Application of interactive technologies in organizing training of managers and specialists of the fuel and energy complex in the field of industrial safety

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Abstract. In this study, we have carried out the analysis of modern educational technologies and methods that consider the socio-psychological aspects of classes (game forms of learning, case studies, group discussion, video analysis, debriefing, brainstorming, training) taking into account interactive learning format features. As a result, we have developed a professional development program "Behavioral Safety Audit. Rules of Conduct" for managers and specialists of the fuel and energy complex, aimed at training auditors. The acquired skills contribute to the formation and development of a high level of industrial safety culture among trainees as an important component of the health and safety management system.

1. Analysis of the main technologies and methods of personnel training

The level of professional competence of employees is a fundamental element in ensuring the competitiveness of the organization. Under the influence of available technological and macroeconomic trends, the companies whose educational technologies and approaches create a context for the formation and development of personal and meta-project competencies of employees achieve significant results in their development strategy. That is why the readiness to transform the educational system towards greater flexibility and openness to new ideas is one of the best investments in ensuring a stable, highly effective future [1].

Modern personnel training practice includes many different methods and technologies (active and passive, group and individual, on-the-job and off-the-job, etc.), which have gained popularity in Western and Russian companies [2]. At the same time, it should be noted that one of the key challenges nowadays is to provide optimal psychological conditions for the personal inclusion of trainees in the process of learning, which is influenced by many internal (motivation, experience, individual psychological age characteristics, etc.) and external (circumstances of life and professional activity, psychological and pedagogical features of the educational process, etc.) factors [3]. In this regard, the emphasis on the socio-psychological aspects of the classes methodology is of particular importance. Let us cite the main methods and technologies that allow increasing the efficiency of the educational process in this context, noting that often the necessary result is achieved in the aggregate of their application.

Main technologies and methods of personnel training:
1. A mini-lecture is a method of narrative presentation of information used as a means of presenting new material for training. The duration of the mini-lecture is 10-15 minutes on average. Despite the prevalence of monologue over dialogue in the mini-lecture, the emotional component of information presentation plays an important role. The material is presented in such a way that trainees can draw a parallel with practice and use the information obtained as early as possible [4].

2. Game forms of learning have long attracted philosophers and researchers, and are especially important when conducting classes in an interactive format. A game in training is a symbolic activity that solves specific applied personal or group tasks, which simulates and transforms reality, has a high degree of spontaneity and freedom, but runs within clearly defined rules, structure and time and under the guidance of a coach (trainer). The main difference between a game and an exercise is that the game contains a game metaphor, a certain plot, while the exercise is closer to the real situation [5]. Both games and exercises are aimed at practicing skills while activating the participants’ considerable interest in the process. The meaning of the games and exercises remains with the trainees in the form of associations and allows looking at the same situation from different angles, in particular when interpreting what the whole group has done.

3. The case study method is one of the most effective methods of innovative learning of foreign practice, in which trainees explore a real or near-real situation, analyze the essence of the problem, offering possible solutions, and choosing the best of them. During the case analysis, trainees become more active and develop decision-making skills in conditions of uncertainty, application of the knowledge gained in practice, teamwork, etc. [6]. When applying this method, it is important to track both the content component of the problem being solved and the group dynamics.

4. Discussion/group discussion (from lat. Discussion – "consideration, research") is a public discussion of an issue by a group of people or a free verbal exchange of knowledge, judgments, ideas, or opinions. It can also be understood as a discussion of a controversial issue, based on the art of reasoning and presentation [7]. During a group discussion, there is a collective interpretation of the problem, allowing participants to feel involved in the decision-making process and to consciously compare opposing views through complementary dialogue and deliberation [8]. The psychological value of the discussion lies in the difference in participants’ perception of the problems/challenges/phenomena under consideration and in finding a common denominator, in the opinion of the group, for their solution.

5. Video analysis is a method that allows analyzing video materials (ready-made videos or recordings of role-playing games and exercises conducted with trainees), comparing observed behavioral reactions and identifying cause-and-effect relationships, examining characteristics of communicative behavior [4]. Currently, video analysis is a challenge to classical retrospective analysis, which allows discussing the problem being addressed by the trainer (in some cases, repeatedly) as well as to see oneself from each of the participants.

6. Debriefing is a process that appeals to the mind and emotions to sum up, what has been heard/passed, a process that helps trainees analyze and share their experiences during the class. Modern studies, particularly in the theory of social exchange or separation of experiences, have found that if a person's experiences are non-standard, unexpected, they can affect self-understanding and thus challenge the usual systems of associations. This means that after experiencing an unusual problem experience, people need to communicate to resolve cognitive dissonance and propose new ways of interpreting the event [9].

7. Brainstorming is an operational method of problem-solving based on team generation and subsequent evaluation of a large number of ideas, including non-standard ones. In the process of brainstorming, there is a ban on criticizing and evaluating the proposed ideas, and there are no restrictions on their format or number. The main advantage of this method is the stimulation of creative potential while developing the semantic, communicative, and emotional competence of trainees. To increase the effectiveness of this method, it is conducted in a comfortable psychological environment [10, 11].

8. Coaching is a consulting technology aimed at achieving goals as quickly as possible and using internal and external resources of an individual and organization with minimal losses [3]. In the process
of conversation, the coach allows overestimating the vision of the situation based on the analysis of answers to questions about the situation.

9. Training session is one of the main modern methods of teaching of applied character, containing a set of the above-described techniques and technologies in a single system built into the structure. Given the lack of a uniform classification of training, they are distinguished not only by the receipt of new information but also by the development of the knowledge obtained in practice [12]. In the process of group solution of specially designed situations, participants consolidate the necessary skills as well as change their attitude towards their own experience, which is extremely important in a psychological context [3]. It should be noted that the results of the logical and emotional analysis of the problems/challenges/phenomena studied in the training session depend both on the trainer and the trainee.

Based on the provisions of the "Learning Pyramid" concept, it is known that the effectiveness of retention largely depends on the method of its learning (as a percentage of 100%, people remember 5% when listening to a lecture, 10% – when reading, 20% – when using video and audio materials, 30% – when demonstrating, 50% – in group discussions, 75% – during practical actions, 90% – when teaching others/directly applying knowledge) [13]. That is why when developing and implementing programs of additional professional education for managers and specialists of the fuel and energy complex it seems necessary to use the methodology of conducting classes in an interactive format, which is based on the idea of the importance of the practical component of learning the material in the group. Application of the mentioned alternative interactive methods of education in combination with traditional ones promotes maximum memorization, assimilation, and application of the obtained knowledge and skills.

2. Development of a professional development program "Behavioral Safety Audit. Rules of Conduct".

Currently, foreign companies widely use the method of evaluating the safe behavior of workers – behavioral safety audit (BSA), which assumes supervision of the manager over the actions of the employee during the work process, as well as the subsequent psychological conversation with the analysis of the correct or wrong employee's behavior model and evaluation of the effectiveness of activities to ensure industrial safety [14]. At the same time, it should be noted that the productivity of the audit directly depends on the competence of auditors – managers and specialists of different levels responsible for the BSA. In this regard, the need for managers and specialists to acquire knowledge and skills to prepare and conduct the BSA is a priority in implementing the procedure at enterprises. This issue becomes especially important for a part of Russian companies of the fuel and energy complex, whose historical industrial safety culture does not provide for analysis of individual social and psychological features of employees. For this purpose, we have developed and approved a professional development program "Behavioral Safety Audit. Rules of Conduct", aimed at comprehensive training of auditors in the practical implementation of BSA procedure, formation and development of the high level of industrial safety culture as an important component of health and safety management system.

The program's content plan consists of three blocks:

1. Block 1 – Formation and Development of Leadership and Industrial Safety Culture.
2. Block 2 – Methodology of Conducting, Data Processing and Results Analysis of BSA;
3. Block 3 – Applied Aspects of Employees' Motivation for Safe Work.

We have designed the scenario of each block in such a way so that the effect of training will be obtained at the level of knowledge/skills and change of motivation by using a combination of the above-mentioned educational technologies. The program methodology is based on the constant involvement of the trainees into the process of discussion of each thesis presented on the slide in order to compare the information proposed for study with the existing experience, as well as to compare the experience in the group to identify objectively best practices (table 1).
Table 1. Structure of a professional development program.

| Perceptual level | Block 1 | Block 2 | Block 3 |
|------------------|---------|---------|---------|
| Knowledge        | Industrial injury analysis, leadership theory, approaches to assessing industrial safety culture | Studying the best BSA practices, BSA methodology, typical BSA mistakes | The methodology of motivation, contextual motivation, examples of motivation programs in different industries |
| Motivation       | Training "The role of the leader in ensuring industrial safety" | Case study "Typical BSA scenarios" | Group discussion "Effective motivation for safe work" |
| Skills           | The implementation of leadership competencies following the local regulatory document of the company, interpretation of BSA assessment results | Audit practice, analysis of specific communication cases, auditor's self-assessment, audit results processing | Approbation of motivation practices, development of personnel motivation strategy, employee values analysis |

The program's thematic workshops, case studies, and round table discussions allow each participant to express one's point of view and make a decision to agree/disagree with the proposed idea not only based on the training material, but also during communication with colleagues. The task of the trainer is to create conditions for a trustful exchange of views in an interactive format to achieve a group result.

The result of mastering the program is the acquisition of knowledge by the trainees, improvement, and formation of professional competences in the field of industrial safety during work, development of practical skills of BSA, identification of dangerous actions/conditions, filling in reporting forms based on BSA results.

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