last syllable changes the duration and pitch of the respective vowels. The final stage involves comparing the pronunciation of the word "молоко" in different regions of Ukraine. This allows for the identification of regional differences in pronunciation, such as different realizations of the phoneme /л/ or variations in vowel sounds depending on the dialect.

Students confirmed that with the Phon program, it is possible to conduct detailed phonetic and phonological analysis of speech. The examples provided demonstrate the main stages of working with the program, as well as its application for analyzing English and Ukrainian speech. Such studies are important for understanding the variability of speech and its acoustic characteristics.

As for morphological analysis, it also proved to be one of the key aspects for students during the course. Teachers focused on studying the structure of words and their grammatical properties. Generally, the most effective tools were:

(a) TreeTagger[101] is a universal tool for text annotation that supports multiple languages, including English and Ukrainian, and allows for

[100] https://upload.wikimedia.org/wikipedia/commons/4/4b/Adftaxi17.jpg; Samuel. mann at English Wikibooks, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons

tokenization, lemmatization, and part-of-speech tagging (see Fig. 3, 4); (б) UDPipe[102] is a tool designed for morphological and syntactic analysis that uses Universal Dependencies models and supports multiple languages, including English and Ukrainian.

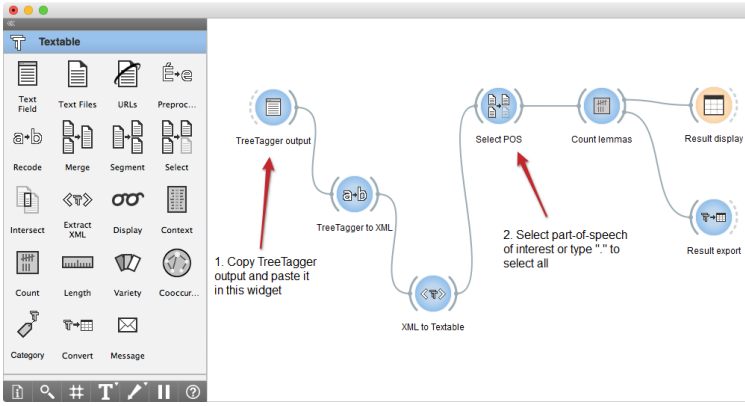


**Fig. 3. TreeTagger as a universal tool for text annotation**

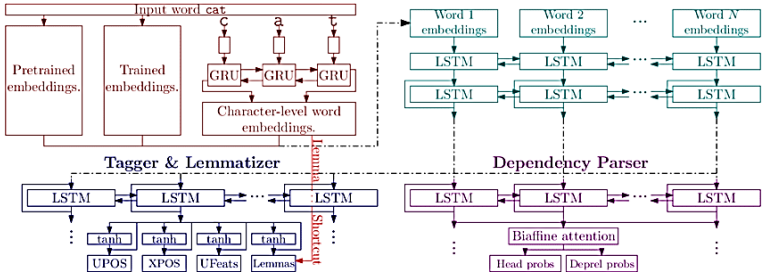


**Fig. 4. UDPipe as a tool designed for morphological and syntactic analysis**

Students use TreeTagger and UDPipe in educational and research projects, which has stimulated the development of practical skills in conducting morphological analysis. Here are examples of using these programs for text analysis in English and Ukrainian.

Students were given the sentence "The quick brown fox jumps over the lazy dog," which they first import into TreeTagger using the graphical

[101] Розробник: Центр лінгвістичних досліджень Тюбінгенського університету.
[102] Розробник: Департамент комп'ютерної лінгвістики Університету імені Карлового.

interface or command line. The program tokenizes the text. TreeTagger performs morphological analysis, identifying the parts of speech and lemmas of each word. As a result, students receive the following output (see Table 1):

Table 1

**Automatic morphological processing of the English sentence using TreeTagger**

| Token | Lemma | POS |
|---|---|---|
| The | the | DT |
| quick | quick | JJ |
| brown | brown | JJ |
| fox | fox | NN |
| jumps | jump | VBZ |
| over | over | IN |
| the | the | DT |
| lazy | lazy | JJ |
| dog | dog | NN |

Based on this table, students need to provide their commentary to convince the instructor of their understanding of the morphological analysis of the English sentence.

The word "The" is a determiner (Determiner) used to indicate a specific noun. In this sentence, the article "the" precedes the nouns "fox" and "dog," specifying that it refers to a particular fox and a particular dog. In English, articles are important grammatical elements that define the definiteness or specificity of nouns.

"Quick" is an adjective (Adjective) that describes the noun "fox." Adjectives in English typically precede nouns and provide additional information about their properties. In this case, the adjective "quick" indicates the speed of the fox, highlighting one of its characteristics.

The word "brown" is an adjective that describes the color of the "fox." Using two adjectives in succession ("quick brown") is typical in English, where adjectives can describe different aspects of a single noun.

"Fox" is a singular noun (Noun). The noun refers to a specific animal. In this sentence, the noun "fox" is the subject performing the action expressed by the verb "jumps."

"Jumps" is a verb in the third person singular present tense (Verb, 3rd person singular present). The lemma "jump" indicates the base form of the verb. The verb "jumps" indicates the action performed by the subject "fox." The third person singular is marked by adding the suffix -s to the base form of the verb.

"Over" is a preposition (Preposition) that shows the relationship between the verb "jumps" and the noun "dog." Prepositions indicate spatial or temporal relationships between objects or actions.

The article "the" is reused before the noun "dog," indicating a specific dog. As in the first case, the article specifies that it refers to a particular known or previously mentioned dog.

"Lazy" is an adjective that describes the noun "dog." The adjective "lazy" adds information about the dog's characteristic, indicating its lazy nature.

"Dog" is a singular noun. In this sentence, the noun "dog" is the object to which the action expressed by the verb "jumps" refers. This word completes the phrase, giving it full meaning.

The morphological analysis of the sentence "The quick brown fox jumps over the lazy dog" using TreeTagger allows for a detailed examination of the grammatical categories and lemmas of each word. The results obtained demonstrate the complexity and interrelationship of grammatical elements in the sentence and highlight the importance of each word in forming the overall meaning. Such analysis is useful for a deep understanding of language structure and preparation for further linguistic research.

After the English text, students are given a fragment in Ukrainian, "Швидка коричнева лисиця стрибає через ледачого пса", which they import into UDPipe through the web interface or local installation. The program performs tokenization and morphological analysis. UDPipe conducts the analysis, identifying parts of speech and lemmas of the words. As a result, students receive the following output (see Table 2):

Table 2

**Automatic morphological processing of the Ukrainian sentence using UDPipe**

| **Token** | **Lemma** | **POS** |
|---|---|---|
| Швидка | швидкий | ADJ |
| коричнева | коричневий | ADJ |
| лисиця | лисиця | NOUN |
| стрибає | стрибати | VERB |
| через | через | ADP |
| ледачого | ледачий | ADJ |
| пса | пес | NOUN |

Based on this table, students need to provide their commentary to convince the instructor of their understanding of the morphological analysis of the Ukrainian sentence.

The word "швидка" is an adjective (Adjective) that describes the noun "лисиця." The adjective is in the feminine gender, singular number, and nominative case, agreeing with the gender, number, and case of the noun. "Швидка" characterizes the fox as being fast.

"Коричнева" is an adjective that describes the color of the fox. Like the adjective "швидка", "коричнева" agrees with the noun "лисиця" in gender, number, and case. Adjectives can precede nouns, adding descriptive details such as color or other properties.

"Лисиця" is a singular noun (Noun) in the feminine gender, nominative case. In this sentence, "лисиця" serves as the subject performing the action expressed by the verb "стрибає." The noun refers to a specific animal and is the main bearer of information about the subject.

"Стрибає" is a verb in the present tense, third person, singular. The lemma "стрибати" indicates the infinitive form of the verb. The verb "стрибає" describes the action performed by the subject "лисиця". This verb shows the action in progress and indicates the activity of the subject.

"Через" is a preposition that indicates the spatial relationship between the verb "стрибає" and the noun "пса." The preposition "через" shows that the action of jumping occurs over or across the object "пса."

"Ледачого" is an adjective that describes the noun "пса." The adjective is in the masculine gender, singular number, and accusative case. This word agrees with the noun in gender, number, and case, adding a characteristic to the object of the action, indicating its lazy nature.

"Пса" is a singular noun in the masculine gender, accusative case. In this sentence, "пса" is the object of the action expressed by the verb "стрибає." The noun "пса" specifies over whom or what the action occurs, highlighting the object's relationship to the subject.

The morphological analysis of the sentence "Швидка коричнева лисиця стрибає через ледачого пса" using UDPipe allows for a detailed examination of the grammatical categories and lemmas of each word. The results obtained demonstrate the complexity and interrelationship of grammatical elements in the sentence and highlight the importance of each word in forming the overall meaning. Such analysis is useful for a deep understanding of language structure and preparation for further linguistic research.

The use of TreeTagger and UDPipe allows students to gain a deeper understanding of the morphological structure of English and Ukrainian. These programs provide accurate tokenization, part-of-speech tagging, and lemmatization, which are critically important for linguistic research. Students can compare different linguistic structures, analyze dialectal and stylistic differences, and explore the impact of context on grammatical forms.

Using TreeTagger and UDPipe for morphological analysis of texts in English and Ukrainian provides students with valuable tools for conducting linguistic research. These programs facilitate the development of language data analysis skills and the expansion of theoretical knowledge in morphology. The examples provided demonstrate the effectiveness of these programs in the educational process and their usefulness for research activities.

Another tool that helps SDPU students adhere to the principles of digitalization is the use of corpus resources for English and Ukrainian.

For example, during the course, students can work with the British National Corpus (for English) and the General Regionally Annotated Corpus of Ukrainian (for Ukrainian) and their resources. Let's demonstrate this with examples from both English and Ukrainian.

**The British National Corpus** (BNC) is a large corpus of English texts containing over 100 million words from various genres and styles. It is an important tool for studying English, as it provides a wide range of examples of real language use[103]. In this academic text, we will consider the methodology of SDPU students working with the BNC, focusing on the stages of data collection, analysis, and interpretation of results. Fig 5.

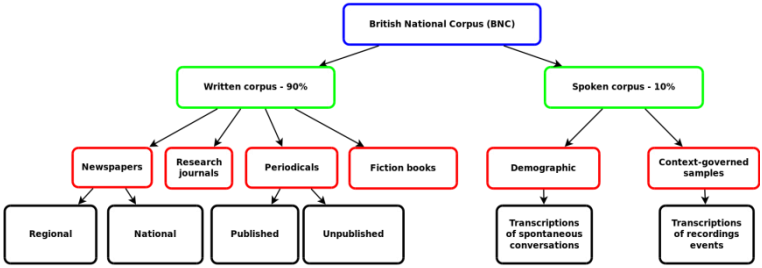


**Fig. 5. British National Corpus Structure[104]**

The first stage of working with the BNC is *the collection of necessary data*. SDPU students had the opportunity to use various tools to access the corpus, such as web interfaces or specialized software applications[105]).

[103] Leech G., Rayson P., Wilson A. Word Frequencies in Written and Spoken English: Based on the British National Corpus. Longman, 2001.

[104] https://upload.wikimedia.org/wikipedia/commons/f/ff/British_National_Corpus_structure.svg; Alexchuvak, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons

[105] McEnery T., Hardie A. *Corpus Linguistics: Method, Theory and Practice*. Cambridge University Press, 2011.

The most common tasks at this stage include searching for words or phrases of interest and downloading the relevant contexts.

SDPU students were interested in how often the word "innovative" is used in different contexts. Using the BNC interface, a student enters this word into the search bar and receives a list of sentences in which this word is used.

Example 1: *The company is known for its **innovative** approach to problem-solving.*

Example 2: ***Innovative** solutions are required to tackle climate change effectively.*

After collecting the data, SDPU students proceeded to analyze it. This stage included the classification and interpretation of the found examples. The main methods of analysis include frequency analysis, content analysis, and collocation analysis.

Frequency Analysis: SDPU students counted the frequency of usage of a word or phrase in various contexts. This helps to understand the prevalence of the word in English [106].

Word "innovative" frequency in BNC with total occurrences: 250

Content Analysis: SDPU students analyzed the content of the sentences to understand the situations in which the word is used[107].

Contexts of "innovative":

– Business: 40%

– Technology: 35%

– Education: 15%

– Other: 10%

Collocation Analysis: SDPU students investigated which words are most frequently used in conjunction with the word being studied[108].

Collocations with "innovative":

– innovative approach

– innovative solutions

– innovative ideas

At the final stage, SDPU students interpreted the obtained results, drawing conclusions about the use of the word or phrase in the English language. This may include comparisons with other studies or formulating recommendations for language learning[109].

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[106] Hunston S. Corpora in Applied Linguistics. Cambridge University Press, 2002.

[107] Biber D., Conrad S., Reppen R. Corpus Linguistics: Investigating Language Structure and Use. Cambridge University Press, 1998.

[108] O'Keeffe A., McCarthy M., Carter R. From Corpus to Classroom: Language Use and Language Teaching. Cambridge University Press, 2007.

[109] Baker P., Hardie A., McEnery T. *A* Glossary of Corpus Linguistics. Edinburgh University Press, 2006.

Based on the analysis, SDPU students concluded that the word "innovative" is most frequently used in business and technology, reflecting current trends in these fields. Additionally, SDPU students recommended studying collocations for a better understanding and usage of this word in real contexts.

Working with the BNC allowed SDPU students to gain a deeper understanding of the actual use of the English language. The methodology, which includes data collection, analysis, and interpretation, promotes the development of critical thinking and linguistic analysis skills. Such research not only enriches the students' language knowledge but also helps them use the language more naturally and effectively.

Another effective tool was **the General Regionally Annotated Corpus of the Ukrainian Language (GRAC)**, the resources of which SDPU students used for studying the Ukrainian language.

Today, GRAC is a large corpus of Ukrainian texts that includes various genres and styles, presented with consideration of regional features. It is an important tool for studying the Ukrainian language as it provides a wide range of examples of real language use[110].

Let's demonstrate the methodology of SDPU students working with GRAC, focusing on the stages of data collection, analysis, and interpretation of results.

The first stage of working with GRAC is the collection of necessary data. Students used various tools to access the corpus, such as web interfaces or specialized software applications[111]. The most common tasks at this stage include searching for words or phrases of interest and downloading the relevant contexts.

SDPU students were interested in how often the word "інноваційний" (innovative) is used in different contexts. Using the GRAC interface, a student enters this word into the search bar and receives a list of sentences in which this word is used.

Example 1: *Компанія відома своїм інноваційним підходом до вирішення проблем.*

Example 2: *Інноваційні рішення потрібні для ефективного вирішення кліматичних змін.*

After collecting the data, the student proceeds to analyze it. This stage includes the classification and interpretation of the found examples. The main methods of analysis include frequency analysis, content analysis, and collocation analysis.

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[110] Корпус української мови. *Генеральний регіонально анотований корпус української мови*. URL: https://uacorpus.org (дата звернення: 19.06.2024).

[111] Мокринська О. Методика використання корпусів у лінгвістичних дослідженнях. Харків: Основа, 2019.

Frequency Analysis: Students counted the frequency of the word or phrase in different contexts. This helped them understand the prevalence of this word in the Ukrainian language[112].

Frequency of the word "інноваційний" in GRAC is 150.

Content Analysis: SDPU students analyzed the content of the sentences to understand in which situations the word is used[113].

Contexts of the word "інноваційний":

– Business: 50%
– Technology: 30%
– Education: 10%
– Other: 10%

Collocation Analysis: SDPU students investigated which words are most frequently used with the studied word[114].

Collocations with the word "інноваційний":

– інноваційний підхід (innovative approach)
– інноваційні рішення (innovative solutions)
– інноваційні ідеї (innovative ideas)

At the final stage, SDPU students attempted to interpret the obtained results, drawing conclusions about the use of the word or phrase in the Ukrainian language. This may include comparisons with other studies or formulating recommendations for language learning[115].

Based on the analysis, SDPU students concluded that the word "інноваційний" is most frequently used in business and technology, reflecting current trends in these fields. Additionally, the student may recommend studying collocations for a better understanding and use of this word in real contexts.

Working with the General Regionally Annotated Corpus of the Ukrainian Language allows students to gain a deeper understanding of the actual use of the Ukrainian language. The methodology, which includes data collection, analysis, and interpretation, promotes the development of critical thinking and linguistic analysis skills. Such research not only enriches the students' language knowledge but also helps clarify their understanding of using the language more naturally and effectively.

In particular, it was interesting to deepen the understanding of the comprehensive meaning of the word "innovation" as part of interdisciplinary tasks, which encompasses both the idea itself and the

[112] Шевченко Л. Частотний аналіз української мови. Дніпро: Дніпропетровський національний університет, 2020.

[113] Жовтобрюх М. Контент-аналіз у дослідженні української мови. Одеса: Одеський національний університет, 2018.

[114] Скорина І. Колокації в українській мові. Львів: Вид-во Львівського університету, 2019.

[115] Коваль О. Аналіз сучасної української лексики. Київ: Наукова думка, 2021.

process of its practical implementation. An important feature of innovative activity, as noted in the "Encyclopedia of Education," is its ability to influence the overall level of professional activity, expanding the innovative field of the educational environment in an institution or region[116].

In the Polish "Encyclopedia of Pedagogy of the 21st Century," innovation and novelty are defined as new solutions to programmatic, organizational, or methodological tasks concerning the goals and content of education. These innovations can pertain to one or several academic disciplines or the improvement of the quality of a school's activities[117].

The study of Polish experience, particularly the innovative teaching methods of the Artes Liberales Faculty at the University of Warsaw, during the internship under the Ukrainian-Polish project "Innowacyjny uniwersytet i przywództwo. Faza IV: strategie komunikacyjne i relacje uniwersytet-szkoła" (Innovative University and Leadership. Phase IV: Communication Strategies and University-School Relations) in November 2018, led to the implementation of interregional projects on media literacy.

### 3. Grant Activity of the Faculty of the University of Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical University named after A. S. Makarenko (Ukraine), which have an advantage in ensuring digitalization principles

The grant activity of participants in the educational process in higher education institutions is an important indicator of scientific and professional activity. It not only promotes the development of research but also ensures the implementation of innovative technologies and methods in the educational process. In this context, the experience of the faculty of the University of Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical University named after A. S.Makarenko (Ukraine) deserves special attention. Both institutions are actively involved in the implementation of projects related to the digitalization of educational processes, which meet the modern challenges and needs of the globalized world.

The implementation of digital technologies in higher education is one of the key strategies for improving the quality of education and research. Digitalization, according to the European Commission, promotes educational accessibility and inclusion as a fundamental strategy for the development of a knowledge society (European Commission, 2020). The faculty of the University of Economics and Human Sciences in Warsaw and

[116] Енциклопедія освіти / гол. ред. В.Г. Кремень. Київ: Юрінком Інтер, 2008. 1040 с.

[117] *Encyklopedia pedagogiczna XXI wieku*. T. 3, Warszawa: Wydawnictwo «Żak», 2004. C. 703.

Sumy State Pedagogical University named after A. S. Makarenko (Ukraine) demonstrate a high level of activity in attracting grant resources, which allows them to develop and implement advanced digital solutions in their institutions.

Digitalization of higher education not only contributes to improving the quality of education but also creates new opportunities for interactive and hybrid learning. Research shows that the COVID-19 pandemic has significantly accelerated the transition to digital teaching methods, forcing universities to rethink their educational strategies[118]. Additionally, studies demonstrate that the digital transformation of higher education institutions requires not only the implementation of new technologies but also changes in cultural and organizational structures, which is an important factor for success[119].

**Grant Activity of the Faculty of the University of Economics and Human Sciences in Warsaw (Poland)**

The grant activity of the faculty of the University of Economics and Human Sciences in Warsaw (Poland) broadens the horizons of academic cooperation. The university's faculty not only actively participates in grant programs but also establishes scientific connections with leading European higher education institutions, such as universities in Germany, Italy, and Finland. Their projects, many of which are aimed at implementing innovative digital technologies, open new opportunities for modern education.

A notable example is the grant activity of a young researcher, Jan Kapranov, an associate professor at the School of Humanities and Arts, who received an individual grant from the Academy of Finland. His research on multilingualism at the University of Oulu not only promotes the development of this scientific field but also underscores the importance of international cooperation in the academic world.

The project, titled "Linguistic and Bodily Involvement in Multicultural Interactions," is aimed at researching and describing the multilingual profiles of migrants and refugees from Ukraine living in Finland before and after the onset of the war. This project is a significant tool for a deeper understanding of digitalization principles and provides participants with valuable resources for use in educational and scientific activities.

The project actively uses digital platforms for data collection and processing, such as surveys and video interviews. This approach allows for

[118] McKinsey & Company. *Technology is shaping learning in higher education*. 2021. URL: https://www.mckinsey.com/industries/education/our-insights/technology-is-shaping-learning-in-higher-education (дата звернення: 19.06.2024).

[119] Wiley D. Developing preservice teachers' equity consciousness and equity literacy. *Frontiers in Education*. 2021. Retrieved from https://files.eric.ed.gov/fulltext/ED545198.pdf (дата звернення: 19.06.2024).

the effective collection of large volumes of data on the language use of Ukrainian migrants and refugees in Finland, ensuring a thorough analysis of language practices and social integration.

The use of software for the analysis of textual and video data helps identify patterns in language use, perform comparative analysis, and obtain statistical data, enhancing the accuracy and efficiency of the research. This approach helps uncover deep connections between language use and social identity[120]; [121].

The research results will be published on an open-access website and through social media, ensuring broad access to the scientific materials and promoting knowledge exchange. This approach is suitable for broader engagement of the academic community and the public with the research findings.

Yan Kapranov is learning to apply modern research methods, such as conversation analysis and sociolinguistic experiments. This provides him with new tools for further scientific activity, enhancing the quality and innovation of his research[122].

Through the project, Yan Kapranov gains new knowledge and skills in the field of multilingualism, contributing to their professional growth and increasing qualifications in the humanities and social sciences. This opens up new opportunities for academic and professional development[123].

The collected data and research results are used to create new educational materials, which help teachers in preparing lectures and seminars on multilingualism, migration, and social integration. This improves the quality of education and provides students with up-to-date knowledge[124].

The publication of the research results and the organization of public lectures contribute to the dissemination of knowledge among a wide range of scholars, students, and the public, raising awareness of the linguistic and cultural aspects of migration. This promotes a more informed public

[120] Auer P. The monolingual bias in bilingualism research or: Why bilingual talk is (still) a challenge for linguistics. *Language in Society*. 2007. Vol. 36, No. 4, pp. 525–546. DOI: 10.1057/9780230596047_15

[121] Bilaniuk L. A typology of Surzhyk: Mixed Ukrainian-Russian language. *International Journal of Bilingualism*. 2004. Vol. 8, No. 4, pp. 409–425. DOI: 10.1177/13670069040080040101

[122] Deppermann A., Haugh M. (Eds.). Action ascription in interaction. *Studies in Interactional Sociolinguistics*. Cambridge: Cambridge University Press, 2022. DOI: 10.1017/9781108673419

[123] Blommaert J., Rampton B. Language and superdiversity. *Diversities*. 2011. Vol. 13, No. 2, pp. 1–21.

[124] Bilaniuk L. Contested tongues: Language politics and cultural correction in Ukraine. Ithaca, NY: Cornell University Press, 2005.

discourse and a better understanding of the challenges and opportunities associated with migration[125].

The project makes a significant contribution to understanding the principles of digitalization and provides participants with valuable resources for their educational and scientific activities. The application of modern methods of data collection and analysis, the integration of new research methodologies, and the broad dissemination of research results foster the development of scientific competencies and professional growth of the participants, as well as increase public awareness of important issues related to multilingualism and migration.

**Grant Activity of the Faculty at Sumy State Pedagogical University named after A. S. Makarenko (Ukraine)**

The results of teaching linguistic disciplines at Sumy State Pedagogical University named after A. S. Makarenko, based on the principles of digitalization (see section), have prompted the authors to conduct a more detailed search for forms that would contribute to the most effective integration of modern digital tools, and the development of digital and media literacy in the informal education of future philologists.

The importance of developing media culture and media literacy among youth, as evidenced in the Presidential Decree of Ukraine "On the Strategy of Information Security" (2021), has become even more relevant in the current wartime realities. There is an urgent need for skills in effectively searching for and organizing information, working with sources and primary sources; distinguishing facts from opinions, identifying the emotional impact of media, detecting manipulative content and fake news; and using modern information technologies and software ethically and safely, with respect for privacy, understanding digital footprints, and personal cybersecurity skills.

Indeed, projects aimed at developing media literacy among youth are a focus of the grant program "Learn to Discern in Schools – National Rollout" by the International Research and Exchanges Board (IREX), supported by the U.S. Embassy and the British Embassy in Ukraine.

During 2020–2023, research laboratories focused on media literacy, academic culture, and the Teacher Professional Development Resource Center at Sumy State Pedagogical University named after A. S. Makarenko competitively secured seven grants from IREX in Ukraine. These grants supported the implementation of interregional projects, including the “Educational Research Center ‘Media & Teacher Campus’”

[125] Bilaniuk L., Melnyk S. A tense and shifting balance: Bilingualism and education in Ukraine. In Heller M., Duchêne A. (Eds.), *Language in Late Capitalism: Pride and Profit*. New York: Routledge, 2008. pp. 67–97. DOI: 10.21832/9781847690883-003

(https://www.youtube.com/channel/UCx-AL3lm3wYbt_E2dRLsLyQ) and "MEDIA & CAPSULES" (https://rctpd.sspu.edu.ua/). The goal of these projects is to develop soft skills in media literacy among higher education students (future philologists and journalists) through informal education, using and creating innovative media-educational linguistic products.

The projects, executed in collaboration with the Department of Ukrainian Language and Literature at Sumy State Pedagogical University named after A.S.Makarenko and faculty from various higher education institutions, such as the Horlivka Institute for Foreign Languages, Lutsk Pedagogical College of the Volyn Regional Council, and Pryluky Pedagogical College named after Ivan Franko of the Chernihiv Regional Council, as well as the specialty 061 Journalism at the Machine-Building College of Sumy State University and Pryluky Pedagogical College named after Ivan Franko of the Chernihiv Regional Council, and the Ukrainian Language and Information Fund of the National Academy of Sciences of Ukraine, resulted in several forms of educational activities and the development and implementation of innovative media-educational products into the educational process: the "Transdisciplinary Cluster 'MEDIA & CAPSULES'" platform and the virtual lexicographic laboratory "Multimedia Dictionary of Media Literacy."

Among the forms of educational activities were webinars on digital security, safe internet surfing, and digital communication. Speakers demonstrated practices using literary texts, such as distinguishing facts and judgments about a writer, creating resumes on behalf of a writer using Canva, and creating memes, sticker packs, comics, advertisements, and covers.

Workshops allowed participants to present their own methodologies, characterize their informational bubbles, verify the credibility of sources, conduct fact-checking, and safely work with online content. They also deepened knowledge about digital corpus technologies and developed digital security skills (setting strong passwords, using antivirus programs, enabling two-factor authentication, protecting against online fraud, and malicious software).

Media literacy workshops involved group interactions focused on specific directions, producing original media products (didactic cases on the Padlet online board, interactive exercises to develop critical thinking and media literacy, etc.) to identify markers of misinformation, narratives, hate speech, and analyze examples of newspeak.

For educational needs, the virtual lexicographic laboratory “Multimedia Dictionary of Media Literacy” was created (Fig 6; 7)[126,127].


**Fig. 6. Layout of the "Multimedia Dictionary of Media Literacy"**

**Fig. 7. Link to the virtual lab "Multimedia Dictionary of Media Literacy"**

This multimedia open-access environment is designed for interaction among educational process participants with digital media resources. It serves as a remote communication tool between project participants for the creation of a dynamic, continuously updated dictionary. This platform enables collective work among teachers, students, lecturers, and researchers.

The product is led by scientists from the Ukrainian Language and Information Fund of the National Academy of Sciences of Ukraine, including A. Zagnitko, V.Shyrokov, M. Nadutenko, and M. Nadutenko. The compilers are lecturers from the Department of Ukrainian Language and Literature at

[126] Широков В.А., Загнітко А.П., Надутенко М., Надутенко М., Семеног О.М. та ін. Віртуальна лексикографічна лабораторія «Мультимедійний словник з інфомедійної грамотності». Український мовно-інформаційний фонд НАН України, 2022. URL: https://lcorp.ulif.org.ua/InfoMediaVLL/ (дата звернення: 15.09.2022).

[127] Презентація віртуальної лабораторії «Мультимедійний словник з інфомедійної грамотності»: URL: https:// www.youtube.com/watch?v=HN0bsmnM6gE (дата звернення: 15.09.2022).

Sumy State Pedagogical University named after A.S. Makarenko and the Machine-Building Vocational College of Sumy State University.

The register of 200 terms from media linguistics (булінг (bullying), відеоблог (videoblog), гаджет (gadget), медіабезпека (media security), медіаграмотність (media literacy), медіависловлювання (media statement), онлайн-шахрайство (online fraud), цифрова безпека (digital security), цифровий слід (digital footprint), фактчекінг (fact-checking), фейк (fake), троль (troll), чат-бот (chatbot) та ін.) is based on the concept of media literacy by IREX. It covers areas such as media literacy, critical thinking, social tolerance, resilience to influence and manipulation, fact-checking, information literacy, digital security, visual literacy, innovation, and creativity development. The terms are organized in a classical alphabetical order.

The dictionary offers definitions of media lexemes, translations, and explanations in English, as well as video clips providing corresponding characteristics (Fig. 8)[128].

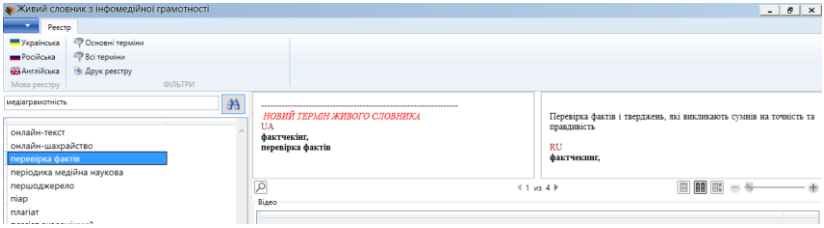


**Fig. 8. Lexeme фактчекінг (lit. *fact-checking*) in the "Multimedia Dictionary of Media Literacy"**

For greater interactivity in classes, the authors created presentation videos (https://www.youtube.com/watch?v=HN0bsmnM6gE) using various interactive methods (brainstorming, project work, situational tasks, etc.), including the word "gadget."

The software product "Transdisciplinary Cluster 'MEDIA & CAPSULES,'" developed by a participant in the grant project, was designed

[128] Надутенко М., Надутенко М., Семеног О. Застосування цифрового методу у викладанні філологічних дисциплін (на прикладі віртуальної лексикографічної лабораторії). *Волинь філологічна: текст і контекст*. 2022. Вип. 34. С. 7–26. URL: https://volyntext.vnu.edu.ua/index.php/volyntext/article/view/1039 (дата звернення: 19.06.2024).

for multimedia visualization of information with a media literacy component[129].

The cluster contains an information retrieval subsystem on separate servers (virtual machines) and an information presentation subsystem in the form of a web portal. Programming languages used: C++, C#, PHP, and JavaScript (see Fig. 9).

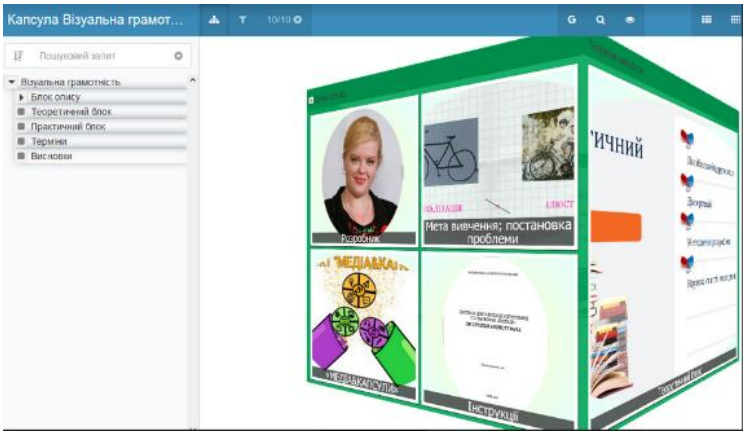


**Fig. 9. "MEDIA & CAPSULES" as an information retrieval subsystem**

The title "MEDIA & CAPSULES" is driven by the need to characterize an interactive media environment where files are interconnected on one resource according to the IREX project competency map: "Media Literacy," "Critical Thinking," "Social Tolerance," "Resilience to Influences, Fact-Checking," "Information Literacy," "Digital Safety," "Visual Literacy," "Innovation, Creativity Development."

Each "MEDIA & CAPSULE" is structured as follows: title, developer, study objective, problem statement; theoretical block (monographs, articles, presentation slides, links to news, videos, etc.); terms included in the "Multimedia Dictionary of Info-Media Literacy"; practical block (exercises, tasks for club activities aimed at developing soft skills in info-media literacy among higher education students) (see Figure 10).

[129] Семеног О. М., Надутенко, М. В. Платформа «Медіа&капсули» як засіб підвищення рівня медіакультури. *Академічні студії. Серія: Гуманітарні науки. 2022*. (2), 39-50. DOI: 10.52726/as.humanities/2022.2.6

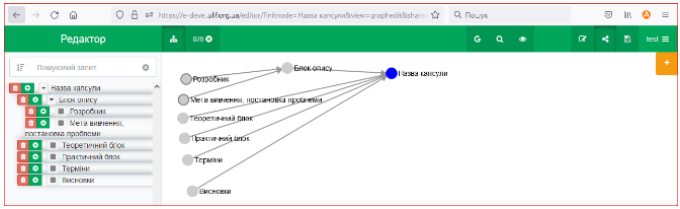


**Fig. 10. Structure of "MEDIA & CAPSULES"**

Innovative platforms are an essential component in the development of media literacy among young people. As the results of the grant projects show, participants have acquired the skills to interpret media texts considering their specificity, extract information from one or multiple media sources, identify main and sub-topics, distinguish between important and secondary details of media messages, and compose media texts considering structural, semantic, and stylistic features. They have learned to work with facts and arguments, analyze photos, posters, and infographics, recognize typical verbal and non-verbal means indicating manipulation, propaganda, or hidden content, and master techniques for communicative interaction in the network space. Additionally, they have gained interpersonal communication skills and the ability to interact effectively with others.

## CONCLUSIONS

The general scientific methods of analysis and synthesis of official and normative documents, as well as scientific works, provide grounds to state that digitalization in the context of philological education is considered as the process of integrating modern digital technologies into all aspects of the educational process. This includes the implementation of electronic resources, online courses, virtual laboratories, and other digital tools to enhance the quality of education and expand access to educational resources. Scientific literature highlights the importance of digitalization in education and science and the development of digital literacy, which is a necessary skill for successful functioning in the modern digital world. This involves the ability to effectively use digital technologies for searching, evaluating, and utilizing information, as well as for communication and collaboration in virtual environments.

The regulatory framework for digitalization of education in Poland and Ukraine covers several levels: (a) at the EU level – the strategic priorities of digital education are defined in the Digital Education Action Plan 2021–2027, which includes improving the educational process through digital technologies and ensuring digital competencies for all participants in the educational process; (b) at the level of Poland – the Digital Competency Development Program (PRKC), which outlines strategies and measures for

integrating digital technologies into educational processes, improving digital skills among the population, and ensuring equal access to digital resources; (c) at the level of Ukraine – the Concept of Digital Transformation of Education and Science for the period up to 2026, which envisages the modernization of the educational system, development of digital competencies, provision of modern equipment and internet connectivity, as well as the creation of high-quality digital educational content.

Based on the analysis and research conducted at the University of Economics and Human Sciences in Warsaw (Poland) and Sumy State Pedagogical University named after A. S. Makarenko (Ukraine), key principles of digitalization in philological education were identified: integration of modern digital tools, accessibility and flexibility of learning, personalization of the educational process, development of digital literacy, interactivity and collaboration, continuous updating of knowledge, and protection of intellectual property rights.

Examples of courses taught at the University of Economics and Human Sciences in Warsaw and Sumy State Pedagogical University named after A. S. Makarenko demonstrate the successful digitalization of the educational process. The course "A Philologist's Workshop: Modern Technologies and Career Paths" at the University of Economics and Human Sciences in Warsaw and the course "Information and Communication Technologies" at Sumy State Pedagogical University named after A. S. Makarenko integrate modern digital tools, providing students with access to various resources and the development of necessary competencies.

The faculty of the University of Economics and Human Sciences in Warsaw and Sumy State Pedagogical University named after A. S. Makarenko are actively involved in grant activities, which contribute to the development of digitalization in education at these institutions. Grants allow for the funding of projects aimed at developing digital competencies, implementing the latest technologies in the educational process, and creating modern educational content.

The digitalization of philological education in Poland and Ukraine promotes the enhancement of education quality, expansion of access to educational resources, and development of competencies necessary for successful professional activity in the modern digital world.

## SUMMARY

The general scientific methods of analysis and synthesis of official and normative documents, as well as scientific works, provide grounds to state that digitalization in the context of philological education is considered as the process of integrating modern digital technologies into all aspects of the educational process. This includes the implementation of electronic

resources, online courses, virtual laboratories, and other digital tools to enhance the quality of education and expand access to educational resources. Scientific literature highlights the importance of digitalization in education and science and the development of digital literacy, which is a necessary skill for successful functioning in the modern digital world.

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