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# **A project approach to fostering students' competencies in the professional field "Ecology and environmental management"**

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## Abstrac

The focus of the paper is a project approach to the formation of students' competencies necessary for the professional field "Ecology and environmental management". The paper indicates that the formation of competencies demands to develop students' scientific basics of rational environmental management and meaningful ideas related to practical skills. Of much importance are certain professional directions and an active life position in the field of protection and improvement of natural environments. Special attention must be paid to rational use and possible increase of natural resources. The research has proved that the competencies under discussion supply the future expert in the field of ecology and environmental management with a profound scientific knowledge about the relationship between nature and society. There is much evidence that the competencies promote tools to help understand the multifaceted significance of nature for society and for everyone. The competencies help to form an understanding that nature is the primary basis of human existence and the place of a human being as a part

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of nature. The competencies aid to cultivate conscious attention and respect for the natural environment.

Keywords: a project approach, competence, environmental management, environment, society, professional training, development, need, motives.

## Un enfoque de proyecto para fomentar las competencias de los estudiantes en el campo profesional "Ecología y gestión ambiental"

### Resumen

The focus of the paper is a project approach to the formation of students' competencies necessary for the professional field "Ecology and environmental management". The paper indicates that the formation of competencies demands to develop students' scientific basics of rational environmental management and meaningful ideas related to practical skills. Of much importance are certain professional directions and an active life position in the field of protection and improvement of natural environments. Special attention must be paid to rational use and possible increase of natural resources. The research has proved that the competencies under discussion supply the future expert in the field of ecology and environmental management with a profound scientific knowledge about the relationship between nature and society. There is much evidence that the competencies promote tools to help understand the multifaceted significance of nature for society and for everyone. The competencies help to form an understanding that nature is the primary basis of human existence and the place of a human being as a part of nature. The competencies aid to cultivate conscious attention and respect for the natural environment.

Keywords: a project approach, competence, environmental management, environment, society, professional training, development, need, motives.

## 1. Introduction

At the present stage, of much importance are complex and dynamic transformations of society's relations with the natural environment. These transformations require a scientific outlook. There is much evidence that deep respect for nature is an integral component of the scientific worldview. It requires the development of interaction skills in the "man – nature" system. The skills and their upgrade are a focal point of special types of higher education programs in the Russian Federation. The development and innovations in the sphere of Russian ecological education is the key aspect of the paper. A special focus of the paper is the mastery of environmental competencies in the professional field of "Ecology and environmental management".

Socio-economic changes and the environmental situation in the Russian Federation necessitate the qualitative improvement of vocational education of future specialists. Vocational training must form a qualified creative expert focused on personal and professional development. The expert must manifest a high level of ecological culture, which results in an active influence on the environment.

The preparation of competent specialists for environmentally appropriate activities in the professional sphere, as well as the formation of their ecological culture, are key strategies to implement environmental development programs in the country. Therefore, one of the main methods of solving environmental problems is the training of citizens with a high level of environmental awareness.

The paper tries to indicate a great role of a project approach to the formation of students' competencies in the professional field "Ecology and environmental management". There is a growing body of literature related to the subject. The works by L.V. Bailagasov (Bailagasova et al., 2017), R.V. Golevoy (Goleva, Stepanov, 2016), V.P. Novikov (Novikov, 2016), A.V. Polianskaia (Polianskaia, 2017), E.A. Sankova (Sankova, 2014), V.I. Sturman (Sturman et al., 2013) and others have highlighted key aspects in the field. The analysis of the research literature outlines contradictions that stress the need to improve the process of forming students' competencies in the professional field "Ecology and environmental management". Similarly, there are severe contradictions between modern requirements for the level of environmental professional training of future specialists and their actual training. Likewise, there are inconsistencies between the public need for highly qualified competitive specialists in the field of ecology and the real level of students' ecological culture. There are severe conflicts between the need for a cross-cutting environmental awareness of the educational process and curricula requirements of vocational training. All these

factors considered will contribute to the quality rise of professional environmental education in the Russian Federation.

## 2. Methods

Several methodological techniques have been utilized to form a theoretical and practical basis of the research, i.e. an abstract-logical method, the methods of induction, deduction, analysis, synthesis, and systematization. Different methods have been proposed to substantiate the importance of a project approach to the formation of students' competencies, i.e. statistical, economic and graphical methods. These methods determined the levels and trends in the changing parameters of future environmentalists' competencies. A special evaluative technique described the ranking of students, according to the criterion of investing in human capital.

The information base of the article is the statistical data of government agencies, legislative and regulatory documents describing the project approach to the formation of students' competencies in the professional field "Ecology and environmental management". Of much importance are the results of the research conducted by distinguished scholars (Karaulova et. al., 2017; Mukhlynina et. al., 2018; Vinogradova et. al., 2018).

In the process of research, the authors proceeded from the idea to improve the project approach to competencies of future environmentalists and nature users. The target was the development of methodologies for coordinating activities among the main participants who developed necessary competencies. The authors also provide the rationalization for the formation of environmental culture among students of the professional field "Ecology and environmental management".

## 3. Results

The results of the study indicate that the formation of students' ecological culture requires a scientific approach. The current study has discovered that it is important to describe the components of ecological culture proceeding from own practical work experience. It is interesting to note that the authors found it possible to determine the structure of ecological culture which could be expanded among the students of the professional field "Ecology and environmental management" (Figure 1).



Figure 1. The components of ecological culture among the students of the professional field "Ecology and environmental management"

The closer inspection of the scheme shows that the motivational component, as a rule, contains motives, interests, attitudes that stimulate the creative manifestation of an individual in professional activities. This process implies the need to increase the level of environmental knowledge, as well as the sustainability of interest in solving environmental problems. At the same time, the basis of all students' behavioral incentives stems from their estimated requirements. These requirements and motives usually originate from the objects of the external world, i.e. ideas, feelings, everything that is related to requirements. Without the understanding of nature as a value and an estimated requirement, any activity in relation to it acquires an ordinary-utilitarian character. The present study found that the formation of personal values occurred in those areas of life, in which it asserted itself as a result, providing a positive attitude to the natural environment.

There is much evidence that the understanding that nature is an indispensable source of well-being is possible only if one masters this knowledge. Therefore, the ecological values include several aspects which are as follows: self-awareness and experiencing the unity with nature, a caring attitude to all living things on the planet Earth, a careful and economical attitude to natural resources, active partici

pation in environmental activities. The basis of the formation of students' competencies related to the professional field "Ecology and environmental management" is a combination of environmental education, upbringing, environmental awareness, and practical activities.

At the same time, environmental knowledge significantly influences students' worldview, since it involves the knowledge of nature's processes in their integrity. The essential feature of ecological knowledge is that it does not only reflect the existing environmental conditions but also target future modes, giving a certain orientation to students' actions in the world of natural resources promoting the development of society. The current study found out that the most valuable environmental knowledge was that which could be applied to the decision-making processes regarding nature.

Therefore, several stages can be distinguished which have impact on environmental knowledge regarding the processes of interaction between future specialists and natural environment. The stages are as follows:

- the stage of environmental knowledge imprinting, i.e. the expansion of environmental research, the strengthening of interdisciplinary communication, the projection of nature as the highest value, the application of environmental knowledge into practice;
- the stage of interaction, i.e. the cooperation of ecological knowledge with various spheres of awareness resulting in the understanding of the socio-cultural significance of nature;
- the synthesizing stage, i.e. a qualitative synthesis of common methodologies related to various scientific fields. The current study indicates that there is always a demand for the organic synthesis of knowledge from different subject fields.

There are indications that the main features of environmental knowledge are consistency, awareness, and meaningfulness. Ecological knowledge is complex since the subject of ecology is the interaction of social, technical and natural sciences.

Another important finding is that the basic components of environmental knowledge reflecting important competencies are as follows: up-to-date ideas about the biosphere and its structural units; current knowledge about ecosystems, their biotic structure, genetic types, the principles of classification; the living matter and its role in biosphere processes; the patterns of substances' circulation, energy and information; the three-component system "man-society – biosphere – space". The important components include the main types of anthropogenic impact on environmental elements and their negative consequences; major global, state and regional environmental problems and their

solutions; economic, legislative and regulatory principles of environmental management; the basics of state and regional environmental policy.

Nevertheless, environmental knowledge must be presented as a system, in a certain order, which constitutes the unity of all elements because they are closely interconnected and interdependent. Therefore, a systematic approach in the educational process acts as a specific scientific methodology of cognition. Students should receive a knowledge system, which is the essence of environmentally friendly activities in the natural environment.

What stands out in the research is the fact that the theoretical level of ecological knowledge consists in the assimilation of the essential characteristics, ecological concepts, processes, rules, laws, theories, revealing their connections in all their complexity. The most interesting aspect is the idea that the form of expression of ecological knowledge at the theoretical level is the ability to operate with top-level environmental concepts. At the empirical level, students should observe environmental objects and record research results, experiments, comparisons, contrasts. This activity results in the ability to establish causal relationships between individual phenomena.

In order to determine the level of students' competencies in the professional field "Ecology and environmental management", the authors conducted a special diagnostical study. The diagnostics covered students of the first and second years of the Moscow State Institute of International Relations, Moscow State Regional University, Russian State Social University, Russian State Agrarian University. In total, 315 respondents took part in the survey. The students were asked to give answers to questions related to their level of professional competence.

According to the results of the survey, the authors decided to find out the level of formation of competencies, namely, to determine the level of the motivational, axiological, cognitive, reflexive and operational criteria. Experimental and control groups were created. In the control and experimental groups, the following requirements were observed: the same number of people in the group, the presence of students with different training levels, the stability of the group for the period of the experiment, the ability to carry out systematic observation, a professional guidance from one specially trained expert.

According to the survey, it was found out that the majority of respondents (62%) had a positive attitude towards the formation of competencies, i.e. they were aware of competencies' importance for future professional activities. Alternatively, 35.4% of the students surveyed noted that they had become more responsible in obtaining competencies. However, it is necessary to note that there were some students (2.6%) who were not entirely motivated and meaningful in acquiring competencies. 42% of respondents showed that they



were satisfied with the process of acquiring competencies, but they believed that the use of modern forms and methods of teaching by teachers during classes would contribute to better learning and skills.

Analyzing the students' answers about the desire to participate in environmental activities, of much importance is the fact that most of them gave a positive answer (42%).

Since solving a complex environmental situation is one of the priority measures, the authors believe that one can realize it on condition that both students and all society members understand the importance of environmental issues.

At the same time, the analysis of the questionnaires (see Table 1) allows us to conclude that a significant part of the students preferred innovative educational technologies. This finding highlights the importance of new instructing technologies for boosting professional level among students. Innovative learning technologies are flexible and correlate with the individual capabilities of students. Interestingly, only 12% of respondents noted the importance of traditional learning methods.

Table 1. Training methods that contribute to the formation of students' competencies studying for the professional field "Ecology and environmental management"

No	Studying methods	Total, %
1.	problem tasks, situations	37
2.	game situations	27
3.	traditional methods (lectures, laboratory classes)	12
4.	research work	24

The reliability of the presented approaches stems from the fact that environmental knowledge in its content is interdisciplinary. There is a transformation of ideological and moral guidelines of the world view, and the reorganization of human activities in natural environments. The scheme “knowledge – experiences – skills” transforms into the scheme “attitude to nature – the ability to explore nature – the skills of environmentally conscious behavior” (Kosevich et. al., 2018; Nikazachenko et. al., 2018; Nikiforov et. al., 2018).

Therefore, the volume, the content and the structure of environmental education constitute a single systemic unity, which considers all local features and targets unconditional understanding by each student. Especially important is the understanding of behavioral and moral aspects. Simultaneously, the peculiarities of students' ecological knowledge formation primarily depend on the organization of the educational process, the content of educational material of the disciplines, the use of various organizational forms and teaching methods. The results of the study indicate that in addition to acquiring environmental knowledge, the development of intellectual and practical skills occupies an important place in the formation of competencies. Intellectual skills represent the ability of students to think environmentally using mental analysis, synthesis, abstraction, and scientific forecasting. With the help of intellectual skills, educators can develop research skills. They are useful for making sound environmental decisions. It is interesting to note that practical skills provide an opportunity to environmentally competently assess the state of nature and, if necessary, take measures to protect the components of ecosystems. General skills contribute to improving environmental awareness and the environmental competence of students.

Nevertheless, environmental knowledge stems from a special type of human activity, i.e. environmental activity. This type of activity considers not only the immediate interests of students in the process of forming their goals but also their coordination with the general requirements of maintaining the foundations of a stable biological society. Therefore, the task of environmental education is the formation of attitudes towards environmentally sound behavior, which is associated with the understanding of such environmental needs which are as follows: considering nature as an intransitive value of human community; communicating with nature, enjoying its beauty; the knowledge of nature. At the same time, the path to environmentally literate behavior lies through incentives and motives for taking care of the environment. Environmental protection activities should be formed at all social levels of interaction between man and nature. The levels are as follows: “an individual and nature”; “a small group and nature”; “a large group and nature”; “human society and

nature.”

Of much importance for the students studying for the professional field “Ecology and environmental management” is the willingness to make decisions on environmentally burning activities proceeding from environmental literacy and the awareness of responsibility for people’s own actions towards nature. Environmental responsibility is the awareness of the need to make specific commitments to harmonize relations with the environment and the ability to predict the consequences of one’s own activities. This responsibility combines such categories as responsiveness, care, rationality, expediency, humanism and performs the function of regulating the relationship of the learner with the socio-natural life environment.

Environmental consciousness, above all, is formed by stimulating environmental thinking. The student determines one’s place and role in the natural environment, looking for directions of environmental activities and the ways of their implementation. The categories of ecological thinking include such categories as “us - them”, “useful - harmful”, “conscious - unconscious”, “economical - costly” and others. Therefore, the development of environmental thinking will become more effective if it emerges from modern scientific knowledge and theoretical concepts.

## 5. Conclusion

The present study is significant in at least two major respects. The formation of competencies among the students studying for the professional field “Ecology and environmental management” implies mastering the scientific foundations of rational environmental management. It also implies necessary beliefs and practical skills, a certain orientation and an active life position in the field of environmental protection and improvement, rational use and possible enhancement of natural resources.

At the same time, the obtained competencies are designed to provide the future specialist in ecology and environmental management with scientific knowledge about the relationships between nature and society, to help understand the multifaceted meanings of nature for society and for each person. These competencies help to form an understanding that nature is the primary basis of human existence, and man is a part of nature, to cultivate a conscious and caring attitude towards it, a sense of responsibility for the environment, to develop creative activity regarding effective use, renewal, and environmental protection.

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