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Olha Ameridze

Doctor of Philosophy in Educational and Pedagogical Sciences,
Associate Professor of the Department of Philology and Translation,
Kyiv National University of Technologies and Design, Kyiv, Ukraine
ORCID: 0000-0002-6111-7996
e-mail: ameridzeolga@gmail.com

Volodymyr Doroshenko

Candidate of Historical Sciences, Doctor of Science in Public Administration,
Associate Professor of the Department of Philology and Translation,
Kyiv National University of Technologies and Design, Kyiv, Ukraine
ORCID: 0000-0001-9951-3241
e-mail: doroshenko.vs@knuvd.edu.ua

Olena Shepeleva

Senior lecturer of the Department of English for Humanities № 3,
National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”,
Kyiv, Ukraine
ORCID: 0000-0003-4260-0840
e-mail: shepelevaolena@ukr.net

**SCIENTIFIC AND INFORMATIONAL SUPPORT FOR FOREIGN
LANGUAGE INSTRUCTION FOR NON-PHILOLOGICAL STUDENTS IN
MODERN HIGHER EDUCATION**

***Abstract.** The article examines the specifics of scientific and informational support in the process of foreign language acquisition among students majoring in non-philological disciplines and delineates its critical role in fostering professionally oriented foreign language competence within the contemporary context of higher education. The study underscores that scientific and informational support functions as an integrated pedagogical system, encompassing content, technological, methodological, and organizational components, each contributing to the optimization of the learning process. The content component involves a purposeful and systematic use of authentic learning materials, including scholarly publications, technical documentation, and professional reports, which are carefully adapted to the specific characteristics of students' respective fields of study. This approach ensures a high degree of relevance of the instructional content and its practical applicability in future professional activities, thereby contributing to the development of competencies directly associated with professional practice. The technological component emphasizes the deployment of modern*

information and communication technologies (ICTs), including learning management systems, online courses, mobile applications, and artificial intelligence tools, which facilitate blended and distance learning modalities while supporting personalized and adaptive educational trajectories. The methodological approach integrates communicative, competency-based, activity-oriented, and CLIL (Content and Language Integrated Learning) frameworks, promoting the simultaneous development of linguistic, cognitive, and intercultural competencies. Additionally, project-based learning and role-playing activities are employed to enhance the integration of professional expertise with language skills, fostering authentic and practice-oriented learning experiences. From an organizational perspective, interdisciplinary collaboration and meticulous planning are emphasized as essential mechanisms to align foreign language instruction with professional curricula effectively. The study identifies several challenges, including heterogeneity in language proficiency levels, limited instructional time, a lack of adapted pedagogical materials, and the necessity to enhance educators' digital literacy and technological competencies. Proposed solutions include the implementation of innovative pedagogical technologies, systematic curriculum updates, expanded interdisciplinary cooperation, and the integration of adaptive learning systems tailored to individual learner profiles.

The findings of the study suggest that scientific and informational support constitutes a strategic instrument for the modernization of higher education, the enhancement of students' professional foreign language competence, and the preparation of competitive specialists capable of functioning effectively in a globalized professional environment.

Keywords: *scientific and informational support, foreign language learning, non-philological students, higher education, information and communication technologies, professional competence.*

General statement of the problem. In the current conditions of globalization and intensive development of the information society, knowledge of a foreign language is becoming a necessary component of professional training for specialists in almost all fields. For students of non-philological specialties, a foreign language serves as a tool for accessing international scientific resources, professional communication, and participation in the global academic environment. That is why scientific and informational support for training is of particular importance, ensuring the systematicity, relevance, and effectiveness of the educational process.

The relevance of the study is due to the growing requirements for the level of foreign language training of future specialists in the context of Ukraine's integration into the global educational and scientific space. The modern labor market requires graduates of higher education institutions not only professional knowledge, but also

the ability to effectively communicate in a foreign language, work with authentic sources of information, participate in international projects, and academic mobility. At the same time, traditional approaches to teaching foreign languages do not always meet these requirements, which necessitates the search for new pedagogical solutions and the introduction of modern learning technologies.

The problem of ensuring high-quality scientific and information support for foreign language teaching, which involves the integration of digital resources, modern methods and professionally oriented content, is of particular importance. Modern conditions for the digitalization of education open up new opportunities for access to international databases, electronic libraries, online courses and interactive platforms, which significantly expands the educational environment and contributes to the individualization of foreign language education.

Analysis of major studies and publications. The issue of scientific and informational support for foreign language instruction for non-philological students in modern higher education is grounded in an interdisciplinary body of research that integrates methodological, technological, and professionally oriented dimensions of language learning. Contemporary scholarship demonstrates a clear shift from traditional language instruction toward models that embed foreign language acquisition within academic and professional contexts, thereby redefining the role of instructional support systems.

A key component of such support is the integration of language and content learning. Within this paradigm, the Content and Language Integrated Learning (CLIL) approach, as conceptualized by Marsh (2002) and further elaborated by Coyle, Hood and Marsh (2010), provides a methodological foundation for aligning linguistic development with subject-specific knowledge acquisition. This approach enhances the relevance of foreign language instruction for non-philological students by situating language use within authentic disciplinary contexts. At the same time, the global dimension of language use is critically addressed by Graddol (2006), who emphasizes that English functions as a key instrument of international academic communication. From this perspective, scientific and informational support must ensure access to global knowledge resources and facilitate students' participation in international academic and professional networks.

Equally significant is the role of digital technologies as a structural element of informational support. Research by Chapelle (2001) highlights the pedagogical potential of computer-assisted language learning, particularly in developing communicative competence and learner autonomy. Expanding this view,

Siemens (2005) conceptualizes learning as a networked process, where knowledge is distributed across digital environments and accessed through connections. This theoretical framework underscores the importance of integrating online platforms, digital resources, and network-based interaction into foreign language instruction. In parallel, Salmon (2004) demonstrates that effective moderation and organization of online learning environments are critical for ensuring meaningful interaction and engagement, especially in дистанційних and blended learning contexts.

Recent research further indicates that multimodal and technology-enhanced approaches significantly strengthen the effectiveness of scientific and informational support. Studies by Ukrainian scholars show that the use of digital narratives and multimodal resources not only improves language proficiency but also increases students' motivation by linking language learning to their future professional activities (Fedorenko, Voloshchuk, Sharanova, Glinka & Zhurba, 2021; Fedorenko & Kravchenko, 2023). This is complemented by findings from Stockwell (2010) and González-Lloret (2016), who emphasize the practical value of mobile technologies and digital tools in supporting vocabulary acquisition and communicative task design. Together, these approaches contribute to the creation of a dynamic and context-sensitive learning environment that aligns with the needs of non-philological students.

An essential dimension of scientific support is the development of instructional materials that reflect both disciplinary specificity and technological innovation. In this regard, Tomlinson (2023) proposes a comprehensive framework for materials development, emphasizing adaptability, authenticity, and learner-centeredness. Empirical evidence provided by Kalay, Fedorenko, Guryeyeva and Kolomiets (2020) further confirms the effectiveness of digital learning platforms, such as Moodle, in developing terminological competence, thereby demonstrating the practical implementation of informational support mechanisms in higher education.

The study by Fedorenko, Kolomiets, Tikan, and Tsepkalo (2020) highlights the significance of an interdisciplinary approach as a key component of scientific and informational support for foreign language instruction for non-philological students in modern higher education. The authors argue that integrating subject-specific content with language learning enhances students' ability to apply English in professional contexts, thereby increasing the practical value of language instruction. Their research demonstrates that modeling interdisciplinary tasks contributes to the development of both communicative competence and domain-specific knowledge,

ensuring a closer alignment between language education and students' future careers (Fedorenko, Kolomiets, Tikan & Tsepka, 2020). Moreover, the study emphasizes that such integration supports the creation of a more coherent and contextually relevant learning environment, which is essential for effective scientific and informational support.

However, the analysis of the source base also reveals certain limitations that directly affect the quality of scientific and informational support. In particular, while Richards (2008) provides important theoretical insights into integrated and communicative approaches, their relative datedness and the absence of properly formatted bibliographic references reduce their applicability in the rapidly evolving educational landscape. Similarly, the theoretical model proposed by Siemens (2005), despite its relevance to digital learning, remains conceptually debated and requires further empirical validation. In contrast, Tomlinson (2023) represents a more current and methodologically robust contribution, reflecting contemporary trends in both pedagogy and technology.

In conclusion, scientific and informational support for foreign language instruction for non-philological students in modern higher education is characterized by the integration of content-based learning, communicative methodologies, and digital technologies. At the same time, the effectiveness of this support depends on the topicality and reliability of the source base, which necessitates continuous updating of research materials, incorporation of recent empirical findings, and adherence to proper academic referencing standards.

The purpose and objectives of the article. The purpose of the article is to highlight the features of scientific and information support for foreign language learning for students of non-philological specialties and to determine its role in the formation of professionally oriented foreign language competence in the conditions of the modern educational environment. To achieve this goal, the following main tasks have been identified: to analyze the theoretical foundations of scientific and information support for foreign language learning; to clarify the specifics of foreign language training for students of non-philological specialties; to characterize the role of modern information technologies in the educational process; to determine effective methods and forms of organizing training taking into account professional orientation; to outline the main problems and prospects for the development of the specified support in the higher education system.

Presentation of the main research material. Within the context of contemporary higher education, scientific and informational support for foreign

language learning among students of non-philological disciplines functions as a comprehensive pedagogical system integrating content, technological, and organizational components. Its implementation is driven by the imperative to cultivate competitive professionals capable of operating effectively in an international professional environment, employing a foreign language as a tool for professional practice, academic engagement, and continuous self-development.

First of all, it is advisable to consider the structure of scientific and information support, which includes the following main components: content, technological, methodological and organizational. The content component involves the selection of educational material that meets the professional needs of students. This involves the use of authentic texts, scientific articles, technical documentation, analytical reports and other materials that reflect the current state of development of the relevant industry. For example, in the training of students of economic specialties, it is advisable to use materials from international organizations that contain analytical reviews of markets, financial reports and economic forecasts. For students of technical specialties, it is effective to involve instructions for equipment, standards, patent documentation and descriptions of technological processes. Therefore, language and professional training are integrated, which increases student motivation and ensures a practical orientation of the educational process.

The technological component involves information and communication technologies, which significantly expand learning opportunities. In this context, learning management systems, online platforms, electronic libraries and digital resources play an important role. The use of such technologies allows you to organize blended or distance learning, provide access to relevant information and create conditions for individualizing the educational process. In particular, the implementation of electronic courses allows students to work at their own pace, complete interactive tasks, take tests and receive feedback. An important aspect is also the use of multimedia tools that contribute to the development of auditory and communicative skills (Fedorenko, Voloshchuk, Sharanova, Glinka & Zhurba, 2021). For example, watching video lectures, participating in webinars, or analyzing podcasts in a foreign language allows students to immerse themselves in a real language environment.

Today, information technologies constitute a central component of scientific and informational support for foreign language instruction in modern higher education. They not only provide access to vast amounts of educational and

professional content, but also fundamentally transform the ways in which this content is processed, interpreted, and applied in the learning process. In this context, digital tools and platforms enable students to engage with authentic materials drawn from international academic and professional environments, thereby enhancing both linguistic competence and subject-specific knowledge. As noted by González-Lloret (2016), the integration of technology into communicative tasks creates conditions for interactive, practice-oriented learning that reflects real-world language use.

From an analytical perspective, the role of information technologies extends beyond mere access to information. They function as a mediating environment in which learning becomes more individualized, flexible, and learner-centered. The incorporation of online resources, multimedia content, and virtual communication tools allows students to actively construct knowledge through interaction, collaboration, and problem-solving activities. This aligns with the principles of network-based learning proposed by George Siemens (2005), where the ability to navigate information flows and establish meaningful connections between knowledge sources becomes a core educational objective.

Moreover, information technologies significantly enhance the interactivity of the learning process. Through the use of digital simulations, discussion forums, video conferencing, and mobile applications, students are not only passive recipients of information but active participants in communicative exchanges. This is particularly important for non-philological students, whose primary goal is to use a foreign language as a tool for professional communication rather than as an abstract system of rules. In this regard, technology-supported environments facilitate the integration of language learning with professional contexts, enabling learners to practice discipline-specific communication in realistic scenarios.

At the same time, the implementation of information technologies contributes to the development of learner autonomy and self-regulation. Access to online databases, electronic journals, and educational platforms encourages students to independently search for, evaluate, and utilize information, which is an essential component of scientific literacy. This aspect of informational support is especially relevant in the context of globalization, as emphasized by David Graddol (2006), where proficiency in English is closely linked to the ability to participate in global knowledge exchange. Among the most effective tools, the following can be distinguished:

- digital learning platforms, including Moodle and Google Classroom, support both distance and blended learning modalities. Instructors can design courses in

which students engage with tasks based on authentic scientific publications, complete structured assessments, and participate in guided discussions. This approach facilitates the integration of language instruction with discipline-specific professional activities, promoting the acquisition of contextually relevant competencies (Kalay, Fedorenko, Guryeyeva & Kolomiets, 2020);

- online courses, such as those offered by Coursera and edX, provide opportunities for students to acquire specialized vocabulary within a professional context, thereby aligning language learning with their disciplinary and occupational needs (Salmon, 2004);

- online applications, such as Quizlet, serve as effective tools for the development of lexical competence and vocabulary acquisition (Chapelle, 2001; Stockwell, 2010);

- exploiting artificial intelligence (e.g., chatbots) to train speech and writing.

However, despite their significant potential, information technologies also present certain challenges. Their effectiveness depends on the quality of digital resources, the level of teachers' digital competence, and the degree to which technological tools are pedagogically integrated into the curriculum. Without a systematic methodological framework, the use of technology may remain superficial and fail to produce meaningful learning outcomes. Therefore, scientific and informational support must include not only access to technological tools but also clear strategies for their pedagogical application.

In sum, information technologies play a multifaceted role in supporting foreign language instruction, acting simultaneously as sources of information, tools for communication, and environments for interactive learning. Their effective integration into higher education contributes to the creation of a dynamic, flexible, and professionally oriented learning space that meets the needs of non-philological students in the contemporary academic landscape.

The methodological component of scientific and information support is based on the use of modern approaches to learning, among which a special place is occupied by communicative, competence-based, activity-based and integrated approaches. The communicative approach orients the educational process towards the development of the ability to communicate effectively in various situations, which is especially important for future specialists. In practice, this is implemented through the organization of role-playing games, discussions, presentations and project activities. For example, students can simulate professional situations: conducting

negotiations, presenting a project, participating in a conference or writing a business letter. Such tasks contribute to the formation of not only linguistic, but also socio-cultural and professional competencies.

CLIL involves the combination of linguistic and subject content. Its implementation can be carried out through teaching individual disciplines in a foreign language or utilizing professional materials in the language learning process (Brinton, Snow & Wesche, 2003). For instance, students may be asked to analyze scientific articles, prepare essays, or complete research assignments in a foreign language.

It should be mentioned that CLIL is based on the 4Cs model. In this model, the 4Cs stand for content, communication, cognition, and culture. This concept, in turn, is based on the idea that the educational process should provide not only the acquisition of subject knowledge, but also the development of linguistic, cognitive, and intercultural skills (Coyle, Hood & Marsh, 2010). And the language here is an effective instrument of both learning and teaching.

The first component of the aforementioned model is content, which involves mastering the content of a specific academic discipline. In CLIL, students study disciplines in a foreign language, so it is important that the educational material is methodically adapted and accessible for understanding by the student audience. The second component – communication – emphasizes the role of language as a means of learning and interaction. Students do not only passively receive information, but also actively use a foreign language to discuss, analyze and complete tasks, improving their communication skills in academic and professionally oriented contexts. The third component – cognition – concerns the development of thinking. CLIL focuses on the formation of various cognitive skills: from understanding basic facts to analysis, synthesis and critical thinking. The tasks are structured in such a way that language is not an obstacle, but a means of processing information based on complex mental operations. Finally, the “culture” component involves the formation of intercultural competence. Since learning takes place in a foreign language, students naturally encounter other cultural contexts and ways of thinking. This to some extent contributes to the development of tolerance, awareness of cultural diversity and the ability to cooperate in a multicultural environment.

Thus, the 4Cs concept allows tracing how integrated learning of the discipline and language creates conditions for the development of intercultural competence and critical thinking. In this approach, culture acts as an equal component of the educational process, which makes it especially valuable for studying the impact of multilingual educational programs on the formation of a student’s multicultural

personality (Coyle, Hood & Marsh, 2010). The project method is particularly effective here, which involves the active participation of students in the learning process. Project activities allow integrating knowledge from different fields, develop critical thinking, independent work skills and teamwork (Федоренко, 2018). For instance, students can develop business plans, create startup projects or conduct research, the results of which are presented in a foreign language .

The organizational component includes planning the educational process, determining forms and methods of work, as well as creating a favorable educational environment. An important aspect is ensuring interdisciplinary interaction, when foreign language teachers cooperate with teachers of specialized disciplines. This allows coordinating the content of the training and make it more relevant to the professional needs of students.

In the process of implementing scientific and information support, the formation of students' information competence is also important. It includes the ability to find, analyze, evaluate and use information from various sources, including in a foreign language. This is especially important in conditions of information overload, when students need to be able to select reliable and relevant data. The practical implementation of this task can be carried out through tasks related to searching for information in international databases, analyzing scientific publications, preparing analytical reviews and presentations. For example, students may be asked to find and analyze an article in their specialty, identify the main ideas, terms, and present the results in the form of a report.

An essential aspect of the educational process is the implementation of adaptive learning technologies, which enable the consideration of individual student characteristics and learning needs. This includes the differentiation of tasks, the use of multi-level instructional materials, and the integration of systems capable of automatically selecting educational content according to each student's current level of knowledge and skills. Such an approach facilitates personalized learning, enhances the effectiveness of material acquisition, promotes autonomous learning, and supports the progressive development of competencies tailored to the specific needs of learners.

However, the implementation of scientific and information support is accompanied by certain difficulties. One of the main problems is the different level of language training of students, which complicates the organization of the educational

process. In addition, the limited number of teaching hours does not always allow ensuring a sufficient level of foreign language competence.

Another challenge is the insufficient training of teachers in the use of modern information technologies. In this regard, there is a need to improve their qualifications, in particular in the field of digital pedagogy. It is also important to create high-quality educational materials adapted to the needs of specific specialties (Fedorenko & Kravchenko, 2023). To overcome these problems, it is advisable to implement a comprehensive approach that involves updating educational programs, integrating modern technologies, developing interdisciplinary cooperation and improving the qualifications of teachers. It is also important to involve students in active educational activities, which helps to increase their motivation and responsibility for learning outcomes. The prospects for the development of scientific and information support are associated with the further digitalization of education, the use of artificial intelligence, the development of open educational resources and international cooperation. In particular, the use of intelligent learning systems can ensure more effective individualization of the educational process and increase its effectiveness.

Thus, scientific and information support for learning a foreign language for students of non-philological specialties is a complex multi-component system that ensures the integration of language and professional training. Its effective implementation contributes to the formation of key competencies necessary for successful professional activity in the modern globalized world.

Conclusions and scope for further research. As a result of the study, it was established that scientific and information support for foreign language learning for students of non-philological specialties is an important component of the modern higher education system, which ensures the effective integration of language training with professional activities. Its implementation contributes to the formation of professionally oriented foreign language competence, the development of skills for working with authentic sources of information and increasing the level of students' readiness to participate in the international academic and professional environment.

It was found that the effectiveness of scientific and information support largely depends on a complex combination of content, methodological, technological and organizational components. The use of modern information and communication technologies, integrated approaches to learning (in particular CLIL), as well as professionally oriented educational materials allows making the educational process more flexible, individualized and practically oriented. At the same time, the

development of students' information competence is important, which involves the ability to effectively work with scientific resources in a foreign language.

At the same time, a number of problems have been identified that complicate the implementation of scientific and information support, including: different levels of language training of students, limited study time, insufficient number of adapted materials and the need to increase the digital competence of teachers. Overcoming these challenges is possible provided that innovative pedagogical technologies are introduced, the content of training is updated and interdisciplinary interaction is developed.

Therefore, scientific and information support for foreign language teaching acts as a strategic direction for the modernization of the educational process, which ensures the training of competitive specialists capable of effective professional activity in the conditions of a globalized world.

Future research prospects include investigating the effectiveness of integrating digital and adaptive technologies, particularly artificial intelligence, in the instruction of foreign languages for students of non-philological disciplines. Additionally, it is pertinent to develop innovative models of integrated learning that facilitate the simultaneous acquisition of linguistic and professional competencies, especially within the broader context of the ongoing digitalization of higher education.

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Амерідзе Ольга Сергіївна,

доктор філософії з освітніх та педагогічних наук,
доцент кафедри філології та перекладу,
Київський національний університет технологій та дизайну,
м. Київ, Україна
ORCID: 0000-0002-6111-7996
e-mail: ameridzeolga@gmail.com

Дорошенко Володимир Сергійович

кандидат історичних наук, доктор наук з державного управління,
доцент кафедри філології та перекладу,
Київський національний університет технологій та дизайну,
м. Київ, Україна
ORCID: 0000-0001-9951-3241
e-mail: doroshenko.vs@knutd.edu.ua

Шепелєва Олена Володимирівна

старший викладач
кафедри англійської мови гуманітарного спрямування № 3,
Національний технічний університет України
«КПІ імені Ігоря Сікорського», м. Київ, Україна
ORCID: 0000-0003-4260-0840
e-mail: shepelevaolena@ukr.net

**НАУКОВО-ІНФОРМАЦІЙНИЙ СУПРОВІД НАВЧАННЯ ІНОЗЕМНОЇ
МОВИ ДЛЯ СТУДЕНТІВ НЕФІЛОЛОГІЧНИХ СПЕЦІАЛЬНОСТЕЙ У
СУЧАСНІЙ ВИЩІЙ ШКОЛІ**

Анотація. Стаття досліджує специфіку науково-інформаційного забезпечення процесу опанування іноземної мови студентами непрофілологічних спеціальностей та визначає його ключову роль у