THE IMPORTANCE OF TEACHING METHODS IN ENSURING OCCUPATIONAL SAFETY

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Abstract: The effectiveness of occupational safety education largely depends on the teaching methods used to develop learners' knowledge, practical skills, and attitudes toward workplace hazards. Traditional approaches based primarily on lectures and theoretical explanations are important for communicating fundamental safety principles; however, they may not always provide sufficient opportunities for learners to apply their knowledge in real-life situations. This article examines the importance of teaching methods in ensuring occupational safety and analyzes the effectiveness of traditional, interactive, practical, problem-based, simulation-based, and technology-supported approaches. Particular attention is given to the development of risk awareness, safe behavior, hazard identification, emergency response skills, and professional responsibility. The study is based on a theoretical analysis of scientific literature and international occupational safety education practices. The findings indicate that combining theoretical instruction with practical activities, demonstrations, simulations, and learner participation can improve the understanding and application of safety requirements. The article also discusses the potential of digital technologies, including virtual reality and interactive learning platforms, in modern occupational safety education. An integrated teaching approach is proposed to strengthen safety competencies among university students and employees, particularly in construction, architecture, engineering, and industrial sectors.

Keywords: occupational safety, teaching methods, safety education, practical training, interactive learning, risk assessment, hazard identification, simulation, professional competence, workplace safety

INTRODUCTION. Occupational safety is one of the essential conditions for protecting human life and health in professional activities. The development of modern industries, construction technologies, engineering systems, and production processes has created new opportunities for economic growth. At the same time, these developments have introduced various occupational hazards that require appropriate preventive measures and effective safety management.

Ensuring workplace safety depends not only on technical protection systems, modern equipment, and compliance with legal requirements but also on the knowledge and practical competencies of individuals. Employees and future specialists must be able to recognize hazardous situations, understand the consequences of unsafe actions, follow established safety procedures, and make appropriate decisions in emergency conditions.

In this context, the teaching of occupational safety and health plays a significant role in developing a preventive approach to professional activities. However, the effectiveness of safety education is closely related to the methods used in the teaching process. The same theoretical information can produce different learning outcomes depending on whether it is delivered through lectures, demonstrations, practical exercises, discussions, simulations, or problem-based activities.

Traditional teaching methods remain important for explaining fundamental concepts, occupational safety legislation, technical requirements, and preventive measures. Nevertheless, the practical nature of occupational safety requires learners to develop more than theoretical knowledge. They must also acquire the ability to apply safety principles in specific working environments.

For example, a student studying architecture or construction engineering may understand the theoretical requirements for working at heights but still lack the practical ability to identify fall hazards in a construction project. Similarly, knowledge of fire safety regulations does not automatically guarantee that an individual can respond correctly during an emergency. These examples demonstrate the need to combine theoretical instruction with practical and interactive learning methods.

International research has increasingly emphasized the importance of active participation in occupational safety training. Burke et al. (2006), in their analysis of 95 quasi-experimental studies involving 20,991 participants, found that training methods requiring greater learner participation generally produced stronger improvements in safety knowledge and performance than less interactive approaches.

The importance of selecting appropriate teaching methods is also emphasized in recent research on technology-supported safety training. Bęś and Strzałkowski (2024) identified active learning, discussions, gamification, demonstrations, and virtual or augmented reality as useful approaches for improving occupational safety training.

The purpose of this study is to examine the role of teaching methods in ensuring occupational safety, identify the advantages and limitations of different educational approaches, and develop recommendations for improving the effectiveness of occupational safety education in higher education institutions and professional training environments.

MATERIALS AND METHODS. The study is based on a theoretical and analytical research approach aimed at examining the relationship between teaching methods and occupational safety outcomes.

Scientific publications, international occupational safety guidelines, and research on educational methods were reviewed to identify the approaches most relevant to developing safety knowledge and practical competencies.

The methodological framework included the following approaches. Literature analysis. Scientific publications addressing occupational safety training, active learning, practical instruction, and technology-supported education were examined. Particular attention was paid to studies evaluating the relationship between learner participation and training effectiveness.

Comparative analysis. Traditional teaching methods were compared with interactive and practical approaches in terms of their educational purposes, potential benefits, and limitations.

Systematic classification. Teaching methods were classified according to their main functions: theoretical knowledge acquisition, practical skill development, risk identification, behavioral improvement, and emergency preparedness.

Pedagogical analysis. The possibilities of integrating occupational safety education into professional training programs, particularly in architecture, construction, engineering, and industrial disciplines, were examined.

The study also considered international occupational safety management principles, including ISO 45001:2018 and the International Labour Organization's ILO-OSH 2001 guidelines.

The research is theoretical and literature-based. It does not claim to present new experimental measurements or survey results. The recommendations are developed through the synthesis of existing scientific findings and established educational and occupational safety principles.

RESULTS. The analysis identified several teaching methods that can contribute to improving occupational safety education. Their effectiveness depends on the educational objectives, characteristics of learners, complexity of occupational hazards, and opportunities for practical application.

Traditional Teaching Methods and Their Educational Importance. Lectures, explanations, textbooks, presentations, and educational videos remain important components of occupational safety education. These methods provide opportunities to introduce learners to fundamental concepts, legal requirements, safety regulations, and the classification of occupational hazards.

Lectures are particularly useful when explaining complex theoretical topics, including occupational risk management, industrial safety legislation, fire protection requirements, electrical safety, and the physiological effects of harmful workplace factors.

However, theoretical instruction alone may not sufficiently develop practical decision-making skills. Learners can memorize safety rules without fully understanding how to apply them in changing workplace conditions.

Therefore, traditional methods should be considered the foundation of safety education rather than its complete form. Their effectiveness increases when theoretical explanations are supported by demonstrations, practical exercises, and discussions.

Interactive Teaching Methods. Interactive teaching methods encourage learners to participate actively in the educational process. Unlike passive information delivery, these approaches require students to analyze situations, express opinions, discuss problems, and develop solutions.

Discussion, brainstorming, group work, question-and-answer sessions, and collaborative assignments are useful methods for examining occupational safety issues.

For example, students can be divided into groups and asked to analyze a construction site where several hazards are present. One group may identify risks associated with working at heights, another may examine electrical hazards, while a third may evaluate the movement of construction machinery and materials.

Following the analysis, students present their findings and justify the preventive measures they recommend.

Such activities develop critical thinking, communication skills, and the ability to recognize hazards from different professional perspectives.

Interactive learning also creates opportunities to discuss real workplace accidents and identify the organizational, technical, and human factors that contributed to them.

Practical Training and Demonstration Methods. Practical training is one of the most important approaches in occupational safety education because it enables learners to apply theoretical knowledge under controlled conditions.

Demonstrations can be used to explain the correct selection and use of personal protective equipment, safe operation of tools and machinery, fire extinguisher operation, first-aid procedures, and emergency evacuation.

For instance, when studying personal protective equipment, students should not only learn about helmets, protective gloves, safety footwear, respirators, and protective clothing but also practice selecting and using them according to specific workplace hazards.

In construction and architecture education, practical exercises can involve identifying unsafe conditions in building layouts, examining evacuation routes, evaluating access to emergency exits, and analyzing construction-site photographs.

Practical training improves the connection between theoretical knowledge and professional activities. It also helps learners develop confidence in applying safety procedures.

However, practical exercises must be organized in a controlled environment and conducted under appropriate supervision. Learners should not be exposed to actual hazards merely for educational purposes.

Problem-Based Learning. Problem-based learning is an educational method in which students acquire knowledge by investigating and solving specific problems.

In occupational safety education, this method can be applied through realistic workplace situations. Students are presented with a problem involving a potential hazard and are required to identify its causes, assess possible consequences, and propose preventive solutions.

For example, students may receive a scenario involving a construction worker performing installation activities at height without adequate fall protection. They must identify the unsafe conditions, determine the possible consequences, and recommend appropriate control measures.

Another example may involve inadequate ventilation in an industrial workshop. Students analyze the potential exposure to harmful substances and suggest engineering and organizational measures to improve workplace conditions.

Problem-based learning encourages independent thinking and helps learners understand that occupational safety requires continuous assessment rather than simple memorization of regulations.

Case Study Method. The case study method involves examining real or carefully developed workplace incidents to understand their causes and consequences.

This approach is particularly valuable because accidents often result from a combination of technical failures, organizational weaknesses, inadequate supervision, and unsafe behavior.

Students can examine reports of workplace incidents and answer several questions:

- What hazards were present before the incident?
- Which safety requirements were not followed?
- What technical or organizational factors contributed to the event?
- Which preventive measures could have reduced the risk?
- How could similar incidents be prevented in the future?

Case studies help learners understand the practical significance of safety regulations and develop the ability to analyze complex situations.

They are particularly useful in construction, mining, manufacturing, transportation, and energy-related education.

Simulation and Role-Playing Methods. Simulation-based learning allows students to practice responding to hazardous situations without being exposed to actual danger.

Emergency evacuation exercises, fire response simulations, simulated workplace inspections, and role-playing activities can be used to develop practical safety competencies.

In role-playing exercises, students may assume different professional responsibilities, such as safety engineer, construction manager, architect, worker, or emergency coordinator. Each participant evaluates a situation from the perspective of their assigned role.

This approach helps learners understand the distribution of responsibilities in occupational safety management.

Simulation is particularly useful for developing emergency response skills, communication, teamwork, and decision-making under pressure.

Digital and Technology-Supported Teaching Methods. The development of digital technologies has expanded the possibilities for occupational safety education.

Virtual reality (VR) and augmented reality (AR) technologies can create interactive learning environments in which students examine hazardous situations and practice appropriate responses.

For example, virtual reality can simulate construction-site conditions, including working at heights, moving machinery, electrical hazards, and emergency evacuation. Students can explore these situations without entering an actual hazardous environment.

Digital learning platforms also allow educational institutions to distribute safety instructions, conduct online assessments, monitor student progress, and organize repeated training activities.

Building Information Modeling (BIM) can be particularly useful in architecture and construction education. Students can examine building models, identify potential safety problems, and consider the relationship between spatial planning, emergency exits, access routes, and fire protection systems.

Artificial intelligence can also support the analysis of safety-related learning materials, the preparation of individual learning tasks, and the identification of knowledge gaps through assessment systems.

Nevertheless, digital technologies should complement rather than completely replace practical training. Their educational value depends on the quality of instructional design, the realism of simulations, and the relevance of learning tasks to professional activities.

Assessment and Feedback in Occupational Safety Education. Assessment is necessary to determine whether learners have acquired the knowledge and competencies required for safe professional activities.

Traditional written examinations can evaluate theoretical understanding, while practical assessments can determine whether students are able to apply safety procedures correctly.

A comprehensive assessment system may include:

- theoretical tests on occupational safety requirements;
- practical demonstrations of safety procedures;
- hazard identification assignments;
- analysis of workplace accident scenarios;
- simulated emergency response exercises;
- evaluation of individual and group projects.

Feedback should be provided immediately after practical activities whenever possible. This allows learners to understand mistakes, correct unsafe actions, and improve their performance.

It is also important to evaluate knowledge retention over time. Periodic assessments and refresher training help ensure that safety knowledge remains relevant and applicable.

DISCUSSION. The findings demonstrate that the effectiveness of occupational safety education is closely connected with the appropriate selection and combination of teaching methods.

Traditional lectures provide the theoretical foundation required for understanding occupational safety regulations and principles. However, practical competencies cannot be developed fully through theoretical instruction alone. Learners must have opportunities to observe, analyze, practice, and evaluate safety-related activities.

This conclusion is supported by Burke et al. (2006), whose meta-analysis demonstrated that more participatory training approaches generally produced stronger improvements in knowledge acquisition and reductions in negative safety outcomes than less engaging approaches.

Similarly, Robson et al. (2012), in their systematic review of occupational health and safety training, found strong evidence that training improves workers' safety-related behaviors, although the evidence was insufficient to establish substantial effects on health outcomes such as injuries and illnesses. This distinction is important because effective education is only one component of a broader occupational safety management system.

Recent research also highlights the importance of selecting training methods according to the characteristics of the learners and the nature of the hazards. Bęś and Strzałkowski (2024) emphasized the value of combining different approaches, including discussions, demonstrations, gamification,

and immersive technologies. Their findings suggest that no single method is universally suitable for every occupational safety training situation.

In architecture and construction education, the integration of practical and problem-based methods is particularly important. Future specialists must understand how design decisions influence the safety of workers and building users.

For example, architectural students should be able to assess whether building layouts provide appropriate evacuation possibilities, whether access routes are safe, and whether construction activities may introduce hazards during the implementation of a project.

The use of BIM and virtual reality can strengthen these learning activities by providing visual and interactive representations of complex situations. However, educational institutions should consider the financial and technical resources required to implement such technologies.

An important issue is the need to adapt teaching methods to different groups of learners. Beginners may require more demonstrations and guided practical activities, while advanced students can benefit from independent projects, complex case studies, and risk assessment assignments.

Based on the analysis, an integrated teaching approach is recommended. It should combine theoretical explanations, interactive discussions, practical demonstrations, problem-based learning, case studies, simulations, and digital educational tools.

The effectiveness of this approach should be evaluated not only through examination results but also through students' ability to identify hazards, select appropriate preventive measures, demonstrate safe behavior, and respond correctly to simulated emergency situations.

Thus, the main objective of occupational safety education should be to develop the ability to apply safety knowledge in professional practice rather than simply memorize regulatory requirements.

CONCLUSION. Teaching methods play a significant role in ensuring occupational safety because they determine how effectively learners acquire, understand, and apply safety-related knowledge.

The study leads to the following conclusions. First, traditional teaching methods provide the theoretical foundation necessary for understanding occupational safety principles, legislation, and workplace requirements. However, they should be supplemented with practical and interactive learning activities.

Second, interactive methods, including group discussions, brainstorming, and collaborative assignments, contribute to the development of critical thinking and the ability to identify workplace hazards.

Third, practical training and demonstrations are essential for developing the skills required to use personal protective equipment, follow safety procedures, and respond to emergency situations.

Fourth, problem-based learning and case studies help students understand the causes of occupational accidents and develop preventive solutions.

Fifth, simulation, virtual reality, augmented reality, and digital learning platforms create additional opportunities for improving the quality and accessibility of safety education.

Sixth, the effectiveness of occupational safety teaching should be evaluated through both theoretical assessments and practical demonstrations of acquired competencies.

Finally, higher education institutions should integrate occupational safety education into professional disciplines, particularly architecture, construction, engineering, and industrial technology. Such integration will help prepare specialists who consider human life and health as fundamental priorities in their professional decisions.

In conclusion, the most effective approach to occupational safety education is not based on one teaching method but on the systematic combination of theoretical, interactive, practical, and technology-supported methods. This approach contributes to the development of safety awareness, professional responsibility, and the ability to prevent occupational hazards in real working environments.

References

1. Nosirjon o’g’li N. M., Xudjayeva R. M. FUNCTIONAL CHARACTERISTICS OF STYLISTIC DEVICES AND NEOLOGISMS IN LITERARY TEXTS: A CASE STUDY OF “1984” BY GEORGE ORWELL AND “A FAREWELL TO ARMS” BY ERNEST HEMINGWAY.

2. Teshaboyeva Z. et al. Alisher Navoiy nomidagi Toshkent davlat o ‘zbek tili va adabiyoti universiteti Shuhrat Sirojiddinov Uzoq Jo ‘raqulov Nozliya Normurodova.

3. Yuldoshev U., Khudjaeva R. Alisher Navai’s Mastery on Usage of Polysemantic Words in Literary Works.

4. Ходжаева Р. ГЕНЕТИК БОҒЛАНМАГАН ОМОНИМЛАРНИНГ ЭЛЕКТРОН ЛУҒАТИНИ ЯРАТИШНИНГ АМАЛИЙ МУАММОЛАРИГА ЕЧИМ ВА ТАВСИЯЛАР //ILMIY XABARNOMA. НАУЧНЫЙ ВЕСТНИК Учредители: Андижанский государственный университет им. ЗМ Бабура. – №. 3. – С. 86-88.

5. ХУДЖАЕВА Р. М. ИНГЛИЗ ТИЛИДА ГЕНЕТИК БОҒЛАНМАГАН ЛЕКСИК ОМОНИМЛАРНИНГ ЭТИМОЛОГИК ТАҲЛИЛИ //ILMIY XABARNOMA. НАУЧНЫЙ ВЕСТНИК Учредители: Андижанский государственный университет им. ЗМ Бабура. – №. 4. – С. 99-100.

6. Kuchimov, Ulugbek Kuchkarovich, Shakhnoza Azimboyevna Yuldoshova, and Dilfuza Zokirovna Rasulmukhamedova. "THANATOLOGICAL MOTIFS IN CONTEMPORARY AMERICAN SCIENCE FICTION AND FANTASY." European Review of Contemporary Arts and Humanities 2.8 (2026): 38-44.

7. Kuchimov, Ulugbek Kuchkarovich, Shakhnoza Azimboyevna Yuldoshova, and Dilfuza Zokirovna Rasulmukhamedova. "THEORETICAL FOUNDATIONS AND METHODOLOGY OF COMPARATIVE LITERATURE." European Review of Contemporary Arts and Humanities 2.8 (2026): 31-37.

8. Kuchimov, Ulugbek Kuchkarovich, Shakhnoza Azimboyevna Yuldoshova, and Dilfuza Zokirovna Rasulmukhamedova. "PSYCHOLOGICAL REALISM AND DYSTOPIAN VISION IN RAY BRADBURY’S WORKS." European Review of Contemporary Arts and Humanities 2.8 (2026): 52-57.

9. Kuchimov, Ulugbek. "The concept of a motif in fantasy works and its typological study." Зарубежная лингвистика и лингводидактика.

10. TURAEVA, Bahor, and Ulugbek KUCHIMOV. "POETIC MODELS OF THE CONCEPT “LITERARY TIME”."

11. Azimboyevna, Yuldoshova Shaxnoza. "JAHON VA O ZBEK FANTASTIK ASARLARIDA TAKRORIY MOTIV TUSHUNCHASI VA UNING BADIIY TALQINI." Research Focus 3.Special Issue 1 (2024): 19-23.

12. Azimboyevna, Yuldoshova Shaxnoza. "EDGAR ALLAN POE VA UNING ADABIY USLUBINING ZAMONAVIY AMERIKA ILMIY-FANTASTIK ADABIYOTIGA TA’SIRI." " Alfraganus" xalqaro Ilmiy Jurnali (2026): 56-66.

13. Azimboyevna, Yuldoshova Shakhnoza. "LITERARY INTERPRETATION OF MOTIFS IN RAY BRADBURY’S WORKS." INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN EDUCATION, TECHNOLOGY AND MANAGEMENT 4.3 (2025): 43-51.

14. Azimboyevna, Yuldoshova Shaxnoza. "FRANSUA RABLE VA JONATAN SVIFT IJODIDA HAJVIYA ORQALI MA'RIFATPARVARLIK MOTIVLARI TALQINI." Alfraganus Universiteti Konferensiya Materiallari 2.1 (2026): 459-465.

15. Yuldoshova, Shakhnoza. "ARTISTIC ANALYSIS OF THE MENTAL STATES PORTRAYAL IN THE NOVELS OF RAY BRADBURY AND ISAJON SULTAN." Foreign Languages in Uzbekistan (2024): 204-218.

16. Sirojiddin M., Umurzoq E. Innovative solutions for improvement of working conditions and environment through the kaizen method. – 2023.

17. Shavkat o‘g‘li E. D., Husan o‘g‘li M. S. INNOVATIVE SOLUTIONS TO PROTEC T WORKERS FROM DANGEROUS GAS AND TOXIC SUBSTANCES IN HAZARDOUS INDUSTRY ENTERPRISES. – 2023.

18. Husan o‘g‘li, Muradov Sirojiddin, and Zayniyev Ulfat Utkir o‘g‘li. "PRINCIPLES OF PASSING AND DOCUMENTING INSTRUCTIONS ON SAFETY TECHNIQUES." (2023).

19. Muradov S. Innovative solutions for improvement of working conditions and environment through the Kaizen method //Modern Science and Research. – 2024. – Т. 3. – №. 2. – С. 485-492.

20. СИРОЖИДДИН М. РАЖАБОВ ХУРШИД ФАХРИДДИН УГЛИ. ИЗУЧЕНИЯ УСЛОВИЯ ТРУДА В КОМПАНИИ ЕВРОПЫ. МУРАДОВ СИРОЖИДДИН //International journal of advanced research in education, technology and management. – 2023. – Т. 10. – С. 27.

21. Sirojiddin M. The Legal Basis for Assessing the Knowledge of Leading Employees and Specialists in Labor Protection in Uzbekistan Through Digital Technologies //MENEJMENT VA MEHNAT MUNOSABATLARI ONLAYN ILMIY JURNALI. – 2024. – Т. 1. – №. 3. – С. 9-14.

22. Muradov S. H. o ‘g ‘li, & Egamov, DS o ‘g ‘li.(2023). INNOVATIVE SOLUTIONS TO PROTEC T WORKERS FROM DANGEROUS GAS AND TOXIC SUBSTANCES IN HAZARDOUS INDUSTRY ENTERPRISES //Educational Research in Universal Sciences. – Т. 2. – №. 14. – С. 340-342.

23. Sirojiddin M. OCCUPATIONAL RISK AND ANALYSIS OF ITS LEVELS //Multidisciplinary and Multidimensional Journal. – 2026. – Т. 5. – №. 3. – С. 125-133.

24. Muradov S. ЭCONOMIC ANALYSIS OF PROFITS IN THE FIELD OF LABOR PROTECTION //Modern Science and Research. – 2024. – Т. 3. – №. 1. – С. 1239-1245.

25. ЎҒЛИ Р. Х. Ф., СИРОЖИДДИН М. ИЗУЧЕНИЯ УСЛОВИЯ ТРУДА В КОМПАНИИ ЕВРОПЫ. МУРАДОВ СИРОЖИДДИН //International journal of advanced research in education, technology and management. – 2023. – Т. 2. – №. 10.

26. ЎҒЛИ Р. Х. Ф., СИРОЖИДДИН М. ИЗУЧЕНИЯ УСЛОВИЯ ТРУДА В КОМПАНИИ ЕВРОПЫ. МУРАДОВ СИРОЖИДДИН //International journal of advanced research in education, technology and management. – 2023. – Т. 2. – №. 10.

27. МУРАДОВ С. Изучения охрана труды на производстве Кореи //Хөдөлмөр, Нийгмийн Харилцаа Судлал. – 2023. – С. 242-247.

28. Muradov S., Siddiqova M., Karimov B. Conditions and environment through the Kaizen method //Modern Science and Research. – 2024. – Т. 3. – №. 5. – С. 794-808.

29. Husan O‘g‘li M. S. Forsayt texnologiyasi va uning bugungi kundagi ahamiyati. – 2025.

30. Mirzaev O. et al. Study of transverse bending of a compound feed cylinder using Euler variational equations //AIP Conference Proceedings. – AIP Publishing LLC, 2026. – Т. 3401. – №. 1. – С. 020049.