Analysis of studying ecological education in Kazakhstan

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Abstract. The article analyzes the materials under study within the framework of teaching natural subjects, such as "Natural Science", "Biology", "Geography", "Chemistry", aimed at environmental education. It was revealed that most of the topics on environmental education are not systematized, that is, some topics such as "Community ecology" are studied before the topics "Population ecology", etc. In addition, some topics such as "The Red Book of the Republic of Kazakhstan" are repeated in the study of different disciplines. It should be noted that the topics have not been coordinated with environmental professionals, this indicates the inclusion of the topic of the law on environmental protection, which currently has no legal force in connection with the use of the "Environmental Code". In order to develop environmental education among the younger generation, it is necessary to include the subject "Ecology" as an independent discipline, in which all topics will be consistently studied in accordance with the levels of organization of all objects of the surrounding world and using this knowledge in practice.

1. Introduction

Environmental education and upbringing is a special, purposeful, organized, systematic, consistent, planned pedagogical process of forming a system of environmental knowledge, skills, attitudes, beliefs, moral qualities, ensures the formation and development of a responsible attitude towards nature as a universal value. Thus, the main goal of environmental education and upbringing is the formation of the environmental culture of schoolchildren.

Modern environmental education and upbringing is designed to directly influence the personality of the future teacher, shaping his spiritual and moral qualities, to prepare students for educational work on environmental education, where state educational institutions and public formations must certainly participate. And in our conditions of increasing requirements for the personality of the future teacher and the quality of training students of pedagogical universities for professional activity, the problem of the formation and development of professionalism of a future teacher in the process of studying at a university acquires special significance. It becomes necessary to develop and prepare the future primary school for the content, forms and methods of professional and pedagogical activity, i.e. ecological culture. The implementation of such formation and training makes it possible to indirectly, indirectly influence the formation of ecological views and beliefs of students, which enhances the pedagogical effect of the first subsystem - the ecological education of future teachers. The essence of this training as a specially organized and consciously carried out activity of teachers and students is the development by future teachers of social and pedagogical experience in environmental education and culture of the
younger generation, the assimilation of relevant knowledge, the formation of skills and abilities on the basis of vigorous activity [1].

2. Research methods

Modernization of environmental education is closely related to social, industrial, interpersonal and family relations and should cover all forms of consciousness - everyday, scientific, moral, philosophical, aesthetic, collective. Some positive experience of modernization of Kazakhstan environmental education available in the high school, where it is mainly carried out also for schetekologizatsii many academic disciplines. In addition, there are two areas of environmental training proper: general (basic) for students of all specialties ("Ecology and sustainable development") and profile (in-depth) for students of environmental, natural-geographical, chemical and biological educational programs. A major drawback of environmental education in the Republic of Kazakhstan is the lack of sections aimed at the formation of a systematic ecological thinking and the ability to model ecological systems. Another major drawback of environmental education is the prevalence of verbal, i.e. verbal, forms of education, while it is vitally important for graduates of educational institutions to acquire skills and know-how in practical work.

Thus, in modern educational institutions of the Republic of Kazakhstan, which play the main role in the educational system, environmental education is developing at an insufficient pace, has a weak material and technical base, is poorly stimulated by state structures, suffers from declarativeness, is not united into a single system, which is connected, on the one hand, with economic difficulties in the country, on the other hand, underestimation of the role of environmental education in the moral, psychological, educational, environmental and economic spheres of the development of society at the present stage [2].

3. Results and discussion

EE and education of schoolchildren in the Republic of Kazakhstan are represented by two subsystems: basic education (at the lessons of biology, geography, etc.) and additional education (DL). Since ecology is not included in the compulsory component of the basic curriculum and is studied in individual schools only in grades 10-11 (1 hour per week), it is difficult to track the results of students' educational achievements [3]. In Kazakhstan, environmental education does not have such a wide use in the courses of school education. In schools of Kazakhstan there is a discipline "Ecology"[4]. Analyzing the practical activity of environmental education, you can meet with the introduction of a number of school review lessons on the protection of nature, optional courses. The study of modern textbooks in such disciplines as "Natural Science", "Biology", "Geography" and "Chemistry" in Kazakhstan shows that environmental issues are not fully disclosed [5]. As you can see from the tables 1-4, environmental topics are included in the course of studying various disciplines, but they are not systematized and it is difficult to compare them with the basics of ecology [6]. In the primary classes in the lessons of "Natural Science" students do not know the concept of society, can not appreciate its changes. In the fourth year of the study of "Natural Science" students should explain the measures of protection of air and water, while not knowing the composition of the atmosphere [7].

Table 1. Aspects of environmental education in grades 1-4 of primary schools in the study of disciplines "Natural Science".

| The 1-st grade | The 2-nd grade | The 3-rd grade | The 4-th grade |
|----------------|----------------|----------------|---------------|
| How to care for plants? | How to save the flora? | How do natural communities change? | How do we protect plants? |
| What do people get from animals? | A variety of different animals | Friend and foe of the plant world | Types of food chains |
| Adaptation of animals | Earth's atmosphere | How do we protect plants? | What animals are endangered? |
| Changes in the habitat of animals | How to protect animals? |
Different states of water sources of natural resources

| Why is the number of animals declining? | How is the air polluted? | How is water polluted? | What can be replaced by minerals? | Is there any harm in mining? |
|----------------------------------------|-------------------------|------------------------|-----------------------------------|-----------------------------|

In grades 5 and 6 (table 2), environmental information is focused on disciplines such as Natural Science and Geography. But even here they do not have certain connections with each other that would make it possible to understand the ecological foundations. In the fifth grade in the course of studying "Natural history" the concepts of ecosystem are given and only in the 6th grade some aspects of the components of the ecosystem are considered. In the course of studying "Geography" in the fifth grade, the concepts of the atmosphere, hydrosphere, minerals, the Red Book and the law on environmental protection are given, and in the 6th grade only on measures to protect water sources [8]. This again indicates the absence of a taxonomy for obtaining environmental knowledge.

**Table 2.** Aspects of ecological education in grades 5-6 of secondary schools in the course of studying the discipline "Natural science" and "Geography".

| The 5-th grade | The 6-th grade |
|----------------|----------------|
| **Natural science** | **Geography** | **Natural science** | **Geography** |
| Ecological system | Material composition of the earth, rocks and minerals | How does mining affect the environment? | Artificial reservoirs, the importance of inland water and its protection |
| Natural and artificial ecosystems | Importance of water for life, properties of water, water protection | What is the relationship between ecosystem components? | |
| Factors affecting the survival of ecosystems | Atmospheric phenomena, their effect on living organisms | Why do ecosystems change? | |
| Changes in natural ecosystems due to human activities | The environment and the place of man in it Natural resources and their efficient use. | How is the exchange of energy within the ecological pyramid? | |
| Environmental issues of Kazakhstan | Reserves, national parks, natural monuments | Are there any inconvenient places to live in our country? | |
| How do we protect nature? | "Red Book" of Kazakhstan | What must we do to keep the planet clean? | |
| Red Book of the Republic of Kazakhstan | Ecology of the environment, nature protection. | | |
| The principle of movement in nature | Environmental Protection Law of the Republic of Kazakhstan | | |

Beginning with the 7th grade basic knowledge about ecology is spread in the courses of "Biology" and "Geography" (table 3). In the 7th grade of "Biology" studies are given the concept of environmental factors, then these topics should be studied before the study of ecosystems, which was previously studied in the 5th grade and again studied in the Red Book of Kazakhstan. In the 8th grade, we return to the components of ecosystems and only then to the population and again environmental factors are considered in the study of adaptation of organisms [8]. However, ecology has its own systematics, which are the first to study the topics that are associated with autecology, that is, those factors that are associated with the organism itself, then a group of organisms or population, then society as a whole, then the ecosystem. In the course of studying "Geography" also lacks systematicity, for example, in the
7th grade they are related to ecology, and in the 8th grade the topics are related to environmental problems of the atmosphere and water, with the protection of living organisms, demographic and other problems. the law on the protection of the environment.

**Table 3.** Aspects of ecological education in grades 7-8 of secondary schools in the course of studying the discipline "Biology" and "Geography".

| The 7-th grade | The 8-th grade |
|----------------|----------------|
| **Biology**    | **Geography**  | **Biology**    | **Geography** |
| Environmental factors | Environmental problems of soil | Components of ecosystems. Aquatic and terrestrial ecosystems. | The negative impact of human activities on the atmosphere |
| Biotic factors, food chains and food networks | Problems associated with the development of natural resources. | Population - its ecological characteristics | Environmental problems of inland waters. Water disasters |
| Ecological succession | Different ways of life of organisms. (K and r survival strategies) | | Protection of flora and fauna |
| The negative impact of modern human activities on the ecosystem | Type of "predator-prey" relationship. Population change. | | Demographic problems |
| Specially protected natural areas of Kazakhstan | Types of direct and indirect interactions of organisms. Adaptation of organisms to changes in environmental conditions. | Economic and environmental assessment of natural resources | |
| Red Book of the Republic of Kazakhstan | The role of man in nature. Rational use of nature. Save the nature. Biodiversity conservation. | The main environmental problems in Kazakhstan (global, national, local) | |
| | Environmental problems of the Republic of Kazakhstan. Causes and consequences. Ways to solve them. | Environmental Protection Law of the Republic of Kazakhstan, "Red Book" of Kazakhstan Specially protected areas, reserves National parks, reserves and others |

Starting from the 9th grade, topics related to ecology are found not only in the study courses "Biology" and "Geography", but also in "Chemistry" (table 4). But even here we note a discrepancy, for example, in Biology, they study minerals, the effects of pesticides, the greenhouse effect, in the course of studying Geography, various environmental problems associated with anthropogenic activities and in the study of chemistry, problems associated with pollution by heavy metals. In the 10th grade in the course of studying "Biology" they again study the biosphere, geographic reliefs and urbanization, in the course of studying "Geography" the principles of rational nature management, global environmental problems, ecological innovation problems, and in the course of studying "Chemistry" the biological roles of various chemical elements. In the 11th grade, in the course of studying "Biology", "Geography" and "Chemistry", the study of anthropogenic pollution must also be systematized as pollutants of the atmosphere, lithosphere and water bodies and, in accordance with this, the consequences that may arise [8].
**Table 4.** Aspects of environmental education in grades 9-11 of secondary school in the course of studying the disciplines "Biology", "Geography" and "Chemistry".

| Biology | Geography | Chemistry |
|---------|-----------|-----------|
| **The 9-th grade** | | |
| Impact of mining on the environment and human health. | Problems associated with the development of mineral resources | Contamination of the environment with heavy metals |
| Effects of pesticides on the environment and human health. | Environmental problems of water resources | |
| Greenhouse effect (greenhouse) and ozone depletion. The impact of rising global oceans, water and atmospheric temperatures on living organisms. | Anthropogenic factors affecting natural complexes; Ways to improve anthropogenic landscapes. | |
| Sustainable development | Problems related to nature management in Kazakhstan | |
| **The 10-th grade** | | |
| The concept of the biosphere, its composition, structure, the concept of the noosphere | Environmental impact assessment of types of nature use | Understanding of radioactive substances, nuclear reactions and their role in the energy potential of Kazakhstan. |
| Problems of protection of geographical crust components of geographical zones and natural zones. | Principles of rational use of nature | The meaning of the periodic law for the development of science, technology and understanding of the chemical picture surrounding the world. |
| Types of settlements and urbanization | Design of environmentally friendly industries | Biological role of metals and nonmetals in the life of living organisms |
| | Pollution of geospheres | Environmental effects of nitrogen oxides, nitrates and phosphates on the environment. |
| | Geoeccological zoning | Biological role of iodine in human life. Measures to protect the health of the people of Kazakhstan from diseases caused by iodine deficiency |
| | Anthropogenic factors in geocology | Contamination of the environment by chemical and metallurgical emissions |
| | Global environmental problems | |
| | Innovative technologies in ecology | |
| | Environmental problems of Kazakhstan | |
| | Geographical aspects of global problems | |
| **The 11-th grade** | | |
| The relationship between biodiversity and ecosystem sustainability. Biodiversity of species Protection of rare and endangered plant and animal species | Types of global problems, their interrelation, the problem of maintaining peace in the world Problems of energy and raw materials | Contamination of the environment with heavy metals. |

Application and effect of plastics on the environment.
Use of various statistical methods to determine the number and distribution of organisms in the local ecosystem

Problems of the world ocean

Global warming: causes, consequences and solutions

The main way to solve global problems is the need for international cooperation of states.

Ecological action of nitrogen oxides and nitrates on the environment.

Ways to solve the problem of reducing the effects of nitrogen compounds on the environment

Problems of environmental protection in the production of metals

12 principles of "Green Chemistry". Pollution of the atmosphere, hydrosphere, lithosphere

The scale of pollution of the atmosphere, hydrosphere and lithosphere

Depletion of the ozone layer of the Earth

Global warming.

Having examined the tables, we can note that there is a need to publish new school textbooks, taking into account the current program requirements - the greening of factual knowledge. All topics that are in one way or another related to environmental education are not considered by professionals with environmental education, for example, there are topics that are not used at the present time, this is a topic that is related to the study of environmental law. Since 2007, all legislative documents have been combined into the "Environmental Code".

4. Conclusion

The absence of the discipline "Ecology or environmental education" in school courses does not allow the improvement of environmental education, therefore it is necessary to introduce this discipline in schools as an independent one [9]. The topics of the discipline "Ecology" should be formed according to the levels of organization of environmental objects, starting from the elementary, that is, the study of the ecology of the organism, groups of organisms or population, the ecology of the community, the biosphere and ecosystem at the initial stages of the educational process. In older grades, it is necessary to focus on anthropogenic impact and ways of solving environmental problems using modern technologies.

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