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# HUMANISM AND CREATIVE ACTIVITY AS THE DOMINANT INSTALLATION IN RISK-BASED THINKING DEVELOPMENT

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### *Abstract*

Modern state educational standards are based on the unity of theory and practice in the formation of competencies to ensure the creative growth of students. The main intention in "Life Safety" course is the concept of "human", all measures to reduce risks are aimed at achieving comfortable conditions for the organization of work and leisure of a person. We consider humanism and creative activity as the dominant attitudes in the development of risk-based thinking. The problems of procuring life safety at the present stage have systemic character. Therefore, to solve them, a level of knowledge synthesis is needed. That allows one to integrate and synthesize knowledge from natural sciences and humanitarian disciplines in a short period of time. The tools for the development of thinking were chosen to integrate activity-oriented and personality-oriented approaches and active and interactive methods in the educational process of training on "Life Safety" course. In order to determine the success of developing "Life Safety" discipline and the level of formation of risk-based thinking among students, a diagnostic questionnaire was carried out containing questions regarding the personal attitude of respondents to safety issues in the professional sphere and in daily life. The results of the study let us conclude that the formation of students' risk-oriented thinking at the high level, at which respondent's safety issues are of high priority.

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## 1. Introduction

Life safety issues are not only relevant, but are also of priority for any organization, therefore, personnel training on safety issues is an essential element of a production culture (White, 2014). Training safety and health at work for young people is of particular importance, as this age group has a higher risk to get a trauma or illness in the production process (Guerin & Toland, 2020; Nielsen et al., 2019; Nykänen et al., 2018; Rodrigues et al., 2018).

Safety training - is more complicated than simply informing the students about the risks and safe methods of working. It should promote the formation of an internal safety culture, the development of safe thinking and psychological responsibility of the trainees to, ultimately, contribute to their own intentions to comply with the safety requirements as well as the strength of the underlying organization of subconscious processes, thoughts and inner beliefs have a significant impact on behavioral safety (Roughton et al., 2019; Yoo et al., 2018).

A lot of Russian (Vygotsky, Leontiev, Teplov, et al.) and foreign scientists (Hadamard, Dunker, Piaget, Poincare, Simon, Slagle, et al.) developed the theory of thinking. The degree of complexity of the problems related with the investigation of thinking reflects an incomplete list of directions of research on these issues:

- Theory of associations (Aristotle, D. Gartley & W. Wundt);
- The operational concept of J. Piaget (synthetic approach to the study of the psyche);
- Humanistic psychology (A. Maslow & C. Rogers).

The greatest successes in psychological and pedagogical research are associated with the integration of systemic and technological approaches, on the one hand, and with the integration of activity-based and personality-oriented approaches, on the other hand. Such integration allows one to introduce a new systemic methodology (system-information analysis of management processes, cybernetic and synergetic approaches, interdisciplinary models, analysis and synthesis of structures) in the process of developing thinking, look at the educational process as a fast changing information dynamic system, where the core of the system there will be a man with his concern for the preservation and active transformation of the environment for the advantage of human.

Sources of dangerous and emergency situations are complex in structure, fast occurring, changing and mutually intersecting at the given time phenomena of a natural, technogenic and social nature. Therefore, at present, security management is a complex task requiring controlled adaptability (Jahn, 2019; Provan et al., 2020) and the formation of a new type of risk-based thinking - way of thinking with categorical systemic methodology, thinking at the level of knowledge synthesis, where the category "Adaptation" plays a key role (Sechkina & Sechkin, 2015). In our work, due to the specifics of the discipline "Life Safety", a personality-oriented approach is organically linked with the idea of Sarantsev (1999) to introduce the student to the analysis of philosophical issues, increase his creative activity and equip methods of scientific search for solutions to complex applied problems. Therefore, we chose humanism and creative activity of students as the main directions of development of a risk-oriented thinking, without which it is difficult to adequately respond to current challenges of health and safety. The relevance of the work is also

associated with the choice of promising, modern, innovative technologies in the educational process at "Life Safety" course.

## **2. Problem Statement**

The experience of authors' teaching indicates that in the process of training on "Life Safety" course there may be an insufficient development of the need-motivational sphere of training for students. This is especially true for those students who did not adequately understand the importance of this course, were passive in class and in independent work. Thus, a problem of developing the need-motivational sphere of trainees arose by correcting the educational process in "Life Safety" subject.

## **3. Research Questions**

The main research questions are as follows:

- What concepts are backbone in "Life Safety" subject?
- What is the main goal of life safety education?
- How can we reformulate the definition of the concept of "risk-oriented thinking" to reflect the development of the need-motivational sphere of students?
- Why is it advisable to use pedagogical technology for the synthesis of knowledge?
- How is it possible to evaluate the learning outcomes in terms of their relevance to the main learning objective?

## **4. Purpose of the Study**

The purpose of the study is to reveal and improve the methodology for mastering the content of the concept "Risk-oriented thinking" and evaluate the effectiveness of the new methodology by means of a comprehensive questionnaire at the end of the course learning process of "Life Safety" based on a combination of activity-oriented and personality-oriented approaches using active and interactive teaching methods.

## **5. Research Methods**

### **5.1. "Life safety course" and number of students**

Education of students participating in pedagogical research on the subject "Life Safety" was held on the fourth year of undergraduate and with specialties of full-time students from Omsk State Technical University, in the 2019-2020 academic year. Number of classroom hours was 36 hours, including practical training - 18 hours. The education included 5 main modules related to safety management issues, methods for reducing production risks, creating comfortable living conditions and protecting the population in emergency situations. In the academic work, we used the next pedagogical technologies and approaches: an activity-based approach, problem-based interactive learning, a personality-oriented approach, and a pedagogical technology for the synthesis of knowledge.

Upon completion of training, in order to diagnose the degree of formation of main competencies and the level of formation of risk-based thinking of students in the course "Life Safety" at a technical university, we developed special forms of questionnaires, including two blocks of questions: a personality block and an block of action with completed forms of questions. Diagnostic survey of students was conducted on the basis of the Omsk State Technical University in December 2019. The sample was formed from students four years of study, the age of respondents 21-22 years. 265 people underwent the study process.

## **5.2. Teaching methods**

The humanistic paradigm in the development of risk-based thinking is largely based on the scientific discoveries of Vladimir Vernadsky, namely: on the idea of the geological eternity of life, on the conclusion about the existence of the biosphere in a single copy and, as a consequence, about the need for care and efforts to preserve it; on the geological role of human as the owner of tremendous power and energy and his historical responsibility for the safety of the planet and all of humanity (for the safety of the noosphere); on the growing role of science in the creation and management of the biosphere (Vernadsky, 1967).

According to Tikhomirov (2007), thinking is a generalized reflection of reality, and that is precisely what it differs from perception. The study of thinking is possible only taking into account its relationship with other cognitive processes and the need-motivational sphere of the subject.

In synthesis of different aspects of mental activity associated with the task of reducing the risks, we have formulated the next-one working definition of a new risk-based thinking. Risk-oriented thinking is an active motivated thought process of a humanistic orientation, the operation of restructuring information about dangerous and emergency situations in order to reduce risks of a natural, technogenic and social character. The solution to the problem of developing risk-based thinking suggests that before studying the course "Life Safety" students have already formed at a certain, fairly high level, a natural-scientific picture of the world (NSPW) and a socio-economic picture of the world (SEPW), but they should before starting to study the course "Life Safety", be supplemented the theory of Vladimir Vernadsky about the biosphere, leading to a new understanding of the governing planetary role of mankind.

A promising method for developing risk-based thinking is the use of a new technology, i.e. the pedagogical technology for the synthesis of knowledge in the formation of main competencies in the course "Life Safety". At the same time, in our opinion, the most important competencies of the Life Safety course are as follows: risk-based thinking, safety culture, environmental culture, the ability to argue their decisions on safety issues, the ability to choose means and methods of protection against danger in the professional sphere.

In the process of learning, on the way to the level of knowledge synthesis, students under the guidance of a teacher must overcome six levels of mastering the most important competencies of the course "Life Safety": Stage 1 - the formation of knowledge about the risks of dangerous and emergency situations; Stage 2 - understanding of the measures of dangers and their responsibility for maintaining human safety and the environment; Stage 3 - the ability to apply your knowledge in reducing risks; Stage 4 - the ability to analyze changes in a rapidly changing environment associated with risks; 5th stage - the ability to carry out the synthesis of risk reduction methods in the face of risk exposure; 6th stage - the ability to promptly make decisions on risk management, objectively evaluate their activities to reduce risks (Bardina, 2011). If the most important competencies for the course "Safety", listed above, are formed on levels 5 and 6, it is

possible to arbitrarily assert that in the development of risk-based thinking of students achieved the level of synthesis of knowledge in this course. Methodological support of the course "Life Safety" is designed to provide all six stages of the formation the most important competencies. Modern technologies and innovative pedagogical approaches to the development of creative activity allow us to gradually complicate the tasks for independent work of students, to use the whole arsenal of active and interactive teaching methods. Formation of the competences in the course "Health and Safety" (organizational, managerial, expert, oversight and inspection and audit) involves movement to the synthesis of knowledge, abilities and possessions, which is determined by motivational and activity criteria. Synthesis - is the highest level of integration of knowledge, it is achieved to solve practical problems and challenges of creative, exploratory character. Therefore, the teacher's special attention is directed to the preparation of methodological materials of three levels (standard tasks; tasks of an increased level of complexity that require solving several competencies; non-standard tasks, tasks of a creative and research plan, tasks of a synthetic character). Third-level tasks are offered to students in the framework of creative collectives, during creative workshops and discussions in preparation for the yearly scientific-practical conference with the participation of students and young scientists. The topics of synthetic tasks are determined by the list of control questions contained in the work program for the discipline "Life Safety". To produce creative tasks of high complexity, we used the following topics: systems safety analysis methods; methods and means of extinguishing a fire; control and supervision of labor protection; methods of countering terrorism; first aid. For example, on the topic "Monitoring and supervision of the state of labor protection", students need to examine and evaluate the state of the employee's working conditions (description of the workplace, equipment and tools used, production is selected individually), while students assess risks and suggest ways to minimize risks for given workplace and production.

To solve the creative nature of problems it is recommended to introduce into the educational process of active and interactive teaching methods (Bhandari et al., 2019; Gao et al., 2019; Loosemore & Malouf, 2019; Yoo et al., 2018). The volume of class hours conducted on the course "Life Safety" at the Omsk State Technical University in an interactive form is 38.88% of the total volume of classroom classes. At the same time, the main technologies used for interactive learning are the Case-study method and teamwork. In the framework of laboratory classes on the topic "First Aid for Victims", interactive training is also provided on first-aid techniques on a simulator robot, where students learn to choose an algorithm for first aid, determine the signs of life and assess the condition of the victim, and practice artificial respiration and indirect massage of heart. According to Konijn et al. (2018), active training is associated with a stronger effect on the mind than passive teaching methods. Later on in the real world trained citizens are more likely to behave safely and self-defense than just Informed (Kievik et al., 2018).

### **5.3. Diagnostic Questioning**

The main tool for developing risk-based thinking in the course "Life Safety" in our work is to rise the value of the teacher's interactive communication with students, where the main topic of discussion is the synthesis of knowledge. Therefore, we determine the effectiveness of the development of thinking by using feedback in the "teacher-student" chain, namely, by questioning students in order to determine the level of psychological responsibility and the level of development of universal educational actions to reduce life risks. The personality-oriented questionnaire block is aimed at identifying a person's ability to

objectively analyze risks to human health, prioritizing safety issues for respondents, and also establishing personal qualities necessary for success in reducing life safety risks.

Survey results showed that on average 55% of respondents are able to objectively assess risks to human health in extreme situations, such as electric shock (59.2%), and traumatic injury (68.8%). The most difficult from the point of view of respondents is to identify risks to human health under the influence of toxic substances. Only 24.1% of the students surveyed are able to objectively assess these risks. The result of the survey indicates the need for correction of the learning process on this topic in further work.

The most important personal qualities necessary for success in reducing the risks of life safety, respondents consider systemic thinking (75.5%), determination (75.5%) and humanism (68.3%).

More than 90% of students ranked safety issues as a priority for society as a whole (95.5%) and personally for each respondent in professional activities (92.4%) and everyday life (90.2%). This is an important achievement in teaching the Life Safety discipline because, according to Zhang et al. (2020), this is an unrealized safety priority in most cases, which is a flaw in the safety culture that leads to emergencies.

The questionnaire block focused on a specific activity shows what actions respondents can take and what measures are taken to minimize risks. This questionnaire block included the following questions:

1. Which of the following preventive measures do you use to reduce the risks associated with your activities (improving working conditions or training, caring for the environment, helping to improve the psychological climate in a team, using individual protective measures)?

2. Are you ready to significantly increase your activity in ensuring life safety by joining the Russian Volunteer Society for an independent environmental impact assessment and environmental protection measures?

3. Are you ready for a significant increase in its activity in ensuring the safety of life through support for socially vulnerable segments of the population, charity?

4. Are you ready to significantly increase your activity in ensuring life safety through the development of sports and athletic movement and the struggle for a healthy lifestyle?

The majority of respondents (73.2%) take preventive measures to reduce the risks associated with professional activities and training. Including 71.7% of respondents improve working and studying conditions, 72.8% - care about the environment, 69.8% - help improve the psychological climate in the team and 78.5% - use personal protective equipment. More than 66% of respondents are ready to significantly increase their activity in ensuring life safety due to the development of sports and sports movement and the struggle for a healthy lifestyle. About 44% are involved in supporting vulnerable groups and charity. More than 21% of the students surveyed are ready to significantly increase their activity in the field of life safety by joining the Volunteers of Russia society for environmental protection measures.

## 6. Findings

Summing up the work, we can draw the following conclusions:

- The "Life Safety" course at a technical university has high potential for developing students' risk-based thinking.

- The dominant concepts in the development of such thinking may serve, in our opinion, the humanistic paradigm as a mandatory component of all of the course modules and creative activity of students in educational and extracurricular work in preparation for professional activities.
- The main scientific and pedagogical methods for the development of risk-based thinking of students are the following: a system-structural approach, flexible technology of problem-modular training and pedagogical technology for the synthesis of knowledge; intensification of cognitive activity through the use of active and interactive teaching methods; a special organization of independent work of students and educational work, focused on the phased formation of the most important competencies of the course "Life Safety".

A comprehensive survey of students of Omsk State Technical University on the problem of diagnosing the development of risk-based thinking revealed a high assessment of the importance of security issues among respondents, which indicates the achievement of the main goal of the training in "Life Safety" course.

## 7. Conclusion

The results of a comprehensive questionnaire indicate that the dominant attitudes (humanistic paradigm and creative activity) make it possible to achieve significant success in the formation of risk-based thinking in "Life Safety" course at a technical university.

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