Information and Communication Technologies

DOI: https://doi.org/10.63377/3005-4966.3-2025-06
UDC: 004.9:378.147
IRSTI: 28.23.01

Competence-based approach for teaching discipline "Information and communication technologies" in foreign language

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Received: 20 May 2025
Peer-reviewed: 04 August 2025
Accepted: 25 August 2025

Abstract

In the article an experience of implementing a competence-based approach for the course "Information and communication technologies" with teaching in a foreign language (English) at technical higher school is explored. The application of the competence-based approach is associated with the need to supplement traditional teaching methods in such a way as to bring the educational process in accordance with the requirements of the information age. Nowadays the need for changing traditional approaches to education from the acquisition of short-term skills to proactive programs that infuses technology into the learning is of utmost importance.

It is known, that foreign languages are a suitable platform for the development of not only special knowledge, but also soft skills, which are modern days requirement. Completing tasks, cognitive skills are developed and consolidated: a logical thinking, mathematical skills, an intellectual thinking (an ability to search and analyze information), English proficiency (an ability to defend one's point of view), memory; technical skills: skills of drawing up a plan, an ability to correctly formulate one's thoughts orally and in writing. Students' oral answers reveal their important social and behavioral skills, such as a desire to gain new experience in a different language environment, desire for development, i. e. to English fluency, an ability to control oneself.

Teaching "Information and communication technologies" in English promotes widening students' outlook, foreign language knowledge actualization and increasing students' interest to study English and other languages, provides to efficiently develop soft skills.

Keywords: artificial intelligence, economy, labor market, investment, efficiency, productivity, world market.

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Ақпараттық-коммуникациялық технологиялар

DOI: https://doi.org/10.63377/3005-4966.3-2025-06
ӘОЖ: 004.9:378.147
ҒТАМР: 28.23.01

«Ақпараттық-коммуникациялық технологиялар» пәнін шет тілінде оқытудағы құзыреттілікке негізделген әдіс

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Мақала келді: 20 мамыр 2025
Сараптамадан өтті: 04 тамыз 2025
Қабылданды: 25 тамыз 2025

Түйіндеме

Мақалада шет тілінде оқытудағы «Ақпараттық-коммуникациялық технологиялар» курсының пәнаралық байланыстары зертханалық сабақтар үшін қарастырылған. Пәнаралық байланыстарды пайдалану курстың құрамдас бөлігі екені көрсетілген. Пәнаралық байланысты өзектендіру студенттердің жүйелі білімдерін арттырады, оқу үрдісінің бірлігін қамтамасыз етеді.

Шет тілдері тек арнайы білімді ғана емес, сонымен қатар заманауи сұранысқа ие "жұмсақ дағдыларды" дамыту үшін қолайлы алаң екені белгілі. Тапсырмаларды орындау кезінде танымдық қабілеттер дамып бекітіледі: логикалық ойлау, математикалық дағдылар, интеллектуалды ойлау (ақпаратты іздеу және талдау қабілеті), ағылшын тілін білу (өз көзқарасын қорғау қабілеті), есте сақтау; техникалық дағдылар: жоспар құру дағдысы, өз ойын ауызша және жазбаша түрде дұрыс тұжырымдай білу дағдысы. Студенттердің ауызша жауаптары олардың маңызды әлеуметтік және мінез-құлық дағдыларына ие екендігін көрсетеді: басқа тілдік ортада жаңа тәжірибе алуға ұмтылы болу, дамуға ұмтылыс жасау, яғни ағылшын тілін еркін меңгеруге, өзін-өзі басқара білуге қадам жасау.

«Ақпараттық-коммуникациялық технологиялар» пәнін ағылшын тілінде оқыту студенттердің ой-өрісін кеңейтуге, шет тілі білімін тереңдетуге, ағылшын және басқа тілдерді үйренуге деген қызығушылығын арттыруға ықпал етіп, икемді дағдыларды тиімді дамытуға мүмкіндік береді.

Түйін сөздер: ақпараттық-коммуникациялық технологиялар, пәнаралық байланыс, лабораториялық жұмыстар, оқыту, жұмсақ дағдылар.

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Информационно-коммуникационные технологии

DOI: https://doi.org/10.63377/3005-4966.3-2025-06
УДК: 004.9:378.147
МРНТИ: 28.23.01

Компетентностный подход в обучении дисциплине «Информационно-коммуникационные технологии» на иностранном языке

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Поступила: 20 мая 2025
Рецензирование: 04 августа 2025
Принята в печать: 25 августа 2025

Аннотация

В статье исследован опыт реализации компетентностного подхода в преподавании курса «Информационно-коммуникационные технологии» на иностранном (английском) языке в техническом вузе. Применение компетентностного подхода связано с необходимостью дополнить традиционные методы обучения таким образом, чтобы привести учебный процесс в соответствие с требованиями информационного века. В современных условиях первостепенное значение имеет переход от приобретения краткосрочных навыков к проактивным программам, которые внедряют технологии в обучение.

Известно, что иностранные языки являются подходящей платформой для развития не только специальных знаний, но и востребованных современностью «soft skills». При выполнении заданий развиваются и закрепляются когнитивные навыки: логическое мышление, математические навыки, интеллектуальное мышление (умение производить поиск и анализ информации), владение английским языком (умение отстаивать свою точку зрения), память; технические навыки: навыки составления плана, умение грамотно формулировать свои мысли устно и письменно. Устные ответы студентов выявляют наличие у них важных социальных и поведенческих навыков: стремление получить новый опыт в иной языковой среде, стремление к развитию, т. е. к свободному владению английским языком, умение владеть собой.

Преподавание дисциплины «Информационно-коммуникационные технологии» на английском языке на основе компетентностного подхода способствует расширению кругозора, актуализации знаний иностранного языка, усилению интереса обучаемых к изучению английского и других языков, позволяет эффективно развивать гибкие навыки.

Ключевые слова: информационно-коммуникационные технологии, компетенции, мобильное обучение, гибкие навыки.

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1. Introduction

Modern education is based on the competence-based paradigm. Reliance on the competence-based approach is response to the challenges to education system in the information century [1, 2]. The competence-based approach is a priority orientation towards goals, vectors of education as follows: learning, self-determination, self-actualization, socialization and development of individuality. Competences and meta-qualities act as tools to achieve these goals.

Competency is a category which associates to sphere of relations between knowledge and practical activity of a person [1]. Knowledge, skills and abilities are considered as possible components of competency. The core of the competency consists of activity abilities that are a set of action methods.

Competences are the elements of the competency as a whole [3]. The competences are generalized methods of action that ensure productive performance of professional activity. These include professional skills and abilities which student masters in the learning process. The competences are necessary to solve problems in the subject area. Through them, a person can realize in practice his/her competency.

Meta-qualities are personality attributes, which determine a productivity, i. e. first of all, a success of professional activity. Therefore, basis of the competency is knowledge and improvement of the educational process, taking into account the competence-based approach, consists in an affirmation, that the goal is not a passive acquisition of theoretical knowledge by trainees, i. e. not knowledge itself, but learning to apply the acquired knowledge and skills in certain situations.

The competence-based approach has significantly influenced on change of content, methods, means, forms and technologies of the modern education. This technique contributes to more effective use of interactive methods and teaching means: discussions, seminars, business games, case method, brainstorming, presentations, trainings, etc. It is aimed to future, on perspective.

There is an opinion, that the use of information and communication technologies (ICTs) in education disrupts traditional learning concepts and activities, especially in higher education [4]. Opposite point of view is that ICTs improve quality of education [5].

The course "Information and communication technologies" (ICT course) with teaching in a foreign language refers to general educational disciplines and is compulsory to prepare junior students of technical and economic specialties at universities [6]. The objectives of the ICT course in graduate school are to teach students to use modern information tools and technologies in the professional subject area, to prepare for rapid perception and processing of large volumes of information, to form an information culture [6-7]. ICTs are an important element of the process of learning and teaching in graduate school [8]. Students will be able to master professional and personal competences, which enable to use modern information and communication technologies in various fields of professional activity, scientific and practical occupations and for the purpose of self-development and self-education.

Teaching ICTs in foreign (English) language on the competence-based approach permits to deepen knowledge of the discipline, to broaden horizons of students, to apply knowledge of the foreign language in practice, i. e. if possible, to turn it from passive to active, to actualize knowledge of English, to increase their cognitive abilities and to promote students' interest in learning English and other languages. ICTs teaching includes lectures, labs, student self-study and a final exam. These refer to traditional teaching methods and forms, by other words, face-to-face teaching.

Development of skills to diversify application of acquired knowledge and actualization of interdisciplinary connections contribute to generalization and deepening of students' competences in pushing forward skills of cognitive self-activity. Interdisciplinary connections are the most important condition and result of the integrated approach to learning [9]. Actualization of the

interdisciplinary links of the ICT course with the courses of mathematics, physics, engineering and foreign language is one of basic teaching principles [8].

The purpose of the article is to consider the application of the competence-based approach in teaching the course "Information and communication technologies" in English. It is known, that foreign languages are a platform for the development of not only special knowledge, but also “soft” skills that are in demand at modern time [10]. Soft skills are universal competences, which are difficult to appreciate by quantitative measures [11]. These skills could be obtained through personal experience. One highlights cognitive, social and behavioral, as well as technical “soft” skills [12].

2. Materials and Methods

To evaluate the educational level of students in the field of Information and Communication Technologies (ICT) and their English language proficiency, a short diagnostic survey was conducted among first- and second-year students at the Kazakh Automobile and Road Institute. The total number of participants was 30. The questionnaire included topics from prior studies in computer science such as computer architecture, office applications (MS Word, Excel), databases (MS Access), Internet technologies, and computer networks.

Based on the survey results, 70% of students confirmed familiarity with computer architecture, Internet technologies, and networks. However, 20% had not studied spreadsheet software, and 36.7% reported unfamiliarity with database systems, indicating varied levels of prior knowledge.

Within the ICT course taught in English, students were introduced to key ICT topics such as the history and development of ICTs, computer system architecture, operating systems, software applications, cybersecurity, mobile technologies, and the application of ICT in professional fields. Instructional methods included lectures, laboratory work, and independent study, culminating in a final exam.

Lectures provided theoretical foundations, while laboratory sessions focused on the practical application of knowledge and the development of digital, linguistic, and cognitive skills. Practical tasks included working with text editors, spreadsheets, databases, Internet search technologies, and web-based platforms. Students were required to complete laboratory reports and orally defend their work, enhancing both technical and soft skills such as communication, problem-solving, and independent thinking.

Mobile learning and e-learning technologies were also integrated to increase accessibility of materials and support out-of-class preparation. Students’ engagement and performance were monitored throughout the semester, and final knowledge assessment was conducted in the form of computer-based testing.

3. Results

In order to appreciate students’ educational level on ICT and English proficiency for the course a short survey has been proposed to first- and second-year students of Kazakh automobile and road Institute. Number of students involved is 30. The survey includes the following questions:

Did you study the following sections of the Computer Science course at school/college?

— Computer architecture
— Office programs (MS Word, Excel)
— Data Bases (MS Access)
— Internet technologies
— Computer networks

Partly students have difficulties answering the questions. 70% of respondents answered affirmatively to the first, fourth and last questions. One-fifth of respondents had not studied spreadsheet software in school and 36.7% had not studied databases (Fig.1). For themes proposed always there are trainees that didn’t study them at their previous education.

Figure 1. Student answers to a question: Did you study the following sections of the Computer Science course at school/college

In the frame of the ICT course with teaching in the foreign language, students are introduced to basic issues and subdivisions as follows: ICTs' history, evolution of computer systems, computer structure, architecture of computer systems and networks, operating systems, database systems, programming systems, applied software, cyber security, electronic and mobile technologies, information technologies in the professional field, etc. At lectures, students master and consolidate knowledge of fundamental concepts: information volume of a message, coding, algorithm, file system, machine cycle, network protocol, number systems, etc.

Knowledge, which students should obtain at the learning process, is as follows:

— general trends in the field of information and communication technologies; economic and political factors contributed to the development of information and communication technologies;
— classification and architecture of computer systems, features of various operating systems;
— tools and methods of data processing and transmission in computer networks.

Student will have an opportunity (that is skills, which he/she will acquire):

— to engage in independent creative search for information in professional subject area;
— to use various forms of e-learning to expand professional knowledge (forward-looking);
— to use various online services for professional interests and for self-development.

At lectures, students receive theoretical knowledge and get acquainted with the necessary terms. This is essential to develop their intellectual abilities and the foreign language (English) skills. Combination of oral explanation with methods of increasing cognitive activity of students (highlighting the main idea, taking notes, drawing up a schematic model of the material presented) is of importance. Lectures on ICTs always include illustrative material. Material of the lectures is fixed at laboratory classes.

The laboratory classes on ICTs in English teach to put into practice knowledge of training language, at the class computer skills have been worked out. The material, which is considered at the classes, allows one to show connection between various disciplines, primarily ICTs and professional foreign language. The labs activate mental activity of students, stimulate them to independently acquire necessary knowledge in their subject area.

Performing labs on ICTs involves writing a report on the work done and oral responses before and after performing a specific lab. The report on laboratory work is drawn up as follows: there are should be indicated the number, topic of the laboratory work, goals, exercises, tasks, necessary calculations and conclusion. Most of the labs are performed on the computer and work files should be kept in the student's own folder. Individual folders are stored (located) in group folders. Although lab assignments are stored electronically, records are in need. Thus, students learn to plan, take notes, and particularly at the laboratory classes, the skills of drawing up a plan and writing are fixed.

Nowadays the need to infuse technology into the learning is of utmost importance [13]. At labs students master ICTs as those shown in Fig. 2.

In order to increase availability of educational resources, primarily the content of laboratory works at the classes, mobile learning and e-Learning have been used (Fig. 3). These teaching technologies perceive to use educational resources not only at the classes, but also for self-preparation of students to laboratory classes.

About 15% of students spoke English in a sufficient level, that is they could explain the material and their own actions. 30% of all students had no interest to the foreign language and the ICTs as a whole. 20 % of trainees were able to complete lab assignments successfully, in general 50%, not including mentioned, could perform the basic part of laboratory tasks.

Self-study work of students is oriented to form their self-thinking, development of the ability to build problem solving procedure in professional field of interest. A conscientious attitude to discipline, mastering the lecture material, performing not only tasks for laboratory work, but also tasks within the framework of self-study, provides one learning systematically and purposefully to apply ICTs in necessary activities.

The study of the discipline ends with an exam. The purpose of the exam is to test theoretical knowledge of trainees, their skills and ability to apply the acquired knowledge in solving practical problems. Examination forms are classical exam (written or oral) and testing.

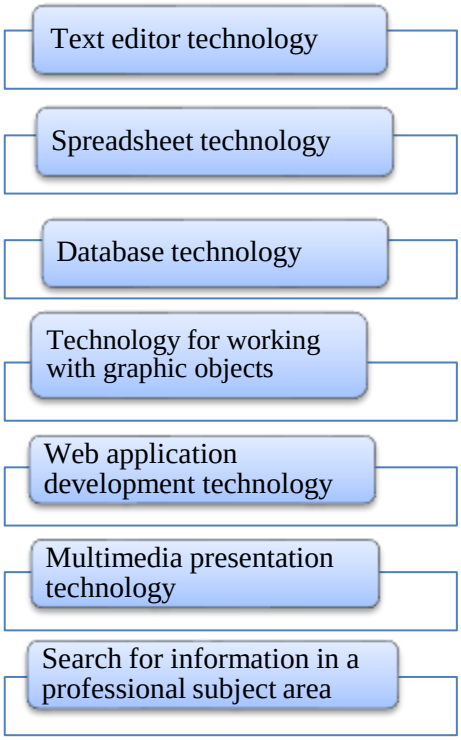

Figure 2. Information and communication technologies, which students gain at laboratory classes

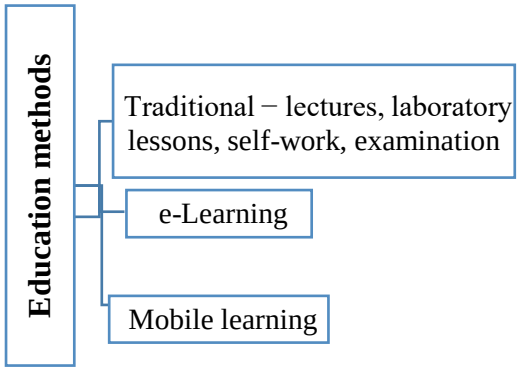

Figure 3. Methods for ICTs teaching

Examination by the discipline was held in the form of testing. About 70% of all students have achieved a sufficiently high level of knowledge quality at the exam.

4. Discussion

The findings of this study demonstrate that implementing a competence-based approach to teaching the "Information and Communication Technologies" course in English significantly enhances both students' technical and linguistic abilities. Teaching ICT in a foreign language environment not only broadens learners' academic and professional horizons but also facilitates the development of soft skills such as communication, self-organization, critical thinking, and digital literacy.

Despite the overall positive outcomes, the results also revealed several challenges. First, a noticeable portion of students lacked prior experience with key ICT tools—particularly databases and spreadsheet software—which affected their initial performance in laboratory assignments (table 1). These gaps underline the importance of preliminary diagnostics and differentiated instruction based on students' entry-level competences.

Table 1. Competences, formed in the frame of ICT course at laboratory classes with teaching in English

Competences	**Topic of laboratory work**	**Technology**
Ability to calculate the information volume of a message, terms proficiency	Laboratory work 1. Introduction to ICT	Text editor technology, Information search technology on the Internet
Ability to determine the duration of the machine cycle by the clock frequency of processor, to determine the performance indicators of a computer, terminology	Laboratory work 2. Computation of metrics of productivity of computer system	Information search technology on the Internet
Ability to determine the path to a file, to find necessary information in a system	Laboratory work 3. Operation with files and directories	Information search in a computer
Keyboard skills to input formulas and skills to build geometric forms and diagrams in MS Word	Laboratory work 4. Non-text objects in text editor	Technology for working with graphic objects
Ability to highlight the main thing in a text and to record data in a tabular form	Laboratory work 5. Creation of database in MS Access Laboratory work 6. Creation of queries in MS Access	Spreadsheet technology Database technology
Ability to convert numbers from binary and hexadecimal to decimal and vice versa	Laboratory work 7. Number systems Laboratory work 8. IP addressing. Monitoring of a network	Information search technology on the Internet
Skills to build graphics	Laboratory work 9. Formulas and	Spreadsheet technology

Competences	Topic of laboratory work	Technology
	functions in MS Excel	
Keyboard skills	Laboratory work 10. Design of graphic interface Web applications	Web application development technology
Terms proficiency	Laboratory work 11. Multimedia technologies Laboratory work 12. Electronic government. Cloud and mobile technologies.	Information search technology on the Internet
AI literacy, ability to formulate one's thoughts, writing a prompt	Laboratory work 13. Application of neural network technologies for educational and professional purposes. Laboratory work 14. E-technologies. International educational platforms. Electronic business. Laboratory work 15. Trends of ICT development.	Neural network technologies

Second, students' motivation varied significantly. While approximately 15% showed strong English proficiency and could engage in discussions and explanations, nearly one-third demonstrated limited interest in both ICT and language learning. This discrepancy in engagement levels suggests the need for continuous pedagogical support, including motivational strategies and scaffolded tasks that gradually increase in complexity.

Moreover, the interdisciplinary nature of ICT education—especially when taught in a foreign language—requires students to integrate knowledge from mathematics, engineering, and language studies. This integrative requirement has a positive effect, fostering cognitive flexibility and deeper learning. However, it may also present a cognitive load challenge for students with weaker academic foundations.

The use of mobile and electronic learning technologies, as shown in Figures 2 and 3, proved effective in supporting student engagement and expanding access to course materials outside the classroom. Nevertheless, successful adoption of these tools depends on students' digital self-efficacy and discipline, highlighting the need to further strengthen these competences within the course structure.

Overall, the integration of ICT content with English language instruction under a competence-based framework promotes a balanced acquisition of professional, linguistic, and soft skills. However, to maximize the effectiveness of this model, instructors must be prepared to provide personalized feedback, foster student autonomy, and adapt instructional strategies to diverse learner profiles.

5. Conclusion

The integration of a competence-based approach in teaching the "Information and Communication Technologies" course in English has proven to be an effective pedagogical strategy for modern higher education. This methodology facilitates not only the acquisition of ICT-related knowledge and practical skills but also the development of essential soft skills and foreign language proficiency.

The conducted study confirms that the interdisciplinary and bilingual nature of the course enhances students' motivation, promotes independent learning, and encourages the practical application of digital tools. Laboratory tasks, combined with language-based activities, create a dynamic learning environment where students build self-confidence, critical thinking abilities, and adaptability to real-world professional contexts.

However, challenges remain in terms of students’ uneven ICT background, varied language readiness, and differing motivation levels. These findings emphasize the importance of continuous pedagogical support, differentiated instruction, and active learning methods. The implementation of mobile and electronic learning also proved beneficial, offering flexible access to resources and encouraging self-directed study.

In conclusion, teaching ICT through a competence-based and English-medium instruction model contributes to shaping well-rounded graduates equipped with the digital, cognitive, and communicative competencies necessary for successful integration into the global workforce and lifelong learning.

Conflict of Interest. The corresponding author declares that there is no conflict of interest.

Cite this article as: Mazhit Z.S., Karlinskaya M.A. Competence-based approach for teaching discipline "Information and communication technologies" in foreign language. *Bulletin of Kazakh Automobile and Road Institute = Kazakh avtomobil-zhol institutynyn Khabarshysy.* 2025; 3 (11). https://doi.org/10.63377/3005-4966.3-2025-06

Ссылка на данную статью: Мажит З.С., Карлинская М.А. Компетентностный подход в обучении дисциплине «Информационно-коммуникационные технологии» на иностранном языке // *Вестник Казахского автомобильно-дорожного института = Bulletin of Kazakh Automobile and Road Institute = Kazakh avtomobil-zhol institutynyn Khabarshysy.* 2025; 3 (11). https://doi.org/10.63377/3005-4966.3-2025-06

References

1. Nechayeva, O.A. “Realizatsiya kompetentnostnogo podkhoda v usloviyakh elektronnoy informatsionno-obrazovatel'noy sredy [Implementation of the competency-based approach in the conditions of the electronic information and educational environment].” *Sovremennyye problemy nauki i obrazovaniya*, 4. (2020). https://science-education.ru/ru/article/view?id=30079. (accessed 02/14/2023).
2. Pak, Y., Kulgildinova, T. “Method of solving problem situational-professional tasks as the basis for the formation of argumentative communicative competence”. *Journal of Educational Sciences*, v. 61, n. 4, 38-46. (2020). https://doi.org/10.26577/JES.2019.v61.i4.04.
3. Churilova, A. G. “Kompetentnostnyy podkhod v prepodavanii informatiki i IKT [Competence approach in teaching informatics and ICT].” https://infourok.ru/kompetentnostniy-podhod-v-prepodavanii-informatiki-i-ikt-415296.html. (accessed 02/14/2023).
4. Scheel, L., Vladova, G. & Ullrich, A. “The influence of digital competences, self-organization, and independent learning abilities on students’ acceptance of digital learning”. *Int. J. Educ. Technol. High Edu.*, 19, 44. (2022). https://doi.org/10.1186/s41239-022-00350-w
5. Oralbekova, A.K., Suleimen, M.M. (2019) ICTs in inclusive education: international experience // Journal of Educational Sciences, 64(3), 72-82. https://doi.org/10.26577/JES.2020.v64.i3.07
6. Sadykov, T. S., Bektemesov, M.A., Iskakov K.T. etc. “Informatsionno-obrazovatel'noye pole v sisteme nepreryvnogo obrazovaniya Respubliki Kazakhstan [Information and educational field in the system of continuous education of the Republic of Kazakhstan: monograph]”. Almaty: KazNPU named after Abay, 2006. (in Russian)
7. Nurpeisova, T.B., Kaidash, I.N. ICT. Uchebnoe posobie. [ICT. Tutorial]. Almaty: Bastau, 2017. (in Russian)
8. Mazhit, Z.S., Bekmukhanbetova, Sh. A., Kanibekova, M.A., Karlinskaya, M.A. Mezhdistsiplinarnyye svyazi pri obuchenii informatsionno-kommunikatsionnym tekhnologiyam na inostrannom yazyke [Interdisciplinary relations for teaching information and communication technologies in a foreign language]. *Vestnik KazADI*, 1, 57-65 (2025). https://doi.org/10.63377/3005-4966.1-2025-04 (In Russian)
9. Sugurzhanova, G., Kudaibergenova, A. “Methods of implementing interdisciplinary links between physics and computer science”. *Journal of Educational Sciences*, 69(4), 155-165 (2021). https://doi.org/10.26577/JES.2021.v69.i4.14.
10. Karpova, A.V. Razvitiye soft skills na zanyatiyakh po angliyskomu yazyku kak klyuchevoy navyk uspeshnogo vypusknika VUZa [Developing soft skills in English classes as a key skill for a successful university graduate]. <https://scipress.ru/pedagogy/articles> Access date: 3 febr. 2023.

11. Kostin, A.V. Master-klass "Formirovaniye navykov Hard-skills i soft-skills" [Master class "Formation of hard-skills and soft-skills"]. <https://nsportal.ru/shkola/informatika-i-ikt/library/2020/10/06/master-klass-formirovanie-navykov-hard-skills-i-soft> Access date: 3 febr. 2023.
12. Ponomareva, O.Ya. Vybor tekhnologiy razvitiya soft skills spetsialistami v usloviyakh tsifrovizatsii [The choice of technologies for the development of soft skills by specialists in the context of digitalization]. <http://inper.academy/wpcontent/uploads/2019/05/DSEME-2018_Conference-Proceedings.pdf> Access date: 3 febr. 2023.
13. Lemoine, P. A., Waller, R. E., Garretson, Ch. J., & Richardson, M. D. “Examining Technology for Teaching and Learning.” *Journal of Education and Development*, 4, 80 (2020) htpps://doi:10.20849/jed.v4i2.781
14. Nurpeisova, T.B., Karlinskaya, M.A. Trekh"yazychiye v universitete: perekhod k novoy real'nosti [Trilingualism at a university: transition to a new reality]. *Vysshaya shkola Kazakhstana*, 4(24), 24-28 (2018)