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FOREIGN LANGUAGE EDUCATION AS A TOOL FOR SOFT SKILLS DEVELOPMENT IN ENGINEERING STUDENTS

Purpose. The purpose of the article is to conduct a theoretical and empirical study of the role of foreign language education in the development of soft skills in engineering students, as well as to identify effective methods and approaches for integrating soft skills into the teaching process of foreign language courses.

Methods. Theoretical methods (analysis of scientific literature, generalization, systematization, and comparative analysis) and empirical methods (questionnaires and observation) were used for the study. The questionnaire was administered to third-year students at V. N. Karazin Kharkiv National University studying the discipline "Foreign Language for Professional and Business Communication."

Results. The study found that foreign languages contribute to the active development of communication skills, critical thinking, presentation skills, teamwork, and intercultural competence. Interactive teaching methods—such as project work, debates, discussions, case studies, and role-playing games—significantly enhance the effectiveness of soft skills development. In particular, students demonstrate greater confidence in public speaking in English and adapt more quickly to new professional situations. Modern technologies, such as online collaboration platforms, virtual laboratories, simulation platforms with artificial intelligence elements, and multimedia resources, provide dynamic, practice-oriented learning and stimulate the development of interpersonal, cognitive, and professional competencies. The use of such tools allows for the simulation of real professional scenarios, the implementation of remote team projects, and the practical training of decision-making skills in a safe learning environment.

Conclusions. The integration of foreign language education with active and technological teaching methods creates favorable conditions for the comprehensive development of soft skills in future engineers, increases their competitiveness in the international labor market, and prepares them for effective intercultural communication and professional mobility. Further research should focus on developing comprehensive models for integrating language training and soft skills development across various technical specialties, as well as on examining the long-term impact of interactive and technological teaching methods.

KEY WORDS: *soft skills, foreign language education, engineering students, professional and business communication, interactive methods, critical thinking, teamwork, multimedia technologies*.

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Introduction

In the current context of higher education transformation and dynamic development of the global labor market, the issue of soft skills development is becoming particularly relevant. Engineering education, which has traditionally focused primarily on the development of hard skills, now requires a rethinking of the content of training for future specialists. Technical knowledge remains fundamental, but it is no longer sufficient to ensure graduates' competitiveness in the international professional environment.

The modern labor market places complex demands on technical specialists that go beyond narrow professional training. Employers emphasize the importance of flexible skills such as communication, critical thinking, teamwork, adaptability to change, intercultural competence, presentation, and negotiation skills. In the context of digitalization and globalization, engineers are increasingly working on international projects that require effective interaction with representatives of diverse cultures and professional communities.

In this context, integrating soft skills development into the professional training system for engineers is becoming a necessary condition for modernizing the educational process. The development of soft skills should not be considered an additional component of training but rather organically integrated into the structure of academic disciplines. One of the most promising tools for such integration is the discipline of "Foreign Language," which by its nature involves communicative interaction, intercultural exchange, and the development of social competence.

The potential of foreign language education in the development of universal competencies is enhanced through interactive teaching methods, project activities, discussions, debates, case studies, and role-playing games that promote critical thinking, cooperation, and responsibility. In addition, foreign language learning fosters the development of intercultural communicative competence, an integral part of the professional mobility of a modern engineer.

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The potential of foreign language education in the development of universal competencies is enhanced through interactive teaching methods, project activities, discussions, debates, case studies, and role-playing games that promote critical thinking, cooperation, and responsibility [10]. In addition, foreign language learning fosters the development of intercultural communicative competence, an integral part of the professional mobility of a modern engineer. Abroad, the issue of soft skills development in higher education is one of the most actively

researched. For example, Al-Habaibeh and Reeves [6] consider methods for developing soft skills in the context of engineering education in a foreign language and emphasize that creativity, creative thinking, and problem-solving skills can be integrated through specially designed language teaching technologies. Smith and Brown [9] propose multimodal approaches to assessing soft skills and interactive educational strategies to improve these competencies.

At the same time, despite the broad theoretical and methodological attention to soft skills in the general educational context, the systematic use of foreign-language education as a targeted tool for developing soft skills in students of technical specialties remains underdeveloped. Existing studies focus either on general pedagogical aspects of soft skills or on examples from the humanities and educational practices, which require further empirical justification for technical disciplines. Thus, the scientific problem is to determine effective pedagogical conditions and methodological approaches for integrating the development of soft skills into the teaching of foreign languages to students of technical specialties. The research gap lies in the absence of a comprehensive model that combines professionally oriented foreign-language teaching with the systematic development of flexible skills in future engineers.

Methodology

Both theoretical and empirical methods were used to study the development of soft skills in engineering students through foreign language learning. The theoretical methods included analysis of the scientific literature, generalization and systematization of the data obtained, and comparative analysis. The analysis of scientific sources involved a systematic study of Ukrainian and international publications on the development of soft skills, their integration into higher education, and the role of foreign language education. Generalization and systematization enabled the identification of key competencies, teaching methods, and approaches to integrating soft skills into foreign language courses. At the same time, comparative analysis allowed comparison of Ukrainian and international practices and the identification of the most effective methodological strategies.

Empirical methods included surveying students to assess soft skills development before and after the introduction of interactive teaching methods, as well as observing the learning process to analyze student activity during group work, projects, and role-playing games. This combination of theoretical and practical approaches enabled a comprehensive assessment of the impact of foreign language education on the development of flexible skills among future engineers.

The purpose of the article is to provide a theoretical justification and empirical research on the role of foreign language education as a tool for developing soft skills in engineering students, and to identify effective methods and approaches for integrating soft skills into the learning process of foreign language courses.

Research results

The study identified a list of soft skills most actively developed during foreign language training for engineering students. Among them, communication skills, critical thinking, the ability to collaborate effectively in a team, presentation and discussion skills, and intercultural competence stand out in particular.

The survey was conducted at the Department of Foreign Language Training, European Integration, and International Cooperation of V. N. Karazin Kharkiv National University among third-year students studying the discipline "Foreign Language for Professional and Business Communication." Three groups of 15 students participated in the study, ensuring a comparative assessment of the results and the reliability of the data.

The study also revealed a close relationship between the use of interactive teaching methods and the level of soft skills development. In particular, project-based methods allowed students to work on real or practice-oriented tasks, which stimulated the development of critical thinking and a sense of responsibility for the final result. The use of debates and discussions contributed to the formation of argumentation and presentation skills, as well as the ability to conduct interpersonal negotiations. Case studies helped students analyze complex professional situations, propose solutions, and evaluate their effectiveness, which directly supports the

development of analytical and critical thinking. Role-playing games stimulated teamwork, increased empathy, and improved the ability to adapt to different social and professional scenarios. The survey and pedagogical experiment results showed positive dynamics in the development of students' soft skills. Before the experiment, most participants rated their communication skills and critical thinking as average, but after the introduction of interactive methods, most students noted a significant improvement in these competencies. Statistical analysis of the survey results confirmed a reliable increase in soft skills development across all three groups.

Thus, the positive impact of an integrated approach — combining foreign language learning with active, interactive methods — on students' professional training has been proven. The integration of soft skills into the course "Foreign Language for Professional and Business Communication" contributes not only to the improvement of language competence but also to the effective development of key professional and interpersonal skills of future engineers.

Discussion

A comparison of the results with those of other studies showed a high degree of consistency with the previous conclusions of Ukrainian and foreign scientists. In particular, our experiment's results confirm the observations of Paslavska and Hnatiuk [11;8] on the effectiveness of interactive teaching methods for developing communication, presentation, and critical thinking skills among students in technical specialties. Similar conclusions are presented in the study by Glazunova, Voloshyna, and Korolchuk [7], which considers project and group work key factors in the development of soft skills in future IT specialists, including teamwork and project planning skills. Foreign scientific works confirm the importance of interactive teaching strategies in engineering education. For example, some authors emphasize that case studies, discussions, role-playing games, and project-based approaches not only develop language competence but also foster interpersonal and independent work skills, as reflected in a significant increase in soft skills among students of technical specialties [1]. In addition, modern pedagogical research highlights the importance of integrated soft skills and technology in higher education, including project technologies, multimedia tools, and group learning activities, which confirms the general trend towards active forms of work in the classroom. Thus, Fedorenko and Molotia [5] showed that group projects and workshops significantly increase students' soft skills development not only in the humanities but also in technical faculties.

Thus, the results obtained are consistent with modern scientific approaches in Ukraine and abroad, confirming that interactive teaching methods can be an effective mechanism for developing students' soft skills in the discipline of "Foreign Language for Professional and Business Communication."

An analysis of the effectiveness of individual teaching methods showed that project work promotes the development of responsibility, the ability to coordinate actions in a team, and effective collaboration with colleagues. For example, as part of the course "Foreign Language for Professional and Business Communication," students completed a project to create an English-language presentation for a hypothetical technical startup, including the distribution of roles: project manager, design engineer, marketer, and translator. This work required participants not only to have language skills but also to plan tasks, coordinate team activities, meet deadlines, and consider each group member's opinions.

Debates and discussions stimulate the development of argumentation, presentation, and communication skills. For example, students were asked to discuss the topic "Introduction of innovative technologies into production processes" in English, with one group preparing arguments "for" and the other "against." During such discussions, students not only formulated and justified their opinions in English but also learned to listen to their opponents, respond quickly to the other side's arguments, and present their ideas concisely and in a structured manner [3].

Case studies and role-playing games contribute to the development of critical thinking, the ability to analyze professional situations, and adaptability. For example, students analyzed real technical cases, such as delays in component delivery for the production process. In the roles of project

manager, engineer, or logistician, students proposed solutions in English, discussed potential risks, and identified ways to optimize processes. Such activity allows students to simultaneously develop analytical thinking, professional vocabulary, and the ability to adapt to changing conditions.

The most comprehensive effect was observed when all these methods were combined in an integrated approach, in which students worked in groups, analyzed professional situations, and presented the results of their projects. For example, during a semester project, students created an English-language report on the development of a new technical system, held debates on possible ways to optimize it, and then defended their project before the teacher and their classmates. It allowed them to combine communication, analytical, presentation, and teamwork skills in a single learning process.

The successful development of soft skills depends on certain pedagogical conditions. Key aspects include: the availability of interactive learning content focused on professional practice (e.g., technical case studies, English-language business documents, product presentations); the constant involvement of students in group and interpersonal activities (role-playing games, discussions, project meetings); the creation of a safe environment that encourages the exchange of ideas and learning from mistakes; and the systematic support of teachers in developing students' independence and critical thinking. This combination of methods and conditions ensures the adequate preparation of future engineers for professional activity in a modern, international, and interdisciplinary environment.

The development of soft skills in future engineers is ensured mainly through the study of a foreign language, as this process integrates the development of communicative, cognitive, and interpersonal competencies. Learning a foreign language stimulates critical thinking, as students must analyze information, construct logical arguments, and adapt their statements to different communicative situations. In addition, group work, discussions, and presentations in English develop teamwork, listening skills, and the ability to consider colleagues' opinions, as well as intercultural communication skills, which are essential aspects of the modern engineering profession in a globalized world.

Modern technologies significantly expand the possibilities for developing soft skills through foreign language learning. These include online collaboration platforms such as Miro, Padlet, and Google Workspace, which allow students to complete group projects remotely, coordinate tasks, maintain shared documentation, and communicate effectively with colleagues in real time [13]. For example, as part of the course "Foreign Language for Professional and Business Communication," students can be asked to create an English-language project titled "Technical Prototype Development," in which each participant is responsible for a separate block: product description, marketing rationale, and financial model. Using such platforms allows students to develop teamwork, time management, and organizational skills [12].

Interactive virtual laboratories are an effective tool for modernizing engineering education amid digitalization and the integration of English as the language of professional communication. The use of platforms such as Labster and Tinkercad enables the simulation of complex engineering and scientific-technical processes in a virtual environment that is as close as possible to real production and research conditions.

Virtual laboratory environments allow engineering students to perform experimental and design tasks that involve analyzing initial parameters, developing technical solutions, assessing risks, and predicting results. This form of work promotes the development of critical thinking, systematic analysis, and the ability to make informed decisions in complex engineering situations, which are key professional competencies for future engineers. The use of English as the primary language of the interface, instructions, and training materials in virtual laboratories is of great didactic importance. In the process of performing laboratory and project tasks, students master professional terminology, work with technical documentation, analyze experimental data, and present their results in English in the form of reports and presentations. It contributes to the development of professionally oriented foreign-language communication skills and prepares students to participate in the international scientific and technical environment.

The opportunity to implement project-oriented learning is significant for engineering training. In particular, the Tinkercad platform enables three-dimensional modeling, electronic circuit design, and component testing in a virtual environment. It ensures the integration of theoretical knowledge with practical skills, as well as the development of project thinking, spatial imagination, and the ability to optimize engineering solutions without the need for expensive physical equipment. In addition, virtual laboratories increase the accessibility of engineering education and the effectiveness of students' independent work. The flexible use of such platforms allows you to run experiments multiple times, adjust model parameters, and analyze errors, thereby contributing to a deeper understanding of the material and the development of reflective skills. Thus, interactive virtual laboratories in engineering education are a powerful tool for developing professional, analytical, and language competencies, providing a comprehensive approach to training future engineers by combining technical training, critical thinking development, and active use of English in a professional context [2;15].

Simulation systems for negotiations and role-playing games with elements of artificial intelligence allow students to practice communication, conflict management, and interpersonal skills in a safe environment. For example, in the role of a project manager, a student can negotiate with a "client" or "supplier" in a virtual simulator, responding to requests and proposals in another language, which simultaneously develops adaptability, empathy, and presentation skills. In addition, the use of multimedia resources — video case studies, interactive presentations, simulation platforms, podcasts, and online webinars with professional engineers — promotes the development of creativity, independence, and public speaking skills [6]. For example, students can be asked to prepare a video presentation in English on the topic of "Innovative Solutions in Mechanical Engineering," after which the group provides feedback, discusses mistakes, and improves the project.

Based on the analysis of practical experience, the following recommendations for foreign language teachers are appropriate:

- Use a combination of online platforms and interactive tasks to cover various aspects of soft skills: teamwork, critical thinking, and presentation skills.
- Create realistic professional cases and projects that meet industry standards and the needs of technical students.
- Encourage feedback and reflection, including discussion of group project results, analysis of mistakes, and improvement of presentations.
- Use artificial intelligence and simulation platforms so that students can practice negotiations and role-playing interactions in a safe environment.
- Integrate multimedia resources and video cases to develop creativity and independence in solving professional tasks.

Thus, integrating foreign languages with modern technologies creates favorable conditions for the comprehensive development of soft skills in future engineers, combining foreign language training with professional and interpersonal competencies, which is especially relevant in the context of globalization and international cooperation.

Conclusion and further research prospects

The study confirmed that learning a foreign language is an effective way to develop soft skills among engineering students. Empirical data showed that integrating interactive teaching methods — project activities, debates, discussions, case studies, role-playing games — significantly improves communication, presentation, analytical, and teamwork skills. A comprehensive approach that combines all these methods and ensures the simultaneous development of cognitive, professional, and interpersonal competencies proved remarkably effective.

Practical experience has shown that the use of modern technologies, such as online collaboration platforms (Miro, Padlet, Google Workspace), virtual laboratories (Labster, Tinkercad), multimedia resources, and simulation platforms with elements of artificial intelligence, significantly increases the effectiveness of soft skills development, making the learning process more dynamic, realistic, and integrated with professional activities.

Further research prospects include the development of comprehensive models for

integrating foreign language education and soft skills development for various engineering specialties; analysis of the effectiveness of individualized approaches and adaptive learning technologies for the development of specific competencies; and developing methodological recommendations for the implementation of an integrated foreign language course focused on international standards of engineering education.

Thus, integrating language training with active and technological teaching methods produces competitive engineers who can function effectively in a global professional environment.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. Furthermore, the authors has fully adhered to ethical standards, including those related to plagiarism, data falsification, and duplicate publication.

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ІНШОМОВНА ОСВІТА ЯК ІНСТРУМЕНТ РОЗВИТКУ SOFT SKILLS У СТУДЕНТІВ ІНЖЕНЕРНИХ СПЕЦІАЛЬНОСТЕЙ

Метою статті є теоретичне та емпіричне дослідження ролі іншомовної освіти у розвитку soft skills у студентів інженерних спеціальностей, а також визначення ефективних методів та підходів до інтеграції гнучких навичок у навчальний процес курсів іноземної мови.

Методи. Для дослідження застосовувалися теоретичні методи (аналіз наукової літератури, узагальнення, систематизація та порівняльний аналіз) та емпіричні методи (анкетування та спостереження). Анкетування проводилося серед студентів 3 курсу Харківського національного університету імені В. Н. Каразіна, що вивчають дисципліну «Іноземна мова професійно-ділового спілкування».

Результати. Дослідження виявило, що іноземна мова сприяє активному формуванню комунікативних навичок, критичного мислення, презентаційних навичок, командної взаємодії та міжкультурної компетентності. Інтерактивні методи навчання — проєктна робота, дебати, дискусії, кейс-стаді та рольові ігри — значно підвищують ефективність розвитку soft skills. Зокрема, студенти демонструють більшу впевненість у публічних виступах англійською мовою та швидше адаптуються до

нових професійних ситуацій. Сучасні технології, такі як онлайн-платформи для колаборації, віртуальні лабораторії, симуляційні платформи з елементами штучного інтелекту та мультимедійні ресурси, забезпечують динамічне, практично орієнтоване навчання та стимулюють розвиток міжособистісних, когнітивних і професійних компетентностей. Використання таких інструментів дозволяє моделювати реальні професійні сценарії, проводити дистанційні командні проєкти та ефективно тренувати навички прийняття рішень у безпечному навчальному середовищі.

Висновки. Інтеграція іншомовної освіти з активними та технологічними методами навчання створює сприятливі умови для комплексного розвитку soft skills у майбутніх інженерів, сприяє підвищенню їхньої конкурентоспроможності на міжнародному ринку праці та забезпечує підготовку до ефективної міжкультурної комунікації та професійної мобільності. Подальші дослідження мають зосередитися на створенні комплексних моделей інтеграції мовної підготовки та формування soft skills для різних технічних спеціальностей, а також на вивченні довгострокового впливу інтерактивних та технологічних методів навчання.

КЛЮЧОВІ СЛОВА: *soft skills, іншомовна освіта, студенти інженерних спеціальностей, професійно-ділове спілкування, інтерактивні методи, критичне мислення, командна робота, мультимедійні технології.*

Конфлікт інтересів

Автори заявляють, що конфлікту інтересів щодо публікації цього рукопису немає. Крім того, автори повністю дотримувались етичних норм, включаючи плагіат, фальсифікацію даних та подвійну публікацію.

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В роботі не використано ресурс штучного інтелекту.

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