

CONTENT MODELING THE ENVIRONMENTAL TRAINING OF FUTURE LABOR TRAINING TEACHERS IN UNIVERSITIES

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Abstract. *The purpose of the article is the theoretical substantiation, development of the effectiveness of the organizational and methodological conditions of the environmental training of the future labor training teachers and the formation of their environmental competence.*

The directions of ecological training of future teachers are defined as: formation of ecological consciousness in students, environmentalization of the content of professional disciplines, students' study of ecological education technologies, organization of ecological labor activities of students during lectures, practical classes, ecological projects, exhibitions of artistic products on ecological topics, etc.

The readiness of the future teacher of labor training for the ecological education of students at school is formed under the following conditions: the development of awareness of the role of the teacher in solving environmental problems; familiarization with the purpose, tasks and content of environmental education; forming a valuable attitude towards nature; environmentalization of professional training; organization of artistic nature conservation work. Organizational forms of ecological training of the future teacher of labor training have been developed on the basis of environmentalization of the content and modeling of innovative variable activities of the future teacher of labor training.

Keywords: *environmental competence, forms, model of ecological training, organizational and methodical conditions, teacher of labor training, technologies and methodical methods.*

Introduction

Today, humanity is facing a new path of civilization, when the problem of interaction between man and nature and the impact of the human community on the environment has become global. Ecological behavior of a man in the environment can be seen in the saving of natural resources, protection of animals and plants, in the careful treatment of objects of the man-made world. The decisive condition for such behavior in the environment is ecological consciousness (Kutsenko & Trillenberh, 2014). Education of individuals with ecological thinking and consciousness, formed ecological behavior, focused on the preservation and enrichment of the environment is crucial in solving today's environmental problems (Varkholyk, 2014).

The research is focused on studying the peculiarities of the organization of ecological training and determining the effectiveness of the formation of ecological competencies of the future teacher of labor training in higher education institutions.

The purpose of the work is the theoretical substantiation, development of organizational and methodological conditions of preparation of future teachers of labor training for environmental education of students of general secondary educations and the formation of its environmental competence.

We used a complex of forms and methods of nature protection and artistic and creative research work of students, which included: groups; student scientific community, research ecological expedition; environmental group to clean the territory of the banks of the Pivdennyi Buh River from garbage. In the methodical training of teachers for the ecological education of students, we pay attention to the environmentalization of labor training in secondary schools – conducting classes in ecological centers; organization of ecological trails; the use of natural material for the production of art products; depiction of nature in artistic and creative works; use of mathematical calculations to save materials, determine damage to the environment, etc. The possible and appropriate methods and technologies of environmental education in the labor training classes in secondary schools are the following: the use of problem situations and problem tasks, the introduction of household environmental didactic games, the implementation of environmental projects by students, the conduct of integrated lessons, labor environmental issues labor environmental affairs.

Literature review

The analysis of psychological and pedagogical bases of pupils' formation of responsible, careful attitude to nature testifies that methods and receptions of training and education should be directed on transfer to internal worldview of the person of social ecological landmarks: knowledge, skills, values, principles, rules

of attitude of civilized society to the environment (Chystiakova, 2020). The situation is being corrected by organizing environmental education in the teaching of natural sciences in secondary schools (Honcharuk, 2019) and in extracurricular activities (Pustovit, 2004). Meanwhile, the lessons of labor training in secondary schools mainly study the technology of using natural resources to meet the material needs of man, which is not an effective approach to environmental education of students.

Sociologists claim that environmental values do not yet take their rightful place in the spiritual world of Ukrainians (Kasianova & Demidova, 2012), the current level of awareness of the importance of environmental knowledge remains low, and information about the ecological situation is often perceived inadequately. Society has high hopes for environmental education. This is especially true when it comes to environmental education of future teachers, whose level of preparation for the implementation of environmental education is a key condition for the formation of environmental awareness and culture of secondary school students.

Scientists have established that the level of environmental education of future teachers capable of shaping the ecological culture of Ukrainian citizens (Varkholyk, 2014) is insufficient, and that is why researchers acutely update the problems of environmentalization of the education system (Demidova & Shakhova, 2019).

Problems that complicate the achievement of the goals of environmental education include the insufficient level of professional training of secondary education teachers to educate values and respect for nature and natural resources (Harmata, 2017). Scholars are unanimous that the school faces a major challenge: to help students become active members of society who will understand environmental issues and have the knowledge needed to solve them (Zyl, 2006; Huz, 2011). According to some scholars, it is necessary to increase the ecological and economic knowledge in the content of education, which will help solve environmental and economic problems of implementing the economic mechanism of rationalization of nature (Dushechkina, 2018).

In the practice of modern environmental education there is a focus on the knowledge component. In particular, O. Lazebna emphasizes the need to develop personal characteristics that provide a value attitude to nature (Lazebna, 2004). That is why the formation of environmental awareness among young people should be a complex and systematic process. According to Demydova, Shakhova, environmental education should be interpreted as a continuous process of learning, education, and personal development, aimed at forming scientific and practical knowledge, values, behavior and activities that ensure a responsible attitude to the environment socio-natural environment (Demidova & Shakhova, 2019).

Environmental education, which is carried out by means of traditional and innovative pedagogical technologies: group discussions (Zaporozhan, 2003), cloud trainings (Shymkova et al., 2021), creative integration projects (Hlukhaniuk et al., 2020), etc. is included into the foundations of the formation of an ecologically competent personality. We agree with the opinion of L.Lukianova that «the ecological culture of the future teacher, as the basis of his readiness for ecological education of students, is based on ecological competence and ecological thinking» (Lukianova, 2008).

Based on the results of the analysis of literature sources, we can say that the problem of readiness of labor training teachers for environmental education of students has not yet found its solution in pedagogical research. Thus, the study of the current state of ecological training of future teachers shows its focus on abstract understanding of ecological knowledge of a global nature and limited study of the ecological state of the environment of a region, which does not contribute to conscious learning of environmental knowledge, skills of environmentally friendly activities (Kubitskyi & Vodotyka, 2010). Therefore, we have identified *the following principles of the environmental training of future teachers of labor training*: to navigate the continuous flow of scientific information, design the content and methods of teaching according to the level of psychological development of secondary school students; formation of a humanistic ecological worldview, values of the individual, formed on the basis of knowledge subordinated to universal values; ensuring the scientific design of the content of environmental education related to the modern development of various branches of science, which is manifested in the selection of valuable environmentally-oriented knowledge.

Methodology

In philosophical, socio-ecological, psychological and pedagogical literature, the essence of the concept of ecological consciousness of the individual includes mental state, as well as cognitive, spiritual and practical human activities. In the context of cognitive activity, the content of the future teacher's education should contain not only a certain amount of natural science knowledge aimed at forming a protective attitude to nature, emotional, ecological and aesthetic perception of nature, but also valeological information, basics of social health theory, methods of creating a health-preserving environment of educational space, etc.

The necessity of such an approach is confirmed by the results of a study conducted by us through questionnaires and surveys of secondary school students and teachers, as well as analysis of test tasks performed by secondary school students and students of higher education. The experience of pedagogical higher education institutions shows that the real state of formation of professional readiness of teachers for environmental education of secondary school students,

given all the recent positive developments, lags far behind the needs of pedagogical practice. Many teachers still lack the ability to assess the environment, protect natural environment from pollution and destruction; there is a contradiction between the general recognition of the need for environmental education and insufficient development of this scientific problem as a purposeful process of formation of environmental competencies of future teachers of labor training in the study of professional disciplines on an interdisciplinary basis.

Currently, environmental training is implemented in higher education in two directions: creation of conditions for the formation of environmental competence, which will contribute to overcoming the environmental crisis with the help of technologies (resource-saving technologies and implementation of restrictive measures) and formation of the ecological outlook of the future specialist in an ecocentric direction (a humanitarian way). For the labor training teacher, we offer a third methodical way: content modeling and organization of ecological training of the future labor training teacher on the basis of environmentalization and integration of education.

Research results

We have researched the naturalistic aspect of the individual educational disciplines content of the general and professional training cycles within the structural-logical scheme of teacher's training in higher education. It includes the study by students of technologies of waste-free production, issues of harmful effects on the environment of certain industries, discussion of health hazards posed by certain materials, etc. The study of such issues will contribute to the expansion of environmental knowledge of future teachers, which is part of environmental competence.

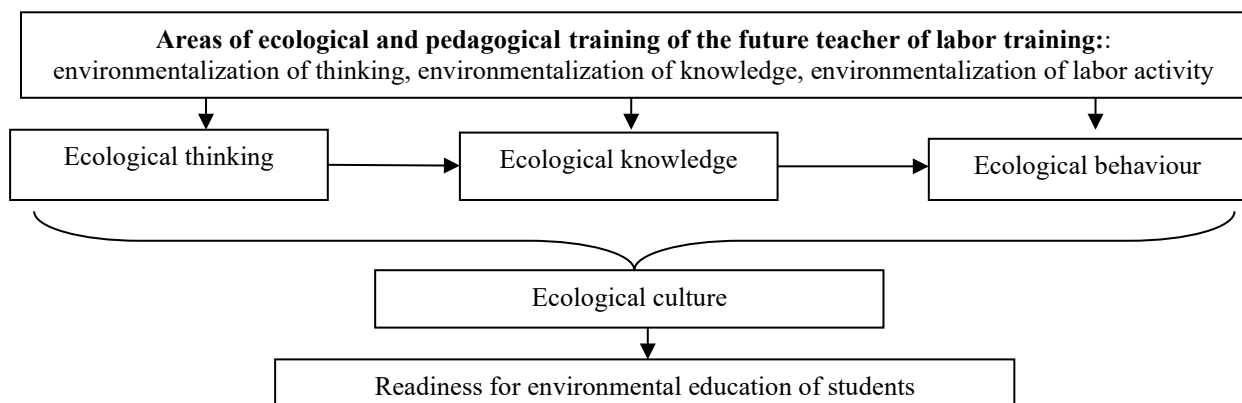


Figure 1 Areas of ecological and pedagogical training of the future teacher of labor training (created by the authors)

We believe that the main goal of the ecological training of a labor training teacher is the development of his ecological culture, which will ensure his readiness for nature conservation, nature protection and ecological-educational activities at school. The areas of ecological and pedagogical training of the future teacher of labor training are indicated in figure 1.

Readiness is an integrated high-quality personal education, the concrete expression of which is the emotional and intellectual characteristics of the individual (Kurliand et al., 2005). That is why we believe that the ecological training of the future teacher of labor training should be phased and integrated (Table 1).

Table 1 Stages of ecological and pedagogical training of the future teacher of labor training (created by the authors)

Stages	Purpose	Task	Forms, methods and technologies
Valuable and motivational	Formation of personal readiness for nature protection and environmental education activities	<ul style="list-style-type: none"> • emotional perception of the world; • education of a respectful attitude towards nature, motives of environmental protection behavior; • formation of interest in ecological and pedagogical activities 	Conducting educational classes, excursions, competitions on environmental topics; environmentalization of technological workshops
Educational and training	Targeted preparation for environmentalization of labor training lessons	<ul style="list-style-type: none"> • actualization of knowledge about the world, about the relationships between its objects, about the influence of man on nature; • disclosure of the essence, meaning and features of environmental education; • formation of knowledge about the essence of environmental culture of students 	Consideration of environmental problems in teaching professional disciplines; solving environmental problems and practical situations, independent processing of literature on the problems of environmental ecology and environmental education
Practically creative	Practical implementation of ecological knowledge, development of skills to carry out nature conservation, nature protection, ecological-artistic and ecological-educational activities	<ul style="list-style-type: none"> • implementation of environmental projects; • formulation and implementation of environmental and labor tasks; • structuring of integrated educational material with ecological content 	Application of the "project method", cooperation technology, implementation of scientific research and creative works on ecological topics, environmentalization of the pedagogical environment

I. Pavlenko recommends to follow such pedagogical conditions in the formation of the environmental culture of students of higher education institutions as implementation of a multidisciplinary approach, environmentalization of most

educational disciplines; organization of students' direct perception of natural objects; implementation at the moral and ethical level of immersion in the world of nature, experiencing its artistic image; the use of works of art as a means of aesthetic dialogue with objects of nature (Pavlenko, 2008).

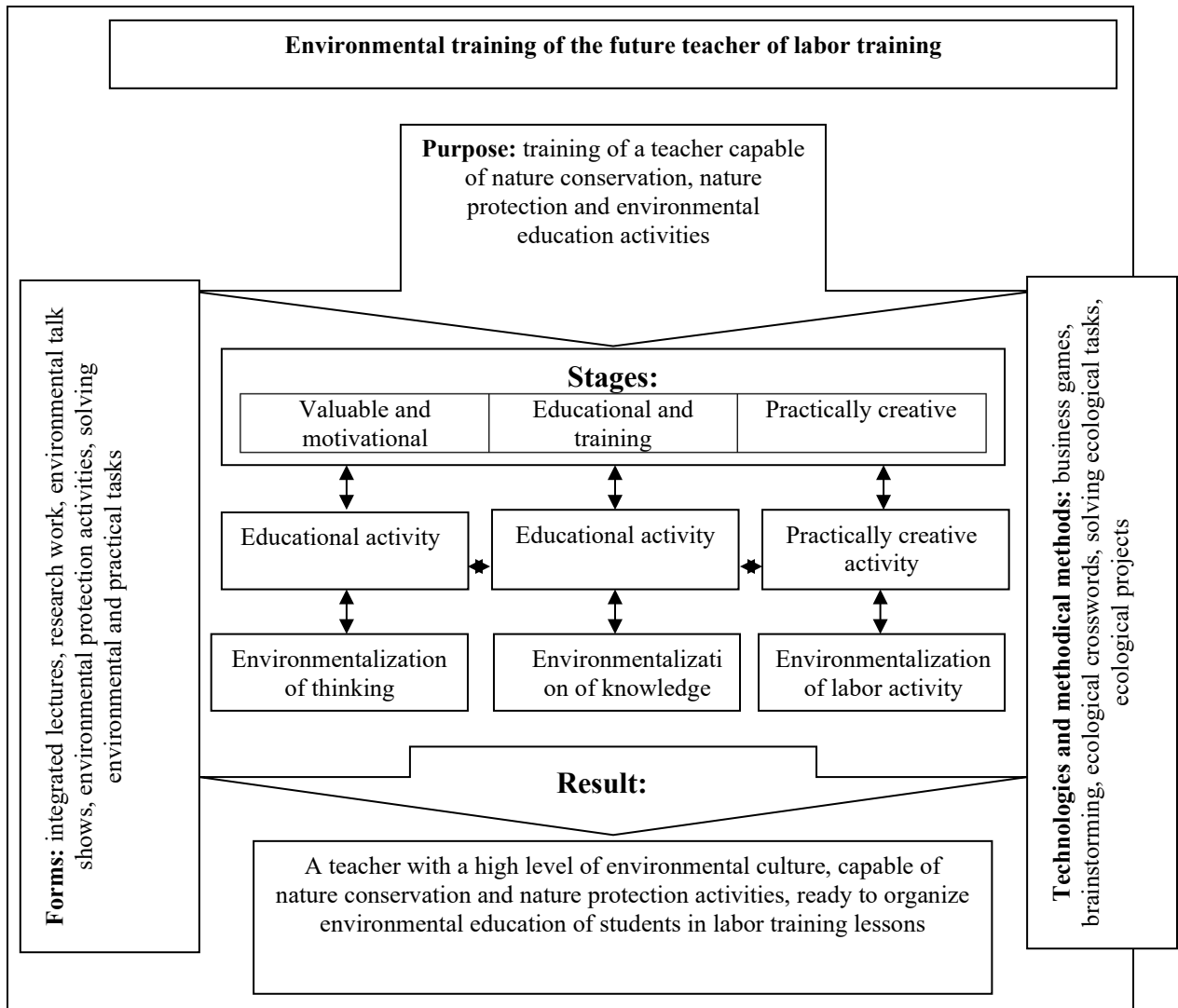


Figure 2 Model of environmental training of the future teacher of labor training (created by the authors)

The ecological culture of a labor training teacher is characterized by the possession of technical, scientific and economic competences and an aesthetic attitude to nature, the development of the emotional and sensory sphere, the cultivation of aesthetic needs and interests, and manifestations of creative activity. We consider the ecological training of the future labor training teacher through the formation of a system of ecological competences of rational nature use, nature conservation and ecological-educational activities and readiness for optimal interaction with nature, for effective ecological education of students of secondary

schools, for ecological education of the population through assimilation by students environmental knowledge, methods of activity, the formation of relevant beliefs, the need to actively participate in the process of educational, scientific activities related to environmental topics.

Taking into account all of the above, we offer a model of environmental training of a future teacher, which is presented in figure 2.

Future teachers of labor training, due to the environmentalization of educational material from professional disciplines, come to the conclusion that the following measures can be a way out of the environmental crisis: the use of environmentally friendly technologies; rational use of natural resources; creation of waste-free productions with a closed cycle; construction of efficient wastewater treatment facilities at all enterprises.

The forms of organization of ecological training of the future labor training teacher are lectures, practical classes, ecological projects, ecological holidays, games-competitions, excursions, expeditions, expositions, landings, ecological clubs, etc. The development of value orientations is facilitated by the participation of students in exhibitions of art products on ecological topics, etc. In classes on artistic and creative disciplines, students use natural materials provided by the program in combination with non-traditional ones. By comparing and examining their properties and qualities, future teachers are interested and creative in performing the proposed tasks, which significantly increases the effectiveness and productivity of classes. Examples of artistic and creative projects of students with ecological content (use of natural materials, secondary raw materials, etc.) are shown in figure 3.

In our opinion, the readiness of the future labor training teacher for ecological education can be ensured by observing the following *organizational and pedagogical conditions*: the development of deep awareness of the role of the labor training teacher in resolving contradictions in the relationship between nature and man; familiarization with the purpose, tasks and content of environmental education and upbringing; formation of a value-motivational attitude towards nature; combination of theoretical and practical training in professional disciplines with issues related to solving environmental problems; organization of labor and artistic and creative practical activities of an ecological direction.

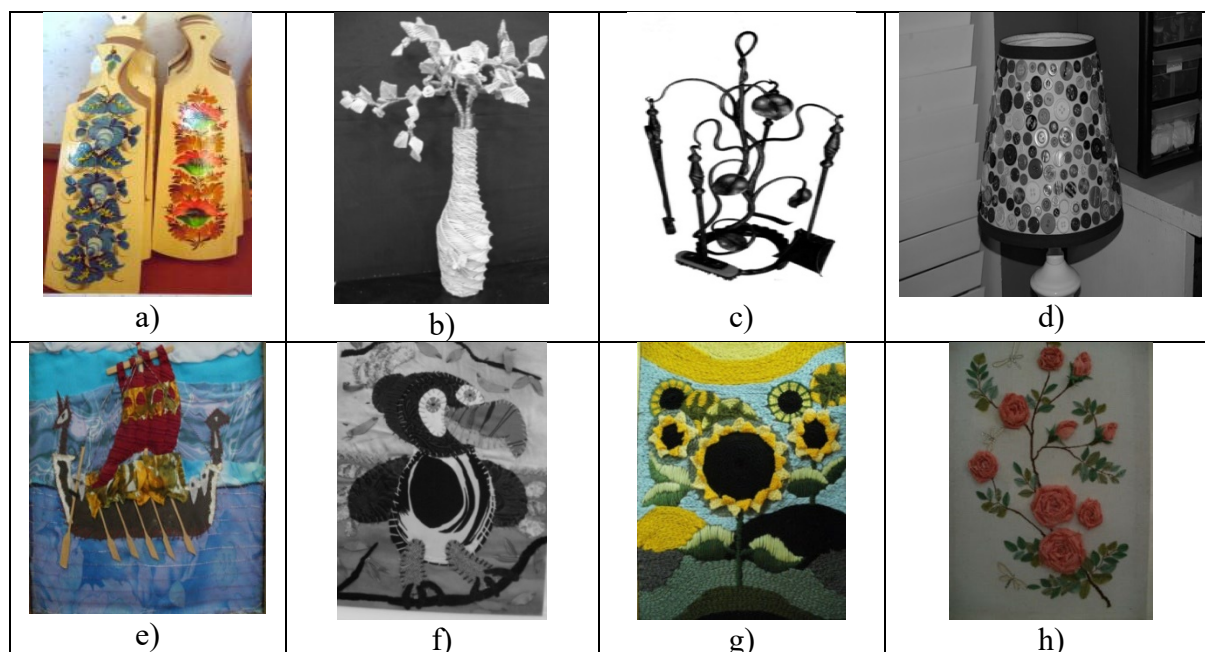


Figure 3 Photos of products from ecological artistic and creative activities of future teachers of labor training: a – made of wood; b – made of straw; c – made of metal; d – decorated with buttons; e,f – a panel made of pieces of fabric; g – knitted panel; h – panel made of paper (student works were performed under the guidance of Vitalii Hlukhaniuk)

We define the following as general indicators of the ecological culture of the labor training teacher: interest in nature; general educational and special ecological knowledge about nature, relationships in nature, human actions on nature; positive activity and behavior in nature; knowledge of safety rules and behavior of students in the environment; awareness of the purpose and tasks of environmental education of students; possession of knowledge about the psychological features of the formation of the ecological culture of the student of the secondary school; mastery of technologies, methods of planning and management of the ecological and educational process. The system of criteria and indicators of the ecological culture of the labor training teacher is given in the table 2.

Table 2 Criteria and indicators of ecological culture of the labor training teacher (created by the authors)

Criteria	Indicators	
Valuable and motivational	V1	awareness of the value of nature
	V2	awareness of responsibility for nature conservation
	V3	understanding the need to preserve the ecological environment for future generations
	V4	feeling the need for environmental protection activities
	V5	the ability to admire the beauty of nature
	V6	desire to communicate with nature
	V7	awareness of the importance of environmental education of students
	V8	desire to engage in environmental education of students;

	V9	understanding the need for nature-based work
	V10	desire to organize students' environmental protection activities
Cognitive	C1	understanding the essence of the nature of human transformative activity
	C2	knowledge about the harmful effects of production on nature
	C3	knowledge about environmental problems of the region, the country, and the world
	C4	environmental protection skills
	C5	mastering the technologies of the ecological educational process
	C6	knowledge of recycling technologies in various industries
	C7	knowledge of the properties of household waste
	C8	knowledge about the harmfulness of household chemicals for health
	C9	knowledge about the harmfulness of chemical fertilizers
	C10	knowledge about alternative types of energy, technologies, fertilizers
Practical	P1	the ability to predict the consequences of one's own actions and activities
	P2	the ability to harmonize relations with the environment
	P3	the presence of econormative behavior in everyday life
	P4	presence of econormative behavior in leisure time
	P5	skills and experience in solving local environmental problems
	P6	participation in propaganda and ecological educational activities
	P7	the ability to organize environmental protection measures
	P8	involvement in artistic and creative works on environmental topics
	P9	the ability to make products from natural material
	P10	the ability to use household waste in artistic and creative activities

Teachers of professional disciplines participated in the assessment of indicators using a 5-point system, as well as mentors of student groups who observed the behavior of students in the environment, conducted collective discussions of environmental problems, and individual conversations with students. The criteria for evaluating students' progress in the study were: the degree of formation of environmental and pedagogical competencies, the degree of independence and competence in the process of performing practical actions, creativity and originality, quality and flexibility in the performance of various tasks.

Conclusions and discussion

The study of the content of the educational and professional programs for the training of future teachers of labor training, the best experience of pedagogical higher education institutions of Ukraine, the personal long-term pedagogical experience of the researchers made it possible to identify the peculiarities of ecological training of future specialists in the teaching of professional disciplines based on a systemic approach: from the formation of an ecological worldview through the transformation of the content component and the application of modern pedagogical technologies for the development of students of high and sufficient levels of environmental culture and the formation of the readiness of future teachers to carry out environmental education of students of secondary schools during labor training.

The following were chosen as the main areas of training of future teachers of labor training for the environmental education of students of secondary schools:

formation of environmental awareness in students, environmentalization of the content of professional disciplines, students' study of environmental education technologies, organization of environmental and labor activities of students.

Future teachers of labor training will learn about the peculiarities of human economic activity during the study of professional disciplines, in the content of which ecological aspects are not sufficiently expressed. Therefore, it was decided to maximally ecologize the content of professional disciplines, which contributed to the formation of an ecological worldview and the development of environmentally sound labor activity skills.

In classes on professional disciplines, the main attention was paid to physical processes determined by nature itself, and the influence of technical achievements on these processes. The study of ecological aspects of production ensured students' assimilation of knowledge of technologies capable of both destroying and preserving the environment. During the teaching of psychological and pedagogical disciplines, the students studied the technologies of environmental education. Artistic and creative works were aimed at cultivating not only aesthetic taste, but also love for nature.

Summarizing the results of the study allows us to find out that the environmentalization of professional disciplines provides: a systematic construction of the entire educational process with regard to environmental problems; generalization and systematization of the content of professional disciplines, optimal combination of essential characteristics of human activity and its impact on nature; the relationship between theoretical and industrial training and the problems of the surrounding world; formation of a holistic system of knowledge and ecological outlook, education of responsibility for one's own activity or inaction; formation of students' ecological outlook and development of general ecological culture; familiarization with the main production technologies from the point of view of their impact on the environment; formation of a holistic system of environmental knowledge; acquiring the skills of researching environmental situations, carrying out the necessary measurements and calculations; development of practical skills in solving environmental problems.

Summary

The main practical result of the professional training of the future labor training teacher for environmental education of pupils is the readiness of students to carry out this activity. The criteria that make it possible to judge the readiness of a future teacher to organize labor activities taking into account the environmental education of students of the secondary school are: motivational (desire to engage in environmental education of students and the organization of environmental protection activities); axiological (awareness of the importance of environmental education of students, understanding of the value

of nature and the need to preserve it); cognitive (availability of ecological knowledge, nature conservation skills, mastery of technologies of the ecological and educational process); organizational and procedural (organization of environmental protection measures, environmental education and ecological educational activities).

Our research does not exhaust the entire scope of this problem, it touches only one of the areas of solving the problem of ecological training of the future teacher. We assume that the following directions of work may relate to the in-depth development of individual components of the training of future teachers of labor training for the ecological education of secondary school students by means of interdisciplinary extracurricular activities, the specification of various components of the professional training of future teachers for environmental and educational activities. The flexible modernization of the pedagogical technology of ecological training of teachers of labor training under the conditions of destructive ecological consequences and deterioration of the environment of Ukraine caused by the Russian military aggression in 2022-2023, which is directed against people, nature, material production and cultural heritage of Ukraine, is acutely relevant today.

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