



ISSN 2450-6486

<http://ehs.eeipsy.org>DOI: <https://doi.org/10.38014/ehs-ss.2026.1.06>

This publication was made with the funds of a joint Grant of
EEIP (Ukraine - France) and ChF "Education: Future"



Oleh YATSUKH

Implementation of case-based learning in online teaching of civil safety

OLEH YATSUKH. Implementation of case-based learning in online teaching of «Civil safety». *The article examines the implementation of the Case Study method in distance education while teaching the discipline "Civil Safety." The relevance of active learning technologies for developing professional competencies in emergency prevention and risk assessment is substantiated. Theoretical approaches of Ukrainian and international researchers to the effectiveness of case-based learning are analyzed. The study presents practical experience in designing and applying professionally oriented cases related to risk assessment at major accident hazard installations in accordance with Seveso III standards. The results confirm that the use of Case Studies in an online learning environment increases student motivation, enhances analytical thinking, improves teamwork skills, and supports the development of decision-making abilities in crisis situations.*

Keywords: Case Study method, distance learning, civil safety, risk assessment, Seveso III.

1. Problem Statement

The current stage of higher education development is characterized by the intensive integration of digital technologies and the expansion of distance learning practices. These processes have been driven by global challenges, including the COVID-19 pandemic, the martial law conditions in Ukraine, and the necessity to ensure continuity of the educational process [1, 2]. Under such circumstances, distance education has become not only an alternative form of instruction but also an essential tool for training modern professionals capable of acting effectively in situations of uncertainty, risk, and crisis [3, 4].

Particular relevance is gained by improving teaching methods for safety-oriented disciplines, especially the course «Civil Safety», which aims at developing students' competencies in preventing emergencies, assessing risks, organizing protective measures, and making managerial decisions in crisis situations [5]. However, the distance learning format complicates the implementation of the practice-oriented component of education, thus requiring the application of innovative active learning technologies [6].

One of the most effective approaches that allows the integration of theoretical knowledge with practical analysis of professional situations is the case study method [7, 8]. Its essence lies in the use of real or realistic problem-based scenarios that require comprehensive analysis, group discussion, and the development of justified solutions.

2. Analysis of Recent Research and Publications

In both Ukrainian and international academic literature, the case study method is considered an effective tool for enhancing students' cognitive activity, developing critical thinking, communication skills, and professional responsibility.

The issue of implementing case-based learning in Ukrainian educational practice has been addressed by researchers such as P. Sheremeta, H. Kanishchenko [9], M. Buzhanska [10] and Yu. Surmin [11], who emphasize that cases model real professional situations, which is particularly important for applied specialties, including civil safety, engineering, and management.

According to M. Buzhanska [10], the case method is an effective instructional tool that combines theoretical knowledge with real-life practice, stimulates students' interest in learning, and contributes to the development of research, communication, and creative decision-making skills.

Yu. Surmin [11] highlights that the specificity of the case method is determined by didactic principles such as providing students with maximum freedom in the learning process and ensuring sufficient access to visual and informational materials.

International studies also confirm the effectiveness of case-based learning. M. Reichelt [12] argues that the case study method teaches not only problem-solving but also the construction of argumentation: participants compare alternative approaches, justify their decisions, and develop professional communication competencies.

Despite the significant number of studies, the issue of applying the case study method in distance education for teaching specialized safety disciplines remains insufficiently explored.

The aim of this article is to analyze the peculiarities of applying the case study method in distance education while teaching the discipline «Civil Safety» and to determine its potential for developing professional competencies of higher education students.

The object of the study is the educational process in higher education institutions under distance learning conditions while teaching the discipline «Civil Safety».

The subject of the study is the application of the case study method as an active pedagogical technology in distance education for the formation of professional competencies of future civil safety specialists.

Research Methods. The methodological framework of the study is based on both theoretical and empirical research methods. Theoretical methods included the analysis of scientific and methodological literature on distance learning and case-based teaching. Empirical methods involved pedagogical observation, student surveys, and statistical processing of the results. Comparative analysis and generalization were applied to evaluate students' performance in solving practical case-based tasks.

3. Research results and their discussion

The study examined the possibilities of implementing the case study method as an active pedagogical technology in distance education while teaching the discipline «Civil Safety». Special attention was given to the practice-oriented nature of training, as professional activity in the field of civil protection requires the ability to operate under increased risk, make rapid decisions, and predict the consequences of emergencies.

The case method was implemented through the development and introduction of problem-based situations close to real professional

conditions. Students were offered cases related to risk assessment at hazardous industrial facilities, emergency response during chemical accidents, evacuation planning, and the analysis of technogenic threats in accordance with European standards, particularly Seveso III [13].

Practical classes were conducted using interactive online platforms such as Zoom and Moodle, which ensured opportunities for group discussion, presentation of solutions, and collective analysis of scenarios. This approach increased students' motivation and engagement in the learning process.

Case studies (situational exercises) are characterized by a clearly defined structure and specific didactic objectives. In the educational process of the Department of Civil Safety at Dmytro Motornyi Tavria State Agrotechnological University, case-based tasks are used to develop the professional competencies of higher education students. In particular, within the course «Civil Safety», during the practical class «Risk Assessment at Major Accident Hazard Installations», students are provided with a situational background and assigned case tasks. In this context, learners act as civil safety specialists, assess potential risks, and develop appropriate managerial decisions.

4. Case Study (Seveso III Format)

Risk Assessment at a Major Accident Hazard Installation (Civil Safety Practical Training Case)

1. General Information (Seveso III Context)

The industrial enterprise «ChemSafe Fertilizer Plant Ltd.» is classified as a Major Accident Hazard (MAH) establishment according to the EU Seveso III Directive (2012/18/EU) due to the storage and use of hazardous chemical substances above threshold quantities.

Main hazardous substances on site: anhydrous ammonia (up to 20 tonnes); nitric acid (storage tanks); compressed gases used in production.

Surrounding vulnerable areas: residential district – 800 m; primary school – 300 m; river ecosystem – 150 m.

2. Case Background (Accident Scenario)

During a scheduled safety inspection, the Civil Safety Engineer identified several critical deficiencies:

Corrosion damage on an ammonia pipeline;

Failure of the automatic alarm and warning system;

Insufficient emergency training of staff;

Outdated Internal Emergency Plan (not compliant with Seveso requirements).

Additionally, strong winds are forecast, meaning that in the event of a toxic release, the ammonia cloud may spread toward the residential area.

3. Problem Statement

The enterprise management requests an urgent risk assessment and safety improvement plan to ensure compliance with: Seveso III Directive requirements; major accident prevention policy (MAPP); emergency preparedness and response measures.

Students act as Safety Authorities / Risk Assessors responsible for analyzing the case.

Student Tasks (Seveso-Based Risk Assessment)

Task 1. Hazard Identification

Identify the major hazards and potential accident scenarios.

Guiding questions:

- What are the main sources of danger?
- Which substances present the highest risk?
- What types of major accidents may occur?

Task 2. Risk Analysis and Vulnerability Assessment

Evaluate probability of pipeline rupture, potential scale of toxic dispersion, and impact on population and environment.

Task 3. Risk Matrix Development

Accident Scenario	Likelihood	Severity	Risk Level
Ammonia leak from pipeline	Medium	High	Critical
Nitric acid spill into river	Low	High	Significant
Explosion in storage area	Low	Very High	Critical

Task 4. Major Accident Prevention Measures (MAPP)

Propose measures in accordance with Seveso III:

Technical: pipeline replacement, gas detectors, alarm systems.

Organizational: emergency drills, Safety Management System update.

Community protection: public warning, evacuation routes.

Task 5. Emergency Response Plan

Develop priority actions for the first hour after accident detection: shutdown, alerting services, evacuation decisions, public communication.

Expected Learning Outcomes

Students should be able to apply Seveso III principles, identify major hazards, conduct risk assessment, and develop prevention strategies.

The obtained results demonstrated that the use of the case method in distance education ensures an effective integration of theoretical knowledge with practical tasks. Students showed a higher level of engagement compared to traditional online lectures, as solving case-based scenarios required independent information search, risk analysis, justification of managerial decisions, and well-argued presentation of conclusions.

An important outcome of the study was the development of key professional competencies among future civil safety specialists, particularly the advancement of analytical thinking, the ability to assess hazards, predict accident consequences, as well as the improvement of teamwork skills and professional communication.

At the same time, certain challenges were identified, including limited technical resources, varying levels of students' digital competence, and insufficient practical experience.

This confirms the need for methodological support from the instructor, who in a distance learning environment performs the functions of a moderator, consultant, and coordinator of the educational process.

5. Conclusions

The conducted research allows the following conclusions:

1. The case method is an effective pedagogical technology that ensures the integration of theoretical knowledge and students' practical activities within a distance learning format.
2. The use of case-based tasks contributes to the development of professional competencies of future civil safety specialists, particularly in risk assessment, decision-making, and emergency management.
3. The effectiveness of implementing case-based learning depends on the quality of case design, students' digital preparedness, technical support, and the instructor's methodological guidance. Therefore, creating a structured case database for safety-oriented disciplines at Dmytro Motornyi Tavria State Agrotechnological University is recommended.
4. Future research should focus on analyzing the application of the case study method in teaching specific disciplines within civil safety training programs.

References:

1. Yatsukh, O., & Zoria, M. (2022). Electronic journal as a tool for monitoring students' success in the process of receiving higher education. *European Humanities Studies: State and Society*, (3), 114–124. <https://doi.org/10.38014/ehs-ss.2022.3.09>
2. Yatsukh, O. (2024). Support of higher education in Ukraine through the Viber social network during the period of martial law. *European Humanities Studies: State and Society*, 1(1), 98–111. <https://doi.org/10.38014/ehs-ss.2024.1.07>
3. Рогач Ю.П., & Яцух О.В. (2020). Організація дистанційного навчання при підготовці бакалаврів з цивільної безпеки в умовах карантину [Organization of distance learning in training bachelors in civil safety under quarantine]. Л.М. Маркіна (Ред.), Актуальні питання техногенної та цивільної безпеки України (С. 40-43). Торубара В.В.
4. Яцух О.В. (2022). Застосування сучасних інформаційних технологій в освітньому процесі ТДАТУ імені Дмитра Моторного [Application of modern information technologies in the educational process]. А.А. Григорова (Ред.), Сучасні комп'ютерні системи та мережі в управлінні (С. 174-176). Вишемирський В. С.
5. Яцух О.В., & Зоря М.В. (2024). Використання соціальних мереж при отриманні вищої освіти в Україні [The use of social networks in higher education in Ukraine]. Удосконалення освітньо-виховного процесу в закладі вищої освіти (Вип. 27, С. 423-434). ТДАТУ.
6. Яцух, О. (2024). Використання соціальної мережі Viber у вищій освіті в період дії воєнного стану в Україні [Use of Viber in higher education during martial law]. Вища освіта України у контексті інтеграції до європейського освітнього простору, 92 (2), 196-207. <https://doi.org/10.38014/osvita.2023.92.180>.
7. Saifuddin, Tasneem, A., & Khan, M. (2025). A comparative study of student-centered interactive teaching strategies and traditional approaches in history education. *Policy Research Journal*, 3(3), 372–383.
8. Стинська, В., Чепіль, М., & Прокопів, Л. (2023). Кейс-метод як інновація у методиці підготовки студентів магістратури у ЗВО. *Молодь і ринок*, (4), 16–19. <https://doi.org/10.24919/2308-4634.2023.279115>
9. Шеремета, П., & Канищенко, Л. (1999). Кейс-метод: З досвіду викладання в українській бізнес-школі (2-ге вид.). Центр інновацій і розвитку.
10. Бужанська, М. (2021). Особливості використання кейс-методу під час вивчення дисципліни «Безпека життєдіяльності та охорона праці». Наукові записки Тернопільського національного педагогічного університету імені Володимира Гнатюка. Серія: педагогіка, 1(1), 67–74. <https://doi.org/10.25128/2415-3605.21.1.8>.
11. Сурмін, Ю. П. (2015). Кейс-метод: становлення та розвиток в Україні. Вісник Національної академії державного управління при Президентові України, (2), 19–28.

12. Reichelt, M. (2000). Case studies in L2 teacher education. *Elt Journal*, 54(4), 346–353. <https://doi.org/10.1093/elt/54.4.346>
13. European Commission. (2015). Seveso III Directive (2012/18/EU): Guidance on risk assessment for major accident hazard installations. Publications Office of the European Union. <http://data.europa.eu/eli/dir/2012/18/oj>

Transliteration of References:

1. Yatsukh, O., & Zoria, M. (2022). Electronic journal as a tool for monitoring students' success in the process of receiving higher education. *European Humanities Studies: State and Society*, (3), 114–124. <https://doi.org/10.38014/ehs-ss.2022.3.09>
2. Yatsukh, O. (2024). Support of higher education in Ukraine through the Viber social network during the period of martial law. *European Humanities Studies: State and Society*, 1(1), 98–111. <https://doi.org/10.38014/ehs-ss.2024.1.07>.
3. Rohach, Yu. P., & Yatsukh, O. V. (2020). Orhanizatsiia dystantsiinoho navchannia pry pidhotovtsi bakalavriv z tsyvilnoi bezpeky v umovakh karantynu [Organization of distance learning in training bachelors in civil safety under quarantine]. In L. M. Markina (Ed.), *Aktualni pytannia tekhnohennoi ta tsyvilnoi bezpeky Ukrainy* (pp. 40–43). Torubara. [in Ukrainian].
4. Yatsukh, O. V. (2022). Zastosuvannia suchasnykh informatsiinykh tekhnolohii v osvithomu protsesi TDATU imeni Dmytra Motornoho [Application of modern information technologies in the educational process]. In A. A. Hryhorova (Ed.), *Suchasni kompiuterni systemy ta merezhi v upravlinni* (pp. 174–176). Vyshemyrskyi. [in Ukrainian].
5. Yatsukh, O. V., & Zoria, M. V. (2024). Vykorystannia sotsialnykh merezh pry otrymanni vyshchoi osvity v Ukraini [The use of social networks in higher education in Ukraine]. In *Udoskonalennia osvithno-vykhovnoho protsesu v zakladi vyshchoi osvity* (Issue 27, pp. 423–434). TDATU. [in Ukrainian].
6. Yatsukh, O. (2024). Vykorystannia sotsialnoi merezhi Viber u vyshchii osviti v period dii voiennoho stanu v Ukraini [Use of Viber in higher education during martial law]. *Vyshcha osvita Ukrainy u konteksti intehtatsii do yevropeiskoho osvithnoho prostoru*, 92(2), 196–207. <https://doi.org/10.38014/osvita.2023.92.180> [in Ukrainian].
7. Saifuddin, Tasneem, A., & Khan, M. (2025). A comparative study of student-centered interactive teaching strategies and traditional approaches in history education. *Policy Research Journal*, 3(3), 372–383.
8. Stynska, V., Chepil, M., & Prokopiv, L. (2023). Case method as an innovation in the methodology of training master's students in higher education institutions. *Molod i rynek*, (4), 16–19. <https://doi.org/10.24919/2308-4634.2023.279115> [in Ukrainian].
9. Sheremeta, P. M., & Kanishchenko, L. H. (1999). *Keis-metod: Z dosvidu vykladannia v ukraïnskii biznes-shkoli* (2nd ed.). Tsentri innovatsii i rozvytku. [in Ukrainian].

10. Surmin, Yu. P. (2015). Keis-metod: Stanovlennia ta rozvytok v Ukraini. Visnyk Natsionalnoi akademii derzhavnoho upravlinnia pry Prezydentovi Ukrainy, (2), 19–28. [in Ukrainian].
11. Buzhanska, M. (2021). Osoblyvosti vykorystannia keis-metodu pid chas vyvchennia dystsypliny «Bezpeka zhyttiedialnosti ta okhrona pratsi». Naukovi zapysky Ternopilskoho natsionalnoho pedahohichnoho universytetu imeni Volodymyra Hnatiuka. Serii: Pedahohika, 1(1), 67–74. <https://doi.org/10.25128/2415-3605.21.1.8> [in Ukrainian].
12. Reichelt, M. (2000). Case studies in L2 teacher education. *Elt Journal*, 54(4), 346–353. <https://doi.org/10.1093/elt/54.4.346>
13. European Commission. (2015). Seveso III Directive (2012/18/EU): Guidance on risk assessment for major accident hazard installations. Publications Office of the European Union. <http://data.europa.eu/eli/dir/2012/18/oj>

The Author

Oleh YATSUKH

Candidate of Agricultural Sciences (Ph.D.),

Associate Professor,

Department of Civil Security, Dmytro Motornyi

Tavriya State Agrotechnological University, Ukraine,

Zaporizhzhia

ORCID: <https://orcid.org/0000-0002-8265-1573>

E-mail: oleh.yatsukh@tsatu.edu.ua

Abstracts

ОЛЕГ ЯЦУХ. Застосування кейс-методу в дистанційній освіті при викладанні дисципліни «Цивільна безпека». У статті розглянуто особливості застосування кейс-методу в умовах дистанційної освіти при викладанні дисципліни «Цивільна безпека». Обґрунтовано актуальність використання активних педагогічних технологій для формування професійних компетентностей здобувачів вищої освіти у сфері запобігання надзвичайним ситуаціям та оцінювання ризиків. Проаналізовано наукові підходи вітчизняних і зарубіжних дослідників щодо ефективності case study у професійній підготовці. Представлено досвід впровадження практикоорієнтованих кейсів, пов'язаних з оцінкою ризиків на об'єктах підвищеної небезпеки відповідно до стандартів Seveso III. Доведено, що використання кейс-методу в онлайн-середовищі

сприяє підвищенню мотивації студентів, розвитку аналітичного мислення, навичок командної роботи та прийняття управлінських рішень у кризових умовах.

Ключові слова: кейс-метод, дистанційна освіта, цивільна безпека, оцінка ризиків, Seveso III.

OLEH YATSUKH. Wykorzystanie metody studium przypadku w nauczaniu zdalnym przedmiotu «bezpieczeństwo cywilne». W artykule omówiono zastosowanie metody Case Study w warunkach nauczania zdalnego przedmiotu «Bezpieczeństwo cywilne». Uzasadniono aktualność wykorzystania aktywnych technologii dydaktycznych w procesie kształtowania kompetencji zawodowych studentów w zakresie zapobiegania sytuacjom nadzwyczajnym oraz oceny ryzyka. Przeanalizowano podejścia badaczy ukraińskich i zagranicznych dotyczące efektywności metody studium przypadku w kształceniu zawodowym. Przedstawiono doświadczenia wdrażania praktycznych studiów przypadku związanych z oceną ryzyka na obiektach podwyższonego ryzyka, zgodnie ze standardami Seveso III. Wykazano, że zastosowanie metody Case Study w środowisku online sprzyja wzrostowi motywacji studentów, rozwojowi myślenia analitycznego, umiejętności pracy zespołowej oraz podejmowania decyzji zarządczych w sytuacjach kryzysowych.

Słowa kluczowe: metoda Case Study, nauczanie zdalne, bezpieczeństwo cywilne, ocena ryzyka, Seveso III.