

Activities-Based Teaching to Build Environmental Competence of Students

Tumen State Oil and Gas University
L.S. Nasrutdinova

The article presents the analysis of various definitions of the concept “environmental competence”, which were suggested by different authors. The author of the paper suggests a new definition of the concept “environmental competence”. The matter of activities-based approach has been revealed. The basic methods to apply activities-based approach to build environmental competence of students have been described.

Key words: *environmental competence, activity approach, active learning methods.*



L.S. Nasrutdinova

The government papers on higher education modernization set the goal to improve specialists training. The Government Strategy of Russian Professional Education declares competence approach to be applied and thus the educational goals to be reconsidered. The main objective is not to provide students with certain amount of knowledge within the scope of curriculum but to enable a specialist (or a graduate) to adapt to different conditions and to act under various life, professional and problematic circumstances. The main result of education modernization is to make a graduate be able and ready to bear responsibility for both personal and social welfare and become professionally competent [6, p. 1–10].

Any professional activity implies interaction between a human being and the environment. Environmental incompetence undermines the foundation of human society and ecologically sustainable development. As a result, it is quite important for a specialist to be competent not only in the sphere of his/her professional activities but also in environmental issues (V.M. Kalinin [19]).

The concept “environmental competence” first appeared in science and social and political spheres in the second half of the XXth century. It was brought into scientific use by a soviet

cultural studies scholar L.N. Kogan and his work “Environmental Competence of Developed Socialistic Society”. The ideas of this work were reported by the author at the conference “Ideological and Theoretical Problems of Scientific and Technological Advance” (June, 1973, Sverdlovsk). Then the concept was developed in different branches of knowledge: ecology, psychology, pedagogics, ethics and cultural studies.

Particularities of environmental competence proper were studied in few psychological and pedagogical works by L.S. Chopenko, A.R. Eferova, I.D. Zverev, V.I. Tomakov, E.V. Muravyova, N.F. Kazakova, L.E. Pistunova, D.S. Ermakov, A.N. Zakhlebny and others.

What is important, the content of the concept “environmental competence” is not the same being used by different authors and varies in matter and functional aspects. Principal differences are represented in Table 1.

Having analyzed the definitions given by different authors we have driven to the following: environmental competence of a modern specialist is an ability to apply timely and effectively the knowledge and experience got in the professional sphere to save and improve the environment, to solve and prevent environmental problems competently, to be ready for changes in

production. To make all these qualities true it is necessary to build environmental competence of future engineers while they are studying at university.

Within the system of ecological education special attention should be paid to pedagogical techniques (or teaching methods) being used to increase the level of knowledge about environment, to improve environmental awareness and to develop environmentally important personality traits (environmental responsibility) of adolescents in present ecological situation in the world, country, and region [8, p. 154-159].

Today, the development of pedagogical techniques is greatly influenced by activities-based approach to teaching, the idea of which is not to transmit the information but to make students

get knowledge in the result of their own educational activities directed to learn the subject theory and the ways to solve the relevant tasks. Knowledge is acquired and displayed through activities only; development of student abilities and skills is based on the action which should be performed by the student independently in the right way (mode). In the process of teaching and learning basic educational actions make up the entire circle of educational activities: apprehension, comprehension, memorizing, summarizing and systematization of any information item to be learned, as well as further control and assessment [4, p. 14-15].

Within the scope of activities-based approach to exploration and organization of educational process the aim of the activity is a set point and is regarded as

Table 1. Definitions of the Concept “Environmental Competence”

Author, year	Definition of concept
L.S. Chopenko, 2007	an integrative personal quality which conditions the ability to interact within the system “man – society – nature” according to acquired ecological knowledge, abilities and skills; beliefs, motives, ideas, environmentally important personal qualities and experience in environmental activities.
A.R Eferova, 2010	a personality trait of an engineer represented by the unity of his/her theoretical knowledge, practical experience, ability and readiness to professional conduct which satisfy production, health and safety requirements, provide the necessary health level, personal and social safety and environmental safety of habitat.
I.D. Zverev, 1995	an individual characteristic reflecting the degree of individual conformity to the requirements of environmental education: cultivating in students environmental knowledge, abilities and skills intended to develop environmental awareness, thinking and world outlook which are necessary to pattern one’s behaviour under a certain ecological situation, to remove or limit environmental risks.
V.I. Tomakov, 2007	a personality trait of an engineer represented by the unity of his theoretical knowledge, practical experience, ability and readiness to provide all professional activities which satisfy production and health and safety requirements, provide the necessary health level, personal and social safety and environmental safety of habitat.
E.V. Muravyova, 2008	to know fundamental laws of nature; to understand that these laws are necessary to be considered and to follow them conducting individual or collaborative activities; to tend to optimal nature management for private and production purposes; to arouse responsibility for nature, environment and public health.
N.F. Kazakova, 2001	an integrated ability consisting of values and motivation, activities and cognitive components making the foundation to create environmental culture of a personality.
L.E. Pistunova, 2006	a personal characteristic including the knowledge about natural environment is of great value, about the way the man influences the environment and how he interacts with it; being creative while being trained to solve ecological problems; experience of participation in activities to save and improve the environment; environmentally important personality traits of a student like being humane, emphatic, economical, responsible for the results of environmental activities.
D.S. Ermakov, 2008	being aware, able and ready to conduct environmental activities on one’s own; experience in the activities directed to saving and sustainable reproduction of life, environmental improvement while identifying, solving and preventing ecological problems.
A.N. Zakhlebny, 1997	application of knowledge about environment and human activities, environmental health risks and abilities to behave in an environmentally competent way under certain circumstances

anticipation of the activity results. As a matter of fact, the function of the aim is to direct the activity.

The main techniques of activities-based approach are exercises (tasks), laboratory and practical methods, active teaching techniques and role plays [4, p. 26].

Let's give some examples how to apply the activities-based approach to build environmental competence of students.

Active teaching and brining-up strategies are those of interaction. The techniques being used make student's activities productive, creative and searching; they encourage student's activities and presuppose free exchange of opinions on different ways to solve a problem. Among active teaching techniques one can differentiate between conversations, debates, seminars, business games and trainings. Any active teaching technique presupposes group training and a certain procedure to follow [1, p. 50-58].

Communicative and business games involve students into the system "man

– society – nature"; familiarize them with the causes of ecological crises and possible ways to restore lost balance of the system; develop environmental competence, environmental mentality, environmental awareness and responsibility. Playing training games is the best way for a student to become psychologically ready for real ecological situations; to understand the ways people of different social roles treat the environment and how it is connected with the professions they have and the positions they occupy; to acquire communicative skills to interact with people of the same age. Association-driven games emphasize the importance of environmental knowledge; develop student's potential and emphatic abilities; determine student's cultural and social values; create the feeling of community and interaction with nature as the most important part of the environment; enrich inner and moral experience of the youth. Role plays give an opportunity to try oneself in various social roles; encourage a student to be effective in different ecologi-

Table 2. Groups of Educational Tasks Necessary to Build Environmental Competence

Nº n/n	Educational tasks necessary to build environmental competence	Content of educational tasks necessary to build environmental competence
1.	Theoretical tasks	include questions, exercises, tests or computer programs, text to analyze and discuss a certain ecological situation. The tasks are directed to develop environmental mentality and make youth environmentally aware what presupposes profound and scientifically grounded understanding of interaction between the human being and nature, the abilities to analyze facts, find out cause-and-effect relationship and take proper decisions. The tasks dwell on chemical contamination of the environment (sources of contamination, way of getting into the biosphere, the influence on ecosystems and organisms, the cycle of matters, habitat deterioration), creation of low-waste and environmentally friendly methods to save human health.
2.	Calculation-based tasks	contain information on quantitative assessment of chemical and environmental processes. These tasks facilitate awareness of environmentally friendly chemical technologies being invented and implemented, natural resources and energy being optimally depleted; present the methods of waste disposal and processing; let assess the scale of contamination and estimate the state of environment using such indicators as MPC, amount of waste per tonne of production.
3.	Experimental tasks	tend to be exploratory. An experiment makes it possible to master the simplest methods of environmental exploration and control, the ecologically friendly ways of dealing with chemical substances. An experiment can be closely connected with modeling or imitation of environmental, anthropogenic or technological processes what encourage thinking and contribute to experimental investigation, develop practical skills. Doing such tasks youth learn to make conclusions by their own what is fruitful both in practical and theoretical aspects.
4.	Combined tasks	are complicated tasks as soon as to solve them one needs to analyze the problem from the theoretical point of view, conduct an experiment and make calculation on basis of the results that were got. As a rule, combined tasks tend to be exploratory and forecasting. They are appropriate for group work.

cal situations; make a student interested in adequate assessment of his readiness for socially important actions; develop the abilities to analyze the actions performed in the environment by himself/herself or by another member of the society, to act in an adequate way in future social and ecological situations, and to aim at accomplishment in social sphere. The main method of teaching in a role play is to develop the skills of rebuilding and regrouping concepts, ideas and facts not to give an educational reply but to response in the way essential for the person whose role is being played. Communicative games help to develop communicative abilities, build up environmentally competent speech and improve social skills; to cultivate the culture of communication and develop the abilities of interaction; to train the youth to pattern their behavior under different ecological situations. Activity games teach students to be aware of the importance of nature in human life, encourage them to participate deliberately in environmental activities, develop the ability to work out social skills using environmental knowledge and experience they have acquired,

provoke need for success and intention to self-actualization; create circumstances under which students get social and environmental experience in connection with inner and moral aspects [9, p. 20-40].

Within the scope of environmental education V.M. Nazarenko points out four groups of tasks necessary to build environmental competence: theoretical, calculation-based, experimental and combined (Table 2).

Depending on the function they fulfill, tasks on environmental issues can be split up into three groups: 1) tasks which provoke interest for environmental problems; 2) tasks which contribute to building students' personal traits (being hard-working, responsible, diligent, and an effective team player); 3) tasks which make a student take a moral choice thus revealing the level of his/her environmental mentality [8, p. 154-159].

To make a conclusion, using these methods (tasks, active teaching methods, role plays) one applies the activities-based approach to education. Students acquire knowledge and skills which will influence their future professional conduct.

REFERENCES:

1. Arutyunov, Yu.S., Chebotar', Yu.M. Active Teaching Methods / All-USSR Society "Knowledge", Polytechnic Museum [and others]. № 1: Business Game "Leader Elections" / Yu.S. Arutyunov. Game Modeling: for Students of Active Teaching Methods Faculty, Polytechnic museum / Yu.M. Chebotar'. Moscow: Knowledge, 1990. 107 p. P. 50–58.
2. Borisova, N.V. Methodology to Select Active Teaching Forms and Methods (Theoretical Model). Candidate's thesis. Moscow, 1991. P. 30–35.
3. Verbitskiy, A.A. Active Teaching at High School: Contextual Approach. Moscow: High School, 1991. 207 p. P. 10–15.
4. Yepisheva, O.B. Profession-Oriented Educational Technology (on Basis of Activities-Based Approach). Tyumen': TSOGU, 2009. 130 p. P. 5–15.
5. Idiatulin, V.S. Cognitive Technology of Education // Psychology of Education. 2006. № 11. p. 12–14
6. Strategy of Russian Education Modernization up to 2010 (The Decree of the Government of the Russian Federation of December, 2001; order № 393 of the Ministry of Education of February, 11, 2002). P. 1–10.
7. Nazarenko, V.M. The System of Continuing Ecological Education at Secondary and High Schools. Moscow, 2007. P. 20–30.
8. Nasrutdinova, L.S. The Problem to Build Environmental Competence of a Future Engineer During his Studying at University. The Proceedings of International Theoretical and Practical Internet Conference «Topical Problems of Modernization in Higher Engineering Education». Tyumen': TSOGU, 2009. P. 154–159.
9. Pistunova, L.Ye. Building Environmental Competence of Students at the University. Abstract of a thesis. Kemerovo, 2006. 48 p. P. 5–40.
10. Savelyev, A.Ya. Educational Technologies and Their role in the Reform of Higher Professional Education in Russia // Vysshee Obrazovanie v Rossii (Higher Education in Russia). 1994. № 2. P. 29–37.