

PROTECTION OF THE ENVIRONMENT AS THE CONTENT AND THE PRINCIPLE OF HIGH EDUCATION

UDC 504.06

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Abstract. *Seriousness of ecological problems and social activities aimed at the protection and quality of the environment at the national and international levels impose the need for urgent and different changes in educational system of many countries. Modern educational theory, practice and recommendations of international organizations lead to the ecological system at the high education. In order to understand the need and the importance of ecological factors and laws in professional domain, the connection between ecological and professional aspects of student's future professional activities, it is necessary to understand the environmental protection as the necessary content and principle of educational work at the university. During the work, the educational needs of different groups of the academic population are observed, in fact, the program's educational orientation for the environmental protection in different segments at the high level of education is shown.*

Key Words: *Environmental Protection, Content, Principle, High Education*

INTRODUCTION

Considering the origins, historical development, foundation, many centuries of existence and tradition of the university as well as fact that the education for the environmental protection represents a new conception, a new philosophy of education is needed as an answer to numerous difficulties and problems that occurred in the second half of the 20. Century that also caused the need for the introduction of this "innovation" into the system of high education. As the problems of environment became that large that it was impossible to ignore them, they provoked the reaction of many universities which concentrated their attention on some questions and problems of environment (e.g. University in Tourou, University in Waterloo, University in Lund, etc.). Either special centers and institutes were founded within the university departments, which were engaged in problems of the environmental protection, or some new departments or faculties were formed or, on the other hand, the whole university dealt with the problems of the environmental

protection. Whatever was done, there is no doubt that the universities urged further developing and spreading of education for the environmental protection at the high education level in many parts of the world.

Significant contribution to the development of education for the environmental protection at the high education was offered by many international organizations (UN, OECD, IUCN etc.). At the conferences of these organizations (France, Denmark, Canada) some important documents and recommendations were adopted otherwise related to the goals and tasks of education for the environmental protection, curriculum, methods, organizational and other problems of education at the high level [7]. It is necessary to emphasize the contribution of some authors who directed their scientific work toward studying of these problems within the national and international frameworks, such as: K. Schaefer, Abilon, L. Peterson, F. Kvig, L. Emmelin, R. Schwass, R. Hundt, R. Moss, A. Strong, E.K. Ivanova, O. Orchakov and others.

1. THE ENVIRONMENTAL PROTECTION AT THE HIGH EDUCATION LEVEL OF EXPERTS OF DIFFERENT EDUCATIONAL PROFILES

Even though we live in the countries with different universities, different students' population attending those universities and supporting the social and economic system of their countries, with different problems of environment, still we can say that there is a lot of common among universities from different places when we talk about the education for the environmental protection.

Realization of education for the environmental protection at the high education level must begin with the definition of goals and tasks of this education, in fact, with the answers to these questions: What do we expect of it? What should we gravitate toward? What is the possible result? The main goal of education for the environmental protection is exactly what should be in common to all universities, namely, the formation of opinions, views and models of behavior by the future experts which will enable versatile, precious and efficient taking into consideration ecological ideas, aspects, factors and laws in their professional activities.

One of the most current tasks of modern high education is related to transfer from informational-communicative teaching to modeling. That kind of transfer brings changes in understanding the essence of high education as well as its basic determinants-goals and contents of teaching, in fact, it means consolidation and breaking-in of proper models that are basic for high education teaching.

In practice of most universities today the goal of teaching is formation of certain systems of knowledge and skills. It is thought that the certain amount of, for example, ecological humanist knowledge is enough, and that this knowledge is automatically "involved" with professional knowledge thus leading to necessary integral effects. It does not only lie in the formation of curriculum but it also concerns what professors and lecturers call "knowledge giving". Of course, you can "give", but you must create such conditions for students to adopt that knowledge and use it in a proper way. The employer will not be interested in what the graduate knows (the one who works for him); what is important to him is how good and how professional he will do certain assignments. It is extremely important that the expert, by doing his tasks, should realize ecological aspects of his professional activity.

For modern expert the "rule" of knowledge is a necessary but not sufficient condition, but if he applies his knowledge efficiently he will create the conditions that are needed for professional ecological activity in different living situations. One of the goals of curriculum and educational work at the high education level should consist of developing students' abilities to analyze environmental problems, find out causes and effects, and, in fact, to explain the conditions under which certain processes happen and what their consequences are regarding the quality of environment. It should also explain what the economic and political interests and influences are, the kind of politics involved, its place and role within the given problems. Results of some research projects showed that a great number of students are interested in problems of the environmental protection because they observe them as closely connected with political and social problems [1]. It means that it is necessary to include and study social-economic background of these problems in curriculum and academic programs. At this level of formal education, like in the previous ones, there is need for universal approach to the problems of environment.

The duty of the university professor is to help the student analyze problems and adopt the knowledge to the level of scientific analysis and scientific research. Scientific exploration leads to the new realizations and new facts, which have to find their way and practical application in everyday life. In this way it provides participation in solving practical problems of the environment which, unfortunately, is not present yet in curriculum at the university. On the other hand, participation, acting, engagement show the skills of man as well as his knowledge. The concrete information which should be adopted by the students during the curriculum must be connected with carrying out of certain actions because they are primary in this process (adopting information as knowledge is secondary). Knowledge without activity loses its curriculum stimulus strength, concrete tools of perception and practical activity.

In this way we exceed traditional determination and defining of goals ("give knowledge") and we are brought closer to the so-called objectives-results, objectives-effects, which reflect changes in our awareness, in other words, reflect desirable changes in knowledge, abilities, ideas, habits, behavior and views toward nature and society. Education for the environmental protection at the high education level represents certain hierarchy or taxonomy of educational goals. The overall goals of education for the environmental protection are divided by Russian author Orchakov into four groups (historical-fact; personal-social; ecosocial and ecoprofessional) and every group does not include some content aspect but also certain levels of adoption of the given contents [4]. Reaching the goals of next level (group) is possible when the goals of the preceding level (group) are reached [4].

As the last one, the "output" in hierarchy is that group of goals (ecoprofessional) whose realization provides respect for ecological factors and consideration of ecological laws in professional activities and acting. It also implies that the goals of the previous goal block are completed (*historical-fact*: study of ecological development, ecological problems, ecological view of the world, etc.; *personal-social*: the development of ecological consciousness, moral, responsibility, values etc; *ecosocial*: understanding of meaning and contents of interaction among ecological, spiritual, economic, political, legal and technological aspects in the development of modern society, the development of ecological culture and understanding of the role and place of ecological culture in system of forms and types of culture, etc.). It also means understanding of connection and inter-

action of - ecological, professional and organizational culture, ability to analyze reciprocal influence and conditions of ecological and professional aspects of the expert opinion, methods for evaluation of results that influence professional activities in natural micro and macro environment, the ability to diagnose, predictions and prognoses of environmental problems from the expert opinion aspect, etc.

In order to realize the importance of ecological factors and laws in professional activities, connection and interaction between ecology and professional aspects of their future professional activity and job (as it would be more or less related to the environment), it is necessary to integrate every content related to ecology and environmental protection in all subjects at the high education level (in a way that suits the main purpose of a given course). In fact, the contents of education for the environmental protection must become a compulsory component of education at the high education level. The environmental protection can be observed as a principle of curriculum and educational work at the university. In that way, the conditions are created, for example, for the students who study chemistry to realize that their responsibility does not end when they release wastewater into the sewage system. They have to learn about the importance and nature of wastewater in technological process, its production, its release, and its influence to the environment, what the possibilities for prevention and the environmental protection are. The same stands for the experts from other faculties-doctors, economists, lawyers, architects whose responsibility in their professional activities also influences the quality of environment as well as possibilities of its protection.

If students are not interested enough in problems of environment, and the professor does not motivate them in a proper way, this way of bringing the education for the environmental protection into the high education level will not be successful. Most of the teaching staff thinks that their subject is one of the most important ones for students. This attitude can be considered as reasonable, even necessary if we have in mind that the enthusiasm and value of what is taught is one of the basic prerequisites for successful work. The consequence of this kind of attitude can prevent some teachers from using the integrated curriculum, which can take into consideration the environmental problems within scientific disciplines. Difficulties are not just of psychological but also of intellectual nature because most of teaching staff has classic education, they are specialized in some way, and they mostly lack proper ecological education.

Specialization is a necessary process in developing career. But lately, what is more important is integration of different aspects of a problem, so it can be said that de-specialization becomes the process of scientific development. Therefore, future experts and scientific workers should be prepared for the education of environmental protection especially the teaching staff at the high education level.

During the studies students should have the opportunity to attend the introductory courses about the environmental protection and its problems. Some authors think that these courses can be common for all students. According to conferences, they should include the contents related to *the biosphere; man and the biosphere; environment and human society; politics and action methods* [3]. Of course, new ideas and conceptions that are connected with the problems of the environment demand permanent improvement of the contents of curriculum, maximum elasticity, but certainly not stereotyped courses.

2. PROFESSIONAL EDUCATION FOR EXPERTS IN THE FIELD OF ENVIRONMENTAL PROTECTION

In order to improve general and special knowledge and abilities for the environmental protection and to achieve possibilities for professional and preventive action in everyday living situations, the education of experts who will work on general and special jobs and problems for the environmental protection is of great importance.

Now, at the high educational system there are two basic tendencies and conceptions for education of these experts.

1. Specialization and advanced study of experts of different profiles for certain problems of environmental protection by postgraduate studies and by scientific research work. Here the postgraduate courses imply proper courses building upon the previous specialized academic profile in which an interdisciplinary aspect should dominate.

2. Education for special profile by graduate studies according to the special integral curriculum of education leading to the title of an expert.

Despite the fact that the above-stated conceptions are understood in different ways as evident in the debates or they involve opposite attitudes and determinations, they do not exclude each other in the pedagogical sense. It can be said that they are complementary and that they should develop simultaneously since both of them have advantages and disadvantages.

The basic argument that the appeal for autonomous education is based on is that specific problems demand a complex and integral approach rather than a partial one. It is a network of different dangerous sources and sites in the environment and their elimination, which should be followed, analyzed and solved. Successful elimination of these dangers in the environment means realization of professional knowledge which "maximal responds to the principles and standards of effective direction to the ecological security and to the minimum and compensation of ecological damage in every phase of transforming natural resources, creating and functioning of industrial production" [2]. Efficiency of this knowledge should be evaluated from the position of possible prevention of ecological damages which would occur if there were no guarantees for ecological security of projects, technology or production that would lean on adequate methodology and knowledge base (classification, criteria of evaluation, estimate methods, standards of project, standards of control and exploitation, special engineering-ecological decisions, etc.)

Factors of danger in the environment which begin in a certain phase of production are in correlation with the phase and they increase with geometric progression. It practically means that efficiency of prevention any final ecological damage is bigger if prevention measures for ecological security are undertaken in an earlier phase of production. This principle is built into the foundation of methodology and professional strategy for the environmental protection.

As ecological security represents complex as well as an inter- and multi- disciplinary area, the experts have to perform different activities in their professional actions, namely those that are analytical organizational practical jobs and problems in the field of environmental protection. They also have to deal with scientific-research work and tasks to solve complex problems of the environmental protection in complex industrial systems and organization and to spread knowledge and experience from this scientific area through education forms and organizations [5].

Therefore, the institutions should concentrate their education on the environmental protection as well as complex nature of all occurrences that are connected with it, which means that the program conception of these institutions must include aspects which are in relation with natural and chemical as well as social sciences. An inter and multi-disciplinary training for the environmental protection must develop knowledge and abilities of students in the following order:

- Recognition of general situation and changes in the environment influenced by different factors; discovering and recognition of potential risks and possibilities of running different kinds of risks in the environment;
- Discovering and recognition of basic sources and causes of danger in the environment by carrying out building, production process, economic activity, their quality and quantity characteristics, the introduction of evaluation method and prognoses of ecological damage and its consequences;
- Carrying out the methodology for the design technology protecting nature and resources as well as the measures for prevention and decrease of dangers and damages, restoration of ecological balance in ecosystems of different type in different parts of country;
- Applying the standards of the permitted influence on the natural environment by carrying out building and other activities, technical ecological expertise, quality control of environment, ecological monitoring etc;
- Realization of economic aspects for performing the activities for the environmental protection and rational use of natural resources;
- Realization of legal aspects for the environmental protection at national and international level;
- Realizing the conception of complex engineering security of production and other economy activities, modern mechanical modeling methods and measures for protection;
- Realizing the methods and measures that will solve or decrease the problems of waste materials of different sources, problems of noise and radiation and other progressive methods for the protection of nature and environment;
- Adopting necessary pedagogy-andragogy and didactic-methodic foundations for successful realization of educational and informative activities in this area, etc.

Further professional education of these experts means, besides personal affinities, developing their practical experience and their scientific interests, in fact, the development of the scientific-methodological base in this area (e.g. working out of local, regional and general ecological scales according to processes of acting; research and working out of methods, technology and means for prevention, prognoses, planning and carrying out of preventive measures for the environmental protection; reconstruction of disturbed ecosystem; working out of exact ecological information about the dynamics of changes in particular ecosystem; analysis and evaluation of (ir)retrievable processes in natural and technical systems; research and application of ecological machines, safe technology and production etc.).

For experts who professionally deal with the problems of environmental protection can be said that they have the greatest responsibility for the environmental protection. Their activity is in the most direct way connected with the destiny of nature and the environment. The better quality of educational process and improvement of these experts, the

less habitual consequences and losses in the environment. These experts should provide other necessary conditions (educational and informative) for other people's activities in the field of environmental protection and in the area of material production in everyday life activity. The education of experts who professionally deal with the problems of environment as well as the education of experts of other profiles in this area cannot stop after they graduate. This kind of education, as any other, has implies permanent education. Besides necessary coordination, inter-chair, inter-faculty, in fact, inter-university cooperation, university can organize special conferences, congresses, meetings etc., in order to stimulate necessary contacts for permanent education of experts in this area.

3. EDUCATION OF TEACHING STAFF IN THE AREA OF ENVIRONMENTAL PROTECTION

Professional and didactic-methodic education and improvement of teachers in the area of environmental protection represent an important segment of education for the environmental protection at the high education level. Its importance is completely understandable if it is known that the success of any educational process depends on the carriers of that process, namely, the teaching staff. It can be said that the teachers (from teacher to the university professor) are key figures for the achievement of goals and tasks in the education for the environmental protection in the formal education system. This statement lies in the fact, which is related to the educational population that these experts may, directly or indirectly, influence in an educational or informative way.

In recent years numerous projects and researches have been dedicated to education of teachers in the area of the environmental protection. Many authors said that this education should provide knowledge of ecological facts and conceptions, proper foundation in sociology connected with human ecological, development of abilities for critical analyses and grasping of problems in the environment and development of responsibilities for the environmental protection. It is about the conception of program which implies:

- Ecology as science which study interactions between living creatures and the environment, including man and his environment, as well as in urban and rural regions and ecological principles connected with components of the environment and the disturbances that make changes in ecosystems;
- Economic aspects of rational use of natural sources as well as planning sources, application of adequate technology, exact politics in the production-consumption relation;
- Sociological aspects which include proper social and individual responsibility for the environment; processes of creating attitudes as well as a legal and administrative system and other measures that are related to the environmental protection, integration of regional planning with ecology and economic demands, etc.

In addition to these aspects that are related to professional foundations of education for the environmental protection, another component of educational program should be related to the development of pedagogy-andragogy and didactic-methodic abilities for realization of this education in this area. Application of classic educational methods, especially modern educational technology, in the education for the environmental protection can be a great challenge for a teacher, as well as confirmation of his didactic-methodic abilities just as it can give him numerous possibilities for inventiveness in the process of the curriculum completion.

This kind of program conception of the teacher's education for the environmental protection means an interdisciplinary approach. Efficiency of curriculum can be achieved by an interdisciplinary, in fact, by an integrated curriculum with a proper team of teachers. Education for the environmental protection should become an obligatory component in other subjects of natural and social sciences according to their goals and tasks, and in accordance with the problems they are dealing with. It means that the subjects referring to the environment protection problems otherwise studied at different teachers' training departments should be connected. The professional and didactic-methodic education in the area of the environmental protection should help integrate all future teachers of different disciplines and specialization from teacher's training faculties as well as non-teachers' training ones. This means introduction of proper contents in the area of the environmental protection not just at the level of regular studies but also at the level of postgraduate studies. At the same time, according to practice of some developed countries in the world and social intentions for permanent education and improvement there is a need for organization of certain educational forms for additional education and improvement of teaching staff who work in the area of primary, secondary and high education. In order to achieve proper results in education and improvement of teaching staff in the area of environmental protection it is necessary to develop more intensive inter-faculty and inter-university cooperation and exchange of experience in the national and international frames.

CONCLUSION

As many theorists have already stressed, the 21st century is going to be the century of computer science and ecology. That is why it is logical for the environmental protection to take the key place in structure of high level education just as it is necessary for the contents and the principles of educational work to become some of the main factors for the development of modern high education. A comparative analysis of educational theory, practice and recommendations of different international organizations all point out to the tendencies of the ecological educational system. The basic component for ecology as a new direction of improvement and development of educational system is education for the environmental protection. The difference between ecology and education for the environmental protection is that ecology represents the tendency of bringing in ecological ideas, principles, ecological approaches into other disciplines, but education for the environmental protection represents adopting of knowledge of different character and level in this area.

Observed from the aspect of high education, educational needs of different groups and categories of educational population can be identified (professional education of experts for the environmental protection, education of teaching staff, education of experts of different profiles in the area of the environmental protection). What is important are program and didactic-methodic problems that are related to choice and didactic transformation of ecological contents and methods, their penetration, integration and didactic-methodic distribution in a system of high education level. Regardless of educational population, program-organizational, didactic-methodic and other problems and difficulties, there is no doubt that the implementation of the environmental protection as a content and a principle of educational work in all segments of high education is necessary. In this way, the basic prerequisites will be formed to create a system of high education, which will be in evolution, which will suit modern demands, ecological intentions and the needs for sustainable development and the society.

REFERENCES

1. Acces to Higher Education, UNESCO and the International Association of Universities, Paris, 1986.
2. Мазур, И.И. Молдаванов, О.И., Шишов, В.Н.: Подготовка специалистов по инженерной экологии в высших технических учебных заведениях, Экологическая культура и образование: опыт России и Югославии Международная Академия Наук, Москва, 1998.
3. Nikolić, V.: The Environmental Protection in the System of Contemporary Education, doct. dis., Faculty of Occupational Safety, University of Niš, Niš, 2002.
4. Орчаков, О.А.: Экоориентированное образование, МНЭПУ, Москва, 1997.
5. Rančić, A., Đorđević, V.: Visokoškolsko obrazovanje stručnjaka za ekološko vaspitanje i obrazovanje dece, omladine i odraslih, Pedagogija, Beograd, 3-1998., str. 46-61.
6. Teaching for sustainable development, Report on workshop at Veldhoven, Netherlands, OECD, 1990.
7. Universities and Environmental Education, UNESCO, Paris, 1986.

ZAŠTITA ŽIVOTNE SREDINE KAO SADRŽAJ I PRINCIP VISOKOŠKOLSKOG OBRAZOVANJA

Vesna Nikolić

Globalnost i ozbiljnost ekoloških problema i društvene aktivnosti usmerene ka zaštiti i poboljšanju kvaliteta životne sredine na nacionalnom i međunarodnom nivou predstavljaju svojevrsan podsticaj različitih promena u vaspitnoobrazovnim sistemima mnogih zemalja. Savremena vaspitno-obrazovna teorija i praksa i preporuke međunarodnih organizacija upućuju na potrebu ekologizacije sistema visokoškolskog obrazovanja. Da bi studenti shvatili potrebu i značaj uvažavanja ekoloških faktora i zakonitosti u profesionalnom delovanju, povezanost i međusobnu uslovljenost ekoloških i profesionalnih aspekata njihove buduće stručne aktivnosti odnosno da se svaki posao u njihovoj profesionalnoj aktivnosti na ovaj ili onaj način, manje ili više odnosi na životnu sredinu, neophodno je zaštitu životne sredine posmatrati kao neophodan sadržaj i princip nastavno-obrazovnog rada na univerzitetu.

S tim u vezi, u radu su posmatrane obrazovne potrebe različitih grupacija visokoškolske obrazovne populacije, zapravo razmatrana je koncepcija i ukazano na programsku orijentaciju obrazovanja za zaštitu životne sredine u različitim segmentima visokoškolskog obrazovanja.

Ključne reči: zaštita životne sredine, sadržaj, princip, visokoškolsko obrazovanje