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## Teaching Methodology of Health and Safety at Modern University (from Work Experience)

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### Abstract

Currently, issues of ensuring personal safety and formation of behavioral skills in dangerous and emergency situations are of particular relevance to modern society. In this regard, there is a need to teach students how to deal with situations that threaten health and life. This task is implemented as a part of the teaching the discipline "Health and Safety". The reduction in the number of classroom lectures and practical classes indicates the need for a constant search and use of modern teaching methods and techniques. The aim of the study was to determine the features of the teaching methodology of the discipline "Health and Safety" in a modern university. In the presented work theoretical and empirical research methods were used, including the analysis of educational and scientific-methodical literature, survey, questionnaire and testing, comparison method. The article describes the experience of teaching the discipline "Health and Safety" using various teaching methods and techniques, including the electronic educational environment. Examples of using situational tasks (case tasks), game modeling, project activities, interaction with relevant organizations, and the method of thematic disputes are given. To evaluate the effectiveness of the applied methods, the questionnaire and testing were carried out at the beginning and at the end of studying the discipline. The results showed an increase in the number of students who are ready to provide first aid. First-aid knowledge and skills became more demanded and necessary for most students. Self-esteem of students in the field of knowledge and skills of first aid dressing increased. Test results revealed an increase in the level of knowledge of first aid in students after studying the discipline. The comparative analysis of the level of knowledge of students of different years at university is shown. The article may be of interest to teachers, educators, and education professionals.

*Keywords:* methodology, health and safety, university, students.

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## **Introduction**

Nowadays the problem of protecting the person from dangers, life and health protection, and forming the safe behavior type is relevant at different stages of the development of society. This is due to many factors: the demographic situation, high morbidity and injuries among the population, emergency situations, and low culture of safe behavior of the population.

The priority direction of the state's social policy is to ensure collective and personal security, creating conditions for responsible personal behavior in various fields of activity.

An important role in the formation and upbringing of health and safety is given to educational institutions, including universities.

New requirements presented by the system of modern education for students are based on the processes of training and education in close cooperation with the educational environment, which helps to create conditions for the harmonious development of the individual, the formation of the values of the safe lifestyle; these requirements are realized in the course of studying the discipline "Health and Safety". Thus, this issue requires a more detailed study.

## **Purpose and objectives of the study**

It is to determine the particularities of the teaching methodology of the subject "Health and Safety" in the modern university.

## **Literature review**

At the present stage of the development of mankind and the growth of various types of dangers, issues of ensuring personal safety and formation of behavioral skills in dangerous and emergency situations are of particular relevance. The educational environment is the fundamental basis for creating effective conditions for the adaptation of the person to changing production and social environmental conditions. There is a need to teach students how to deal with situations that threaten their health and life, introduction to the values of the safe lifestyle (Radzhabaev & Alimova, 2018; Wang & Ma, 2018; Lindholm et al., 2019). At university this task is implemented as a part of teaching the subject "Health and Safety". Teaching this discipline is aimed at assimilating and subsequently applying by students the acquired knowledge and skills in order to ensure safe living conditions, the ability to determine the degree of exposure of dangerous

and harmful factors on the body and the environment, provide first aid to victims, predict and model decision-making results in unusual situations (Petukhova, 2015; Radzhabaev & Alimova, 2018; Tsvetkova, 2018).

According to a number of authors (Mahmudov, 2017; Eliphanov & Okazova, 2018.; Fuks, 2018; Frolov et al., 2019) and taking into account the experience of teaching at the university, the quantity of class lectures and practical classes has recently been reduced due to reforms taking place in the modern educational environment. This in its turn causes a significant compaction of the studied material, which often leads to deterioration in its assimilation. The study of individual topics and sections is becoming formal.

New federal state educational standards, based on the acquisition of professional competences by university graduates and increasing competitiveness, require the introduction of innovative technologies in the educational process: practice-oriented and problem-based learning, project methods, game modeling methods, thematic disputes, interaction with organizations, etc. (Mekhan'teva et al., 2016; Kuvshinova et al., 2017; Kretova, 2018; Malerova et al., 2018; Frolov et al., 2019; Husanova & Safarova, 2019; Silakova & Filimonenkov, 2019).

Improving the educational process using various teaching methods and techniques aimed at enhancing the cognitive and activity functions of students, promotes self-development and successful socialization of the individual in society (Prokofieva et al., 2017; Kretova, 2018).

Educational standards also provide for the availability of innovative electronic educational environment at the university. Today, one of popular forms of organizing the educational process is the use of the Moodle platform. Moodle (modular object-oriented dynamic learning environment) is a free learning management system that is primarily focused on the organization of interaction between the tutor and students. This learning environment is also suitable for organizing traditional distance learning courses, as well as supporting full-time education. Moodle provides opportunities to design, create and further manage tasks that are compiled by the teacher for students to complete. The teacher has the opportunity to independently create an electronic course, manage this process, making the necessary adjustments to the course content directly during the educational process.

Using the Moodle virtual learning environment has several advantages over traditional methods and forms of organizing the educational process, organizing classroom and extracurricular independent work of students (Rebko, 2015; Klyueva, 2017; Luk'yanova et al., 2018; Egoshina et al., 2019). There is an opportunity to implement the principle of individualization of the activity; the presence of quick feedback; great opportunities for visual presentation of material; variable nature of independent work; activity, responsibil-

ity for the work done. This learning environment allows increasing the amount of information introduced during the lesson, organizing and optimizing active cognitive independent students' activities, increasing the interest in learning (Kostylev & Kostyleva, 2015; Nasonova, 2019).

According to foreign and Russian authors, electronic technologies are actively being introduced into education in Russia, significantly improving its quality and effectiveness (Yavorskiy et al., 2020). Based on the foregoing, there is a need for a constant search and application of effective methods and techniques of teaching "Health and Safety".

### **Methodology**

In the course of the research, we used theoretical (analysis of educational, scientific and methodological literature) and empirical (survey, questionnaires, testing, pedagogical observation, comparison) research methods.

The study was carried out in several stages. At the first stage, the theoretical analysis of the problem was carried out according to the literature.

At the second stage, the questions were selected for questioning and testing the first- and the third-year students of the training program "Management" (1st and 3rd year), the training program "State and municipal administration" (3rd year), the training program "Service" (3rd year), the training program "Tourism" (1st and 3rd year) in FSBEI HE "Vyatka State University" (Kirov); the questionnaire and test questions were compiled on the basis of the working program of the discipline "Health and Safety".

At the third stage, 123 students were questioned and tested to determine the level of knowledge of providing first aid.

At the fourth stage, the analysis and interpretation of the results were carried out.

### **Results**

The result of mastery the discipline "Health and Safety" is universal competence (UC-8): "Able to create and maintain safe living conditions, including in emergencies".

In accordance with the subject working program, 20 hours are allocated for classroom studies. The larger half (72% of the subject working program) is presented in the form of independent work. This organization of the educational process causes certain difficulties in mastering the subject. To optimize students' educa-

tional and cognitive activities, to improve the quality of assimilation of educational material, various teaching methods and techniques are used.

We consider the basic methods and techniques that are used in teaching the discipline “Health and Safety” and are implemented by teachers of the department.

When studying the section “Dangerous and harmful environmental factors” (electrical injuries, the effect of cold on the body, drowning, poisoning, etc.), the following methods are used: the solution of situational tasks, work in small groups, the method of “brainstorming”, watching videos on the topic. The use of these methods in the educational process helps to master the skills of analyzing situations, making decisions and taking right actions in a particular situation.

The method of problem situations (case-task method) is aimed at mastering the discipline by students, organizing independent educational activities, forming the need for working with additional sources of information, and it also allows evaluating the results of students' work.

The main role of using situational tasks in practical exercises is the ability to summarize the gained knowledge, to work out the correct algorithms for actions in dangerous and emergency situations, and most importantly the ability to apply them in real conditions without sacrificing personal safety and the safety of others. This method is often used when studying how to provide first aid, which develops the ability to make the right decisions in unusual situations, removes the psychological barrier that arises when it is necessary to provide assistance to the victim. The situational task is a special methodological resource that allows for the implementation of practice-oriented teaching of students at a university. In addition, it contributes to formation of the need for constant search for relevant information, which improves the quality of students' knowledge and skills.

One way to solve situational tasks is to analyze the proposed dangerous or emergency situation, presented in a series of illustrations, or described in the media with the list of facts, causes, consequences, as well as possible measures to prevent the dangerous situation. Let us consider some examples.

“According to the data from administration of Kirov, an accident on a heating main in the area of house number 50 on Kazanskaya Street occurred at about 03 a.m. on Saturday. The damaged part of the heating system was shut off by the emergency service, and on July, 4 heat supply to 32 houses was stopped. As a result of the accident, one victim was hospitalized, three people received outpatient care. Everyone has burns with boiling water of the lower extremities. Analyze the emergency; identify the causes, preventive measures”.

“On June, 12, at the 942 kilometer of the locality Lyangasovo, the young man decided to cut the path and climb over the tank car. The tank car was on the electrified track of 27,500 volts. The young man was shocked by the contact network. As a result, he received a burn with a flame of a volt arc of 2-4 degrees, 12% of the skin was damaged. Define the action algorithm”.

Tasks for solving situational tasks (case-tasks) can be of a different nature and have a different level of complexity. 1. Build the algorithm of actions yourself. 2. Choose the correct options from proposed and organize them in the necessary sequence. 3. Choose one correct option from several offered. 4. The task may be with a description of the situation with several victims. In this case, it is necessary to determine who of the victims needs help at first. For example: there is a victim with external bleeding and a victim with a closed injury.

When studying the section “Emergencies of natural and technogenic character” game modeling is used. Game modeling should be considered as a way to create the active learning environment in the educational process. Using this method, such complex topics as “First aid for bleeding victims”, “First Aid for Various Types of Injuries”, “First Aid for Carbon Monoxide/Chlorine/Ammonia Poisoning”, “Collective Protective Equipment for the Population” and other topics are studied.

Among effective methods of organizing the educational process and improving the quality of learning material interaction with relevant organizations is used, which provides additional opportunities for studying the most complex topics of the discipline. So, for example, when studying the topic “Fire protection”, students of the Faculty of Physical Culture and Sports visit the “Center of Fire-fighting Detachment”. The staff and specialists of the center acquaint students with features of working with personal protective equipment, demonstrate the mode of operation of fire equipment: modern fire rescue equipment, modern fire extinguishers, etc. This contributes to the activation of cognitive activity of students, and therefore increases the level of formation of competences.

In the educational process, the project method is also used, which develops the ability to navigate in the information space, model knowledge, and think critically and creatively. The project activity makes it possible to use the research, search, problem methods in the learning process and integrate knowledge from various scientific fields, which is especially important for the discipline “Health and Safety”. For example, students of the Faculty of Physical Culture and Sports of the training program “Health and Safety” are invited to develop a project on safety issues as part of the school subject “Basics of Health and Safety”. The project may be of informative, involve the collection and analysis of information about a particular object and phenomenon with subsequent conclusions and presentation of the results. A more detailed study

of some issues can make a research project from an information project. A research project requires a lot of time and preparation: defining the goal, methods, research tasks, ways to solve the problem and discussion of the results. The implementation of a practice-oriented project is a real product of one's own or group activity: compilation of a booklet (memo) of the rules of conduct in dangerous and emergency situations of various origins, design of a shelter layout, evacuation plan, etc. when studying the topic "Emergencies of natural and technogenic character". For students of pedagogical training programs it is proposed to develop a booklet or a presentation on the topics "Dangerous environmental factors", "Evacuation of students in case of fire", "Safe behavior in public transport" as a project task.

The method of thematic disputes, which is a focused collective discussion of educational issues, is also actively used in the study of health and safety. The most discussed issues for thematic debates are "Problems of the growth of natural, man-made, social emergencies in Russia", "Forecasting the consequences of a man-made emergency", "Biological weapons of the 21st century", "Terrorism as a real threat to security in modern society", "The basic trends in development of natural phenomena in the territory of the Kirov region", "Forecasting the situation during forest fires in the territory of the Kirov region", etc.

Vyatka State University is actively introducing electronic educational resources. Teachers of the department developed the electronic training course on health and safety in the Moodle system, with the help of which students get the necessary information; testing of knowledge with the help of tasks of different difficulty levels and control of educational activities of students take place; this system provide the possibility of organizing independent work of students who have academic debts in the discipline. This form of training helps students who are often absent due to sports competitions, participation in conferences, and Olympiads or students who are ill. Videos on practical exercises are being developed and recorded which demonstrate necessary techniques and skills.

To assess the effectiveness of the applied methods, the students were questioned and tested on the topic "First Aid for Victims in Emergencies". Mastering this topic, taking into account the experience of teaching and the opinion of teachers of other universities, causes certain difficulties for students (Bielec et al., 2014; Panfilyonok, 2018). The study involved 123 first and third year students of the Faculty of Management and Service of Vyatka State University. It should be noted that students of this faculty have an insufficient level of biomedical knowledge, which is necessary when studying first aid issues.

According to the results of the testing, we can conclude that the number of students who are ready for providing first aid increased by the end of studying the discipline by 34.2%, compared with the results obtained at the beginning of the academic semester (89.2 and 55%, respectively). At the same time, 10.8%

of the students believe that they are not ready for giving first aid. The analysis of the testing carried out at the end of the semester shows an increase in the number of students who are ready to help anyone in need, compared with the similar indicators at the beginning of the semester – 52% and 37%, to help the nearest and relatives – 44% and 43%, respectively, acquaintances – 30% and 29% respectively. First-aid knowledge and skills became relevant and necessary for the majority of students (91%), which is 24% more than the data from the survey carried out at the beginning of the experiment (67%). Thus, we can conclude that in the end of studying the discipline, there is an increase in students' motivation to study first aid issues, which confirms the effectiveness of the used methods and means of health safety. At the same time, the results of self-assessment of knowledge and skills in providing first aid showed that 85.7% of the respondents consider them sufficient, which is 26% higher compared to the testing at the beginning of studying the discipline (59.7%).

The analysis of the results of testing, which was carried out at the beginning of studying the discipline, revealed a low level of students' knowledge on first aid (first aid for clinical death, bleeding), despite the fact that many topics in this area are studied in “Basics of health and safety” classes at school. So, at the beginning of studying the discipline only 38% of the students gave the correct answers to test tasks on the technique of giving cardiopulmonary resuscitation and indications for its implementation. By the end of the study of the discipline, the number of students who mastered the technique of giving cardiopulmonary resuscitation increased 2.45 times and amounted to 93%.

During the initial testing only 39.9% of the students answered the questions related to the temporary stop of external hemorrhage, in comparison with the results of re-testing (89.1%).

According to the students' answers for the initial testing and re-testing, the most difficult questions are tasks associated with the construction of the correct algorithm of actions. So, 73.4% of the students showed the correct sequence of first aid measures for electrical injury, compared with the results obtained at the beginning of studying the discipline (35%). When providing first aid for carbon monoxide poisoning, the correct algorithm of actions was noted by 81% of the students, compared with the test results at the beginning of the semester (37%). Despite the fact that the students more accurately began to determine the sequence of first aid after studying the discipline, some students in some situations make mistakes when implementing the correct algorithm of actions.

According to the results of re-testing carried out at the end of studying the discipline, it was found that most of the students note the necessity to call the ambulance in emergency situations. At the same time,



39% and 71% (at the beginning and at the end of the discipline study respectively) of the respondents did not indicate in their answers the first principle of first aid – “to make sure of safety”.

The results of the study showed that after studying the discipline, the level of knowledge of the students participating in testing in providing first aid increased by 56%, compared with the data obtained during the initial testing.

Teaching the right actions when providing first aid has its own characteristics. It is not enough to acquire certain theoretical knowledge, it is necessary to repeat the action many times in the specific situation, for example, traumatic injury. For this purpose training simulators are used in the educational process to develop practical skills in cardiopulmonary resuscitation, and tourniquets, scarves, bandages, standard and improvised tires are used when teaching to provide first aid for bleeding and injuries. The solution of situational tasks (analysis of specific situations), case-tasks, game modeling are used to work out the correct algorithm of actions. In addition, the positive in the organization of the educational process is an increase in the number of hours of students' independent work with the possibility of developing practical skills in this discipline. During extracurricular studies, students have the opportunity to develop practical skills using the equipment available at the department.

The comparative analysis of the results of testing in 2019 with the data of similar testing conducted in 2017 showed an increase in the level of knowledge of students in providing first aid (table). The introduction of electronic educational resources, the use of case-tasks, as well as the increase in the number of hours for independent work in 2019 compared to 2017 contributed to a more effective assimilation of educational material by the students.

Table – The results of testing of students in providing first aid

<b>Tasks</b>	<b>Percentage of correct answers (the year 2019, n=123)</b>	<b>Percentage of correct answers (the year 2017, n=108)</b>
<b>First aid for clinical death</b>	93,0	74,0
<b>First aid for bleeding</b>	89,1	67,7
<b>The algorithm of first aid for electrical injury</b>	73,4	50,8
<b>The algorithm of first aid for carbon monoxide poisoning</b>	81,0	70,2

<b>First aid for burns</b>	95,0	80,2
<b>First aid for fractures</b>	84,3	77,0
<b>Emergency call</b>	92,1	88,6
<b>First Aid Safety</b>	61,0	50,3

## **Discussions**

In the field of the educational activity, teaching safe behavior is of particular importance. The discipline "Health and Safety" helps students to master the necessary level of knowledge and skills to determine the influence of harmful and dangerous factors on the human body and the environment, provide first aid and make the right decisions in situations that threaten human life and health.

At the same time, students of humanitarian and pedagogical training programs who master this subject often run into the difficulty of perceiving a number of issues based on school knowledge of biology, physics, and chemistry. This requires the selection and application of such methods and techniques that contribute to students' understanding of the studied material, cause active learning, and, therefore, the meaningful and responsible attitude to their own' behavior.

The characteristic feature of teaching this discipline is its practical orientation, so, any theoretical knowledge should be transformed into practice. The choice of teaching methods should take into account the use of knowledge and skills acquired by students in life situations.

At the initial stage of the study, when conducting the questionnaire and testing, it was found that many students are not ready for providing first aid or experience certain difficulties and a sense of fear when providing it; have a low level of knowledge on these issues. An increase in the level of knowledge on providing first aid, positive motivation to study this subject, and students' willingness to provide the necessary assistance to the victim were revealed as a result of the introduction into the educational process effective methods and techniques when studying how to provide first aid. In this regard, for better assimilation of the educational material it is necessary to constantly search for new and modern teaching methods.

## **Conclusion**

Characteristics of the teaching methodology of the discipline "Health and Safety" is determined by the use of modern teaching methods and techniques that contribute to a better assimilation of educational material, taking into account the specifics of the discipline and its practical orientation. The rational organization of

students' independent work and the use of electronic training courses allow optimizing the learning process. For this, it is necessary to constantly improve teaching methods, to search for innovative teaching methods and techniques, to increase students' motivation to study the discipline, which is a necessary condition for effective training.

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