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INTRODUCING THE TECHNOLOGY OF CRITICAL THINKING ON THE ECOLOGY COURSE FOR EDUCATION

G. G. Pervyshina (a), S. P. Boyarinova (b)*, Y. N. Koval (c), L. V. Dolgushina (d)

*Corresponding author

(a) Siberian Federal University, Svobodny ave. 79 Krasnoyarsk, Russia, eva_apple@mail.ru

(b) FSBEE HE Siberian Fire and Rescue Academy EMERCOM of Russia, Severnaya str. 1, Zheleznogorsk, Russia, sveta1208@mail.ru

(c) FSBEE HE Siberian Fire and Rescue Academy EMERCOM of Russia, Severnaya str. 1, Zheleznogorsk, Russia, a_yulya@inbox.ru

(d) FSBEE HE Siberian Fire and Rescue Academy EMERCOM of Russia, Severnaya str. 1, Zheleznogorsk, Russia, ldolgushina@gmail.com

Abstract

The article talks about the introduction of critical thinking technology at "Ecology" classes in educational institutions of higher education. The methodical development of the lesson using the "Six Hats of Thinking method" by Eduard de Bono, implemented at the Siberian Federal University and the Siberian Fire and Rescue Academy of the State Fire Service of the Ministry of Emergencies of Russia during a practical (seminar) lesson in the field of Ecology is presented. The advantage of using this format is that mindfulness develops - students are fixed on various aspects. The psychological role-playing game disturbs the usual way of thinking and decision-making to the brain. It is based on the consideration of the problem from different angles. The essence of this method is that the colour of the hat at each stage of the game sets the direction of the discussion for the participants in a single direction. The teacher gives students a specific task - to state the facts or express their opinion, depending on what colour the hat is in the group. In this case, hats act as metaphors that indicate the direction of the discussion. This method is applicable in the educational process of these higher education institutions for the first time. The final test control showed high results in the development of new material in practical exercises. The effectiveness of the application of the Six Hats of Thinking method has been proven by Siberian Federal University and Rescue Academy State Fire Service of EMERCOM of Russia.

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Keywords: Pedagogical method, six-hat-thinking, ecology.



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1. Introduction

Russian third-generation federal state general education standards higher professional education (including 3+ and 3++) provide for the implementation of training sessions not only in traditional, but also in interactive forms. At the same time, the presence of interactive classes is determined by both the main educational program and the content of specific disciplines.

Analysis of the curricula of the discipline "Ecology" implemented in the Siberian Federal University at Hotel business, Product's technology and catering major and "Ecology and Environmental Monitoring" of Siberian Fire and Rescue Academy State Fire Service of EMERCOM of Russia for the Technosphere safety major showed good comparability within the framework of the thematic lesson plan of the sections on the basics of rational nature management (Table 01).

It is seen from the data presented in the table, the amount of practical sessions on the basic principles of environmental management in Siberian Federal University includes 4 academic hours (2 sessions) and in Siberian fire-saving Academy it includes 6 academic hours (3 sessions) that allows holding at least one session devoted to the problem of waste disposal in the form of an interactive form with a panel discussion.

Table 01. Thematic lesson plan

p/p	Modules, topics (sections) of the discipline	Lecture classes (academic hour)	Seminar Classes		Independent work (academic hours)
			Seminars and / or practical exercises (academic hours)	Laboratory work and / or workshops (academic hours)	
Siberian Federal University					
3.	The basic principles of environmental management	0.28 (10)	0.11(4)		0.5(18)
Siberian Fire and Rescue Academy State Fire Service					
2.	Ecological basics of environmental management	0.17 (6)	0.17 (6)		0.5 (18)

2. Problem Statement

Development and implementation of interactive teaching methods - the method of "Six Thinking Hats" of Edward de Bono is used in practical classes on "Basics of environmental management". The choice of this method is due to the fact that it is one of the simple and practical ways of obtaining practical thinking skills for the objective perception of information, its understanding and analysis, which contributes to the formation of a special thinking style, which is characterized as understanding the ambiguity of points of view, as well as flexibility, reflexivity, openness.

3. Research Questions

The paper gives the information about the environmental program of Solechnogorskiy district, Moscow region which is implemented jointly with the company «Coca Cola Hellenic» (presentation - 13 slides).

4. Purpose of the Study

The topic of the lesson is “Basic principles of rational nature management: household waste”.

The purpose of the lesson is to consolidate the knowledge of the cadets and students gained in the lectures of the discipline "Ecology" (Section: "Basic principles of rational environmental management") using interactive forms of training. The purpose of this study also includes the choice of a solution to the problem under consideration, the development of its own solution (Mushtavinskaya, 2004).

5. Research Methods

Work on the solution of the problem is designed for two academic hours. When implementing classes on this topic, we used various pedagogical methods (Dmitrieva et al., 2014; Guzeev et al., 2004).

Each higher education institution has made a selection of two groups of students: the control (conducting classes using the method of problem-based learning "round table") one and the experimental one. The number of students in the group ranged from 15 to 20 people (Kontorusova et al., 2016). The implementation of classes using the method of "Six Thinking Hats" of Edward de Bono is shown in Table 2 (Samsonova, 2016).

The consideration and decision-making take place in the course of work of the teacher, who plays a leading role. The teacher may suggest changing the hat. At the end of the lesson, the teacher analyzes and evaluates the work of the group. The reflection stage was carried out in the form of test control at the next lesson.

6. Findings

The main findings are described in Table 02.

Table 02. Organization of practical exercises using the method of "Six Thinking Hats" of Edward de Bono

Type of “hat” by E.de Bono	Tools offered for work in a subgroup	Task for a subgroup
Blue	-	We determine the purpose and subject of discussion. What do we want to achieve? What do we think? What is our goal? The sequence of hats is discussed. Everyone expresses suggestions and opinions, and at the end the teacher makes a decision.
White	Mental map	Consider the “dry facts” connected with the generation of production and consumption waste, as well as their use and disposal by the example of the Krasnoyarsk Territory (if there are students from other regions in the group, you can suggest choosing numbers for comparison, for example, the Krasnoyarsk Territory and the Republic of Khakassia). Recommended source of material: http://krasstat.gks.ru/ As part of the work in the "white hat" to offer students to answer the questions: - What do we know about waste management? - What do we need to know? - What is missing?

Type of “hat” by E.de Bono	Tools offered for work in a subgroup	Task for a subgroup
		<ul style="list-style-type: none"> - What questions should I ask? - Where and how can I get the necessary information? <p>The task of each participant is to make every effort to fully study the subject of discussion. (Note: <i>it is possible to carry out this part of the work as homework, with the preparation of a presentation and a presentation at a seminar. During the report, the participant tells what he managed to find out and what information he still needs</i>)</p>
Red	Mental map	<p>To get know the materials presented on the website http://www.solidwaste.ru/publ.html (if the duration of the lesson is 2 hours, then you can offer an introduction to only two materials: http://www.solidwaste.ru/publ/view/614.html, http://www.solidwaste.ru/publ/view/118.html)</p> <p>To express anxiety about methods for the disposal of industrial household waste, to cast doubt on the relevance of existing solutions to this problem. Students can be asked to track changes in their own emotional state when they get acquainted with publications on a topic, to note which publications have this or that emotion associated with? Why?</p>
Black	Analysis	<p>It is necessary to invite students to analyze the difficult, unclear, problematic, negative aspects of the problem, to analyze their causes (you can suggest the implementation of this task on the example of the presentation shown at the beginning of the lesson) At the same time, participants should answer the questions: Does this correspond to our values, resources, strategies, goals and potential?</p>
Yellow	Analysis	<p>Look at the positive side of the problem, argue why they are positive. It is necessary to find valuable and useful in solving the problem under consideration. At the same time, it is necessary to focus on the explanation of the stated provisions (you can suggest the implementation of this task on the example of the presentation shown at the beginning of the lesson)</p>
Green	Brainstorming	<p>Ask yourself:</p> <ul style="list-style-type: none"> - How can I solve the problem of recycling production and consumption wastes; what methods can be used in this situation? - What could be done differently, why and how exactly? - How could we improve ways to solve the problem? <p>The main direction is to find new facets in solving the problem under consideration and answer the questions:</p> <ul style="list-style-type: none"> - “What has to be done? What other options are there?”
Blue	Top	<p>Sum up the discussion, resume the above, draw conclusions, make a decision on further action. What have we achieved? The Chairman summarizes the work of the group to decide what was striven for and what has been achieved?</p>

7. Conclusion

Using such format of interactive teaching methods as the method of "Six Thinking Hats" of Edward de Bono promotes such abilities as the formulation of ideas, the ability to listen and to delve into the ideas

of comrades who participate in the group to carry out a reasoned critique not only of others, but as well as of the students' own ideas (Khutorskoy, 2012).

Thus, the organization of the learning process, using the method considered, is more focused on the creative perception of the problem, the development of creative imagination, the ability to improve ideas and create objective prerequisites for the development of creativity among students (Kapin, 2017; Zaitsev et al., 2019).

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