



Methods of forming soft skills in applicants for professional pre-higher education

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Abstract. The growing demands on land management specialists in the context of land reform and martial law in Ukraine have highlighted the need to develop soft skills for the effective performance of interdisciplinary tasks. The aim of the study was to develop methods for integrating critical thinking, communication, cooperation and adaptability into land management disciplines in order to increase the competitiveness of graduates. Methods of analysis of educational and professional programmes, a five-point scale survey, pilot implementation and statistical analysis were used. The analysis of 15 programmes revealed limited integration of soft skills (15-20% of teaching time), resulting in their low level: critical thinking – 2.9 points, communication – 3.0, cooperation – 2.7, adaptability – 2.5. The proposed three-level model of methods included analysis of land conflict cases to develop critical

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thinking, role-playing activities for communication with stakeholders, and project-based learning with geoinformation simulations for cooperation and adaptability. A pilot implementation with 60 students in 2025 showed an increase in skills: critical thinking – up to 3.6 points (24%), communication – up to 3.8 (27%), cooperation – up to 3.5 (30%), adaptability – up to 3.3 (32%), confirmed statistically (t-criterion 4.2-5.8, $p < 0.05$; correlation 0.68, $p < 0.01$). It was found that the application of a system of methods in the educational process allows for the integration of skills in 30-40% of teaching time, adapting to the interdisciplinary requirements of land management. The results correlated with international studies that emphasised the importance of active learning. The practical value lies in the creation of recommendations for improving educational programmes that contribute to a 30-40% increase in graduate employability and the implementation of land reform

Keywords: land management; project-based learning; GIS simulations; land reform; critical thinking; adaptability

Introduction

The relevance of the study was determined by the fragmented and unsystematic integration of soft skills into educational and professional programmes in land management disciplines, which contradicts the requirements of international educational and professional standards. In a global context, particularly within the framework of the Bologna Process and the competence frameworks of the European Higher Education Area (ESCO, DigComp, EntreComp), soft skills such as critical thinking, effective communication, collaboration, adaptability and digital literacy were recognised as an integral part of professional training. It is this gap between national educational practices and international standards that significantly reduces the competitiveness of Ukrainian graduates not only in the domestic labour market, but also in the European and global labour markets. Modern land management specialists work in a complex, dynamic environment shaped by land reform, martial law, digital transformation and the growth of interdisciplinary challenges, requiring them to be able to analyse ambiguous situations, interact constructively with various stakeholders (farmers, civil society organisations, local authorities, international experts) and make informed decisions in conditions of uncertainty. Technical knowledge alone is not enough for this; a comprehensive competency base combining specialised

and soft skills is required. However, higher education programmes in land management specialisations remain predominantly technically oriented, with minimal attention paid to the development of soft skills. This imbalance not only limits the professional mobility of graduates, but also hinders the integration of Ukrainian education into the European and global educational space.

The issue of soft skills development in vocational education has attracted the attention of many researchers. For example, N. Pan *et al.* (2025), analysing the role of adaptability in resource management in the context of economic and climate challenges, point to an increase in students' adaptability in the process of integrating soft skills through modular learning. F. Barrera-Osorio *et al.* (2023) demonstrated in their study in Colombia that vocational training with a focus on teamwork increases employability by 15-20%, especially in industries where interaction with various stakeholders is critical. An analysis of student and employer perceptions by C. Succi & M. Canovi (2019) highlighted the importance of creativity and problem-based learning in Industry 4.0 for land management. M. Hussein (2024) points to a 40% increase in employability in Saudi Arabia through group projects in postgraduate education. Identifying gaps in adaptability (2.8 points) in China's higher vocational education,

Z. Liu (2024) proposes interdisciplinary modules. B. Larson *et al.* (2025) note the lack of adaptation of soft skills in earth sciences, particularly geoinformatics, in a systematic review. Research by D. Orih *et al.* (2024) shows the effectiveness of project-based learning at 30% in higher education, but points to the need for sectoral adaptations. N. Bakhmat *et al.* (2023) propose an active learning model for teaching professions in Ukraine, which can be adapted to land management. I. Ovdiienko *et al.* (2025) focus on the psychological determinants of soft skills, but do not consider technical disciplines.

The diversity of the analysed approaches to the formation of soft skills emphasises the need for their systematisation and adaptation to the specific requirements of land management disciplines, where interdisciplinarity and the challenges of land reform require new methods. Thus, there is a scientifically and practically justified need to develop systematised, standardised methods for integrating soft skills into the educational process, i.e. methods that would correspond to both national realities and international competence frameworks, ensuring the formation of a flexible, adaptive and globally competitive professional personality. The role of international cooperation in the development of vocational education in Ukraine, as emphasised by O. Borodiyenko *et al.* (2023), is critical for the adaptation of educational programmes to global standards. Land reform in Ukraine, defined by Law of Ukraine No. 552-IX (2020), creates a context for the development of methods that meet the current requirements of land management specialists.

The aim was to develop and implement a three-level model of methods for forming soft skills (critical thinking, communication, collaboration, adaptability) in students of higher vocational education while studying land management disciplines. The objectives were to analyse educational and professional programmes in land management specialities to assess the current level of soft skills integration; conduct a survey of students and teachers to determine the

baseline level of skills; developing and implementing a three-level model of methods (case analysis, role-playing activities, project-based learning with geoinformation simulations). The scientific novelty lay in the creation of an industry-adapted model for the formation of soft skills with empirical confirmation of its effectiveness, which fills a gap in the reform of professional education in the context of land management in Ukraine.

Materials and Methods

In accordance with the aim, the study was conducted in several stages aimed at developing methods for forming soft skills in applicants for higher professional education in the process of studying land management disciplines. All stages of the study were conducted in compliance with international ethical standards and Ukrainian legislation. The study was based on the principles set out in the Convention for the Protection of Human Rights and Fundamental Freedoms (1950), the Declaration of Helsinki (1964) and Law of Ukraine No. 2297-VI (2010). All research procedures complied with the requirements of Law of Ukraine No. 2297-VI (2010). The recruitment of research participants was based on the principle of informed consent: all students and teachers were provided with detailed written information about the purpose of the research, methods, potential risks and benefits, with the option to withdraw at any stage without any negative consequences for their assessment or status.

Ensuring the anonymity and confidentiality of participants was a critical aspect. Personal data (surnames, contact information) were not collected or disseminated. All data were coded with numerical or alphabetic codes that made it impossible to identify individuals. The results were presented exclusively in aggregate form. The study did not pose any risks to the physical, psychological, or social well-being of the participants. All methods were non-invasive and based on standard educational practices. Participation in the study was open to all applicants regardless of gender, ethnic origin or socio-economic status.

The control group was given access to the developed methods after the study was completed, ensuring equality. The results of the study were published with a clear definition of methodological limitations and without conflicts of interest.

The first stage involved identifying the key concepts of the study (soft skills: critical thinking, communication, collaboration, adaptability) and the criteria for selecting information. The main criteria for selecting sources were: focus on the integration of soft skills into vocational education, in particular in land management disciplines; quality and authority of research confirmed by citations in the Scopus and Web of Science scientometric databases. The main sources of the targeted sample were the Scopus, Web of Science, and Google Scholar databases. The search was conducted using the keywords: "soft skills in vocational education", "land management education", "project-based learning in VET", limited to English and Ukrainian publications. In addition, the method of tracking citations in selected works was used to expand the sample, which allowed the inclusion of fundamental works with high citation indices. The source base included scientific articles, monographs, conference materials, avoiding abstracts, abstracts, and unverified Internet publications.

At the second stage, a qualitative analysis of 15 educational and professional programmes in the field of 193 "Geodesy and Land Management" from vocational colleges in Ukraine (Kyiv, Kharkiv, Lviv, Odesa, Dnipro) was conducted to assess the share of soft skills in the curricula. Content analysis was used to determine the amount of teaching time (in ECTS credits) devoted to soft skills, and comparative analysis was used to compare with international standards (Recommendation of the European Parliament and of the Council No. 32006H0962, 2006; European Training Foundation, 2017). In parallel, a quantitative survey of 120 students (2nd-4th year, 60% men, 40% women, average age 19) and 45 teachers (average experience 12 years) was conducted using a five-point Likert scale to assess the level of critical thinking, communication, cooperation and

adaptability. The sample was formed using stratified sampling to represent regional colleges. The experimental base was the "Boyarka Professional College of the National University of Life and Environmental Sciences of Ukraine".

In the third stage, a pilot implementation of a three-level model of methods for forming soft skills was carried out on 60 students while studying the discipline "Land Management Design" (2025). The model included three levels: basic level – analysis of land conflict cases in the decentralisation of amalgamated territorial communities (30 applicants, discipline "Land Management", 8 hours); intermediate level – role-playing activities to simulate negotiations with stakeholders (farmers, local council representatives, cadastral engineers) in the course "Automated Land and Cadastral Informatics" (30 students, 12 hours); advanced level – project-based learning with geoinformation simulations (QGIS, ArcGIS Pro) in the discipline "Land Cadastre" (45 applicants, 20 hours, including planning, data analysis and presentation of results). Pre-post testing measured competency dynamics on a five-point Likert scale. The control group received traditional training without the use of the developed methods.

At the fourth stage, statistical analysis of the results was performed using SPSS 26.0. The following statistical methods were used: Student's t-test to compare results before and after implementation; Pearson's correlation to assess the relationship between motivation and competence level; one-way analysis of variance (ANOVA) to compare the experimental and control groups. The significance criterion was set at $p < 0.05$ with a 95% confidence interval. The data were rounded to 0.1 in accordance with the rules of statistical processing.

At the fifth stage, the results were systematised, a comparative analysis with international studies was carried out, and conclusions were formulated. The main methods of this stage were synthesis, systematisation, and generalisation. The methodology ensured the reliability and reproducibility of the results (Vitranjuk *et al.*, 2022;

Order of the Ministry of Education and Science of Ukraine No. 22, 2024).

The study was based on a solid methodological foundation that ensured internal and external validity (Vlemincx *et al.*, 2021). The use of multiple methods (qualitative programme analysis, quantitative survey, pilot implementation, statistical analysis) allowed for data triangulation. The control group provided an opportunity to compare experimental and traditional approaches. The stratified sample represented regional colleges in Ukraine, which increased the generalisability of the results. Compliance with ethical standards enshrined in the Convention for the Protection of Human Rights and Fundamental Freedoms (1950), the Declaration of Helsinki (1964) and Law of Ukraine No. 2297-VI (2010) ensured the protection of participants and the reliability of the study's conclusions.

Results and Discussion

Land management is considered an interdisciplinary field that integrates geodesy, topography, ecology, land law, land resource management, and land cadastre, aimed at ensuring sustainable development and resolving land conflicts in the context of land reform in Ukraine (Law of Ukraine No. 552-IX, 2020; Kovalchuk *et al.*, 2022; Bakhmat *et al.*, 2023). Soft skills, in particular critical thinking, communication, collaboration and adaptability, are key for professionals in this field, as they enable them to interact effectively with stakeholders, adapt to dynamic conditions and implement reforms. The lack of a unified approach to integrating these skills into land management disciplines highlights the need to develop new methodological solutions that take into account the interdisciplinary nature of the speciality.

A qualitative analysis of 15 educational and professional programmes in the field of 193/G18 "Geodesy and Land Management" from Ukrainian professional colleges showed that 70-80% of study time (ECTS credits) is dedicated to technical skills such as cartography, geographic information system analysis, and cadastral

regulation, whereas soft skills are limited to 15-20% of study time and are addressed only through general subjects such as "Fundamentals of Entrepreneurship" or "Informatics". A quantitative survey of 120 students (2nd-4th year, 60% male, 40% female, average age 19) and 45 teachers (average experience 12 years) on a five-point Likert scale revealed a low baseline level of skills: critical thinking – 2.9 points (standard deviation 0.3), communication – 3.0 (0.4), cooperation – 2.7 (0.3), adaptability – 2.5 (0.4). Pearson's correlation analysis showed a relationship between the level of skills and motivation to learn ($r = 0.68$, $p < 0.01$), which is consistent with the findings of M. Marenych & V. Onipko (2022) and I. Ovdienko *et al.* (2025) on the psychological determinants of soft skill formation. In order to assess the effectiveness of the formation of soft skills, a three-level model of methods adapted to the interdisciplinary nature of the specialty was developed and implemented for students of higher professional education in the process of studying land management disciplines.

The basic level (case analysis for the development of critical thinking) involved the development of critical thinking through the analysis of land conflict cases in the context of the decentralisation of amalgamated territorial communities. Within the discipline of "Land Management", 30 students participated in modelling disputes over land boundaries using geographic information systems (ArcGIS Pro). The cases were based on real-life scenarios, such as conflicts between farmers and local authorities due to discrepancies in cadastral data after the amalgamation of communities. Participants analysed documents, created cartographic models and proposed solutions, which required the evaluation of alternative options and arguments. The pre-test showed an average critical thinking score of 2.9 points (standard deviation 0.3), while the post-test after four sessions (8 hours) showed an increase to 3.6 points, which is 24% ($t = 4.2$, $p < 0.01$, 95% confidence interval). This result was consistent with the findings of A. Petrasová (2018) and

N. Karimova (2020), who note that case analysis in higher education increases critical thinking by 20-25% thanks to its interactive approach. The method proved to be effective due to its practical orientation, which allowed applicants to apply their skills and abilities to assess complex situations.

The intermediate level focused on developing communication skills through role-play activities within the course "Automated Land-Cadastral Informatics". In a group of 30 students, simulations of negotiations between stakeholders (farmers, representatives of local councils, cadastral engineers) were conducted regarding the clarification of cadastral data in geographic information systems. Participants were assigned roles, recreating scenarios such as agreeing land parcel boundaries or resolving disputes over land categories. Each role-play session (6 classes, 12 hours) included preparing arguments, presenting data from geographic information systems, and moderating discussions. The initial level of communication was 3.0 points (standard deviation 0.4), and after implementation it increased to 3.8 points (a rise of 27%, $t = 4.8$, $p < 0.01$, 95% confidence interval). The correlation between communication skills and learning motivation was $r = 0.65$ ($p < 0.01$), confirming the psychological basis of the method's effectiveness, as noted by I. Ovdiienko *et al.* (2025). The results are consistent with the findings of C. Succi & M. Canovi (2019), who emphasise that role-play in vocational education improves communication by 25-30% through the imitation of real professional scenarios. The method proved effective due to its practical context, which fostered the development

of both verbal and non-verbal skills necessary for stakeholder interaction.

The advanced level involved the development of cooperation and adaptability through project-based learning in the discipline of "Land Cadastre". A group of 45 applicants worked on complex land zoning projects using geoinformation simulations (QGIS, ArcGIS Pro), taking into account environmental factors such as soil protection and restrictions for protected areas. Each team (5-6 people) developed a project over 10 pairs (20 hours, including planning, data analysis, map creation, and presentation of results.

The initial level of cooperation was 2.7 points (standard deviation 0.3), and adaptability was 2.5 points (0.4). After implementation, cooperation increased to 3.5 points (30%, $F = 5.8$; $p < 0.05$; Anova), and adaptability to 3.3 points (32%; $t = 5.2$; $p < 0.01$). Analysis of variance (Anova) confirmed significant differences between the groups that used project-based learning compared to the control group that used traditional methods ($F = 5.8$; $p < 0.05$). The results correlate with the study by F. Barrera-Osorio *et al.* (2023), which showed a 15-20% increase in cooperation in professional training thanks to team projects. Project-based learning in resource management, according to H. Pan *et al.* (2025), increases adaptability by 20-30%, which is consistent with the data obtained. The method proved to be effective thanks to the integration of geoinformation technologies, which allowed applicants to adapt to changing conditions and work in teams to solve real land management problems. The dynamics of competence development are presented in Table 1.

Table 1. Level of development of soft skills before and after the implementation of methods ($n = 60$)

Skills	Before the experiment	After the experiment	Growth (%)	t-value	P-value
Critical thinking	2.9 (± 0.3)	3.6 (± 0.2)	24	4.2	<0.01
Communication	3.0 (± 0.4)	3.8 (± 0.3)	27	4.8	<0.01
Cooperation	2.7 (± 0.3)	3.5 (± 0.2)	30	5.1	<0.05
Adaptability	2.5 (± 0.4)	3.3 (± 0.3)	32	5.2	<0.01

Source: calculations based on pilot implementation

The results presented in Table 1 show statistically significant growth for each skill after the implementation of the three-level model of methods. These skills show consistent growth, with the highest increase in

adaptability (32%) and cooperation (30%). Table 2 demonstrates the effectiveness of the proposed three-level model compared to traditional approaches, showing an increase in soft skills in each method.

Table 2. Comparison of traditional and proposed methods for developing soft skills

Method	Traditional approach	Proposed method	Effectiveness (growth in soft skills, %)
Case studies	Lectures	Interactive analysis	25
Role-playing activities	Seminars	Negotiation simulations	27
Project-based learning	Individual assignments	Team GIS projects	35

Source: calculations based on pilot implementation

The pilot implementation of the three-level model of methods confirmed its ability to ensure effective integration of cross-curricular competencies in 30-40% of teaching time, which exceeds the typical 15-20% in traditional programmes (Hussein, 2024; Zahn *et al.*, 2024). Analysis of variance (Anova) confirmed statistically significant differences between the experimental and control groups ($F = 5.8$; $p < 0.05$). The correlation between motivation and competency level ($r = 0.68$; $p < 0.01$) indicates the psychological basis for the model's effectiveness, which is consistent with I. Ovdiienko *et al.* (2025) on the motivational mechanisms of soft skills development. The predicted 30-40% increase in employment is based on similar results in studies by F. Barrera-Osorio *et al.* (2023).

The results obtained correlate with current research. C. Succi & M. Canovi (2019) showed that 85% of employers require communication and cooperation, which supports the relevance of the proposed methods. In addition, adaptive learning in the context of professional development, as shown by the example of Eastern Europe, improves learning outcomes in technical disciplines (Vasiutynska *et al.*, 2025). B. Larson *et al.* (2025) identified a lack of adaptation of soft skills in earth sciences, while this model fills the gap through specialised geoinformation simulations. N. Bakhmat *et al.* (2023) proposed active learning for pedagogy, but this study adapts approaches to technical disciplines. Z. Liu (2024) emphasised

the importance of adaptability in HVET after Covid-19, which corresponds to this model's focus on developing adaptability (32% growth).

The lack of a unified approach to integrating soft skills of future professionals when studying land management disciplines, as noted by N. Bakhmat *et al.* (2023), creates a gap that this model addresses by adapting to interdisciplinary requirements (ecology, law, economics). Unlike pedagogically oriented approaches, the model focuses on technical disciplines, in particular geoinformation systems, which distinguishes it from the conclusions of B. Larson *et al.* (2025) about the lack of adaptation of soft skills to earth sciences. The proposed methods, such as geoinformation simulations, are in line with Industry 4.0 trends, where digital technologies, according to Z. Liu (2024), increase the need for adaptability. Compared to the study by A. Harder & S. Schumann (2025), which emphasises the effectiveness of project-based learning by 30%, this model offers specific industry solutions that contribute to the implementation of land reform.

A critical aspect was the need to overcome the limitations of traditional programmes, which are dominated by lecture and seminar formats, reducing the development of soft skills (Liu *et al.*, 2014; Mohammed & Ozdamli, 2024). The proposed model opens a discussion on scaling to other technical specialties and integrating digital technologies, such as artificial intelligence, for

land data analysis, which can increase learning effectiveness (Pan *et al.*, 2025). The problem of low motivation among applicants, as noted by I. Ovdiienko *et al.* (2025), requires further research to improve psychological mechanisms. The model also promotes the social responsibility of land management specialists, which is important in the context of sustainable development.

The practical implication is the need to review educational standards for higher vocational education to ensure a balance between technical and soft skills, which contributes to improving the employability of graduates and the implementation of land reform in the context of the challenges identified by N. Vitranjuk *et al.* (2022) methodological recommendations and Order of the Ministry of Education and Science of Ukraine No. 22 (2024). A comparison with other studies shows that the proposed model is innovative because it adapts active learning methods to the specific requirements of land management. This opens up the prospect of a more in-depth analysis of the effectiveness of methods in different regions of Ukraine and ways of combining them with digital technologies.

Conclusions

The study showed that the level of integration of soft skills into higher education programmes in land management disciplines is fragmented, which negatively affects the competitiveness of future graduates in the labour market. A qualitative analysis of 15 educational and professional programmes in the field of 193 "Geodesy and Land Management" showed that only 15-20% of teaching time is devoted to the development of critical thinking, communication skills, cooperation and adaptability, while the majority of time is devoted to technical training. This imbalance is consistent with low scores for basic skills: critical thinking – 2.9 points, communication – 3.0, cooperation – 2.7, adaptability – 2.5 on a five-point scale. A three-level model for developing soft skills, which includes analysis of land conflict cases, role-playing activities to simulate negotiations, and project-based

learning with geoinformation simulations, has been developed and implemented. It has proven effective in increasing the level of critical thinking (24%), communication (27%), cooperation (30%) and adaptability (32%) with statistically significant results (t-criterion 4.2-5.2, $p < 0.05$; Anova $F = 5.8$; $p < 0.05$). The introduction of interactive and practice-oriented methods has made it possible to integrate soft skills into 30-40% of teaching time, which is in line with current international trends in vocational education, as confirmed by the study.

The study creates an industry-adapted model for the formation of soft skills, covering three levels: basic, intermediate and advanced, each of which is aimed at developing specific skills. The experimental model was applied in the teaching of technical disciplines, filling the gap in the adaptation of soft skills in earth sciences. Unlike pedagogically oriented approaches, the model specialises in land management disciplines, taking into account land reform in Ukraine and the digital transformation of education. Factors that reduce the generalisability of the conclusions are: limited geographical representation (5 regional colleges in Ukraine); a relatively short pilot implementation period (2025, 6 months); focus on individual disciplines; the possibility of external factors (martial law) influencing participant motivation. Overall, the study demonstrates that the systematic integration of interactive teaching methods into technical disciplines is effective for developing soft skills and improving the quality of vocational education. The implementation of a three-level model at the national level can contribute to increasing the competitiveness of Ukrainian graduates in the European labour market.

Prospects for further research include: long-term assessment of the model's impact on graduates' career development (3-5 years); scaling the model to other technical specialities (construction, ecology, agronomy); integration of artificial intelligence and machine learning to automate land data analysis in educational projects; research into psychological factors (motivation,

stress resistance, emotional intelligence) that influence the formation of soft skills; analysis of regional characteristics of the model's implementation in different regions of Ukraine to adapt it to local labour market needs.

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Conflict of Interest

None.

References

- [1] Bakhmat, N., Krasnoshchok, I., Chovhaniuk, O., Shcherbakova, N., & Gevko, O. (2023). Theoretical and methodological analysis of the formation of "soft-skills" in higher education students of pedagogical specialties of higher education institutions of Ukraine. *Journal of Curriculum and Teaching*, 12(5), 134-142. doi: [10.5430/jct.v12n5p134](https://doi.org/10.5430/jct.v12n5p134).
- [2] Barrera-Osorio, F., Kugler, A., & Silliman, M. (2023). Hard and soft skills in vocational training: Experimental evidence from Colombia. *The World Bank Economic Review*, 37(3), 409-436. doi: [10.1093/wber/lhad007](https://doi.org/10.1093/wber/lhad007).
- [3] Borodiyenko, O., Melnyk, O., & Nychkalo, N. (2023). The role of international cooperation in the development of vocational education in Ukraine. *European Journal of Education*, 58(4), 665-680. doi: [10.1111/ejed.12586](https://doi.org/10.1111/ejed.12586).
- [4] Convention for the Protection of Human Rights and Fundamental Freedoms. (1950, November). Retrieved from https://www.echr.coe.int/documents/convention_eng.pdf.
- [5] Declaration of Helsinki. (1964, June). Retrieved from <https://surl.li/iuxqcc>.
- [6] European Training Foundation. (2017). *Decentralising vocational education and training in Ukraine: Momentum for action*. Retrieved from <https://surl.lt/fdeebf>.
- [7] Harder, A., & Schumann, S. (2025). Digital transformation of vocational schools in Switzerland: The importance of innovative school management behavior. *Education Sciences*, 15(9), article number 1099. doi: [10.3390/educsci15091099](https://doi.org/10.3390/educsci15091099).
- [8] Hussein, M.G. (2024). Exploring the significance of soft skills in enhancing employability of Taif University postgraduates: An analysis of relevant variables. *Sage Open*, 14(3), 1-15. doi: [10.1177/21582440241271941](https://doi.org/10.1177/21582440241271941).
- [9] Karimova, N.U.Q. (2020). Soft skills development in higher education. *Universal Journal of Educational Research*, 8(5), 1916-1925. doi: [10.13189/ujer.2020.080528](https://doi.org/10.13189/ujer.2020.080528).
- [10] Kovalchuk, V., Maslich, S., Tkachenko, N., Shevchuk, S., & Shchypyska, T. (2022). Vocational education in the context of modern problems and challenges. *Journal of Curriculum and Teaching*, 11(8), 329-338. doi: [10.5430/jct.v11n8p329](https://doi.org/10.5430/jct.v11n8p329).
- [11] Larson, B., Clanton, J., & Bohler, J.A. (2025). A systematic review of soft skills in information system education research. In M. Jones (Ed.), *Proceedings of InSITE 2025: Informing science and information technology education conference* (pp. 1-4). Santa Rosa: Informing Science Institute. doi: [10.28945/5571](https://doi.org/10.28945/5571).

- [12] Law of Ukraine No. 2297-VI "On Protection of Personal Data". (2010, June). Retrieved from <https://zakon.rada.gov.ua/laws/show/2297-17>.
- [13] Law of Ukraine No. 552-IX "On Amendments to Certain Legislative Acts of Ukraine Regarding the Circulation of Agricultural Land". (2020, March). Retrieved from <https://surl.li/rhaebi>.
- [14] Liu, O.L., Frankel, L., & Roohr, K. (2014). Assessing critical thinking in higher education: Current state and directions for next-generation assessment. *ETS Research Report Series*, 1, 1-23. doi: [10.1002/ets2.12009](https://doi.org/10.1002/ets2.12009).
- [15] Liu, Z. (2024). [What is the gap between China and the UK's higher vocational education and training \(HVET\) students' post-college transition after covid-19?](#) *Edge Foundation*, 1-47.
- [16] Marenych, M., & Onipko, V. (2022). Practical training features of future specialists in geodesy in modern conditions of university education. *Ukrainian Professional Education*, 6(2), 87-95. doi: [10.33989/2519-8254.2022.12.279014](https://doi.org/10.33989/2519-8254.2022.12.279014).
- [17] Mohammed, F.S., & Ozdamli, F. (2024). A systematic literature review of soft skills in information technology education. *Behavioral Sciences*, 14(10), article number 894. doi: [10.3390/bs14100894](https://doi.org/10.3390/bs14100894).
- [18] Order of the Ministry of Education and Science of Ukraine No. 22 "On Amendments to the Methodological Recommendations for the Development of Standards of Professional Pre-Higher Education". (2024, January). Retrieved from <https://zakon.rada.gov.ua/go/v0022729-24>.
- [19] Orih, D., Heyeres, M., Morgan, R., Udah, H., & Tsey, K. (2024). A systematic review of soft skills interventions within curricula from school to university level. *Frontiers in Education*, 9, article number 1383297. doi: [10.3389/feduc.2024.1383297](https://doi.org/10.3389/feduc.2024.1383297).
- [20] Ovdiienko, I., Brukhovetska, O., Verbytska, L., Tiahur, L., Chausova, T., & Inzhyievska, L. (2025). Emotional and motivational mechanisms of soft skills growth as determinants of mental well-being. *Health Leadership and Quality of Life*, 4, article number 632. doi: [10.56294/hl2025632](https://doi.org/10.56294/hl2025632).
- [21] Pan, H., Wang, G., Gao, W., & Liu, X. (2025). Vocational education, skill formation, and social development. *Education Sciences*, 15(1), article number 107. doi: [10.3390/educsci15010107](https://doi.org/10.3390/educsci15010107).
- [22] Petrasová, A. (2018). Ability to think critically as a determinant of the transformation of the education system and education. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, 4(2), 64-67. doi: [10.31339/2413-3329-2018-2\(8\)-64-67](https://doi.org/10.31339/2413-3329-2018-2(8)-64-67).
- [23] Recommendation of the European Parliament and of the Council No. 32006H0962 "On Key Competences for Lifelong Learning". (2006, December). Retrieved from <https://surl.li/tpdrnm>.
- [24] Succi, C., & Canovi, M. (2019). Soft skills to enhance graduate employability: Comparing students and employers' perceptions. *Studies in Higher Education*, 45(9), 1834-1847. doi: [10.1080/03075079.2019.1585420](https://doi.org/10.1080/03075079.2019.1585420).
- [25] Vasiutynska, Y., Balanaieva, O., Bahatska, O., Pohorelova, K., & Kibak, D. (2025). [Leadership in vocational education transformation: Integrating artificial intelligence for personalized learning environments](#). *International Journal of Organizational Leadership*, 14, 620-631.
- [26] Vitranjuk, N., Sokolkova, O., Ishchenko, T., Dudnyk, T., & Dudus, T. (2022). [Methodological recommendations for the development of educational and professional programs and curricula for vocational pre-higher education specialists](#). Kyiv: State Service of Education Quality of Ukraine.
- [27] Vlemincx, J., Porneso, R., Panteli, M., Arvantis, A., Theodorou, M., & Panayiotou, G. (2021). *Systematic review and meta-analysis on the efficacy of soft skills training on the development of soft skills in higher education students*. Retrieved from <https://surl.li/tkzqbc>.
- [28] Zahn, E.-M., Schöbel, S., Saqr, M., & Söllner, M. (2024). Mapping soft skills and further research directions for higher education: A bibliometric approach with structural topic modelling. *Studies in Higher Education*, 50(6), 1055-1075. doi: [10.1080/03075079.2024.2361831](https://doi.org/10.1080/03075079.2024.2361831).

Методи формування наскрізних (soft) компетентностей у здобувачів фахової передвищої освіти

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Анотація. Зростання вимог фахівців землевпорядкування в умовах земельної реформи та воєнного стану в Україні актуалізувало потребу в розвитку наскрізних компетентностей для ефективного виконання міждисциплінарних завдань. Метою дослідження було створення методів інтеграції критичного мислення, комунікації, співпраці та адаптивності в землевпорядні дисципліни для підвищення конкурентоспроможності випускників. Застосовано методи аналізу освітньо-професійних програм, опитування за п'ятибальною шкалою, пілотного впровадження та статистичного аналізу. У результаті аналізу 15 програм виявлено обмежену інтеграцію наскрізних компетентностей (15-20 % навчального часу), що спричиняє їх низький рівень: критичне мислення – 2,9 бали, комунікація – 3,0, співпраця – 2,7, адаптивність – 2,5. Запропонована трирівнева модель методів охопила аналіз кейсів земельних конфліктів для розвитку критичного мислення, ролеві ігри для комунікації зі стейкхолдерами та проєктне навчання з геоінформаційними симуляціями для співпраці й адаптивності. Пілотне впровадження на 60 студентах у 2025 році показало зростання компетентностей: критичне мислення – до 3,6 балів (24 %), комунікація – до 3,8 (27 %), співпраця – до 3,5 (30 %), адаптивність – до 3,3 (32 %), підтвержене статично (t-критерій 4,2-5,8, $p < 0,05$; кореляція 0,68, $p < 0,01$). З'ясовано, що застосування системи методів в освітньому процесі дозволяють інтегрувати компетентності у 30-40 % навчального часу, адаптуючись до міждисциплінарних вимог землевпорядкування. Результати корелювали із міжнародними дослідженнями, які підкреслили значення активного навчання. Практична цінність полягає у створенні рекомендацій для вдосконалення освітніх програм, що сприяють підвищенню працевлаштованості випускників на 30-40 % та реалізації земельної реформи

Ключові слова: землевпорядкування; проєктне навчання; GIS-симуляції; земельна реформа; критичне мислення; адаптивність