

DOI <https://doi.org/10.30525/2592-8813-2023-1-12>

## THE WAYS OF THE FUTURE PRIMARY SCHOOL TEACHERS' ECOLOGICAL COMPETENCE FORMATION

**Viktoriia Koval,**

*Ph.D. in Biology, Associate Professor,  
Associate Professor at the Department of Preschool and Primary Education,  
T. H. Shevchenko National University "Chernihiv Colehium" (Chernihiv, Ukraine)  
ORCID ID: 0000-0003-0550-8631  
kovalchernigov@gmail.com*

**Oksana Kysla,**

*Ph.D. in Pedagogy, Associate Professor,  
Associate Professor at the Department of Preschool and Primary Education,  
T. H. Shevchenko National University "Chernihiv Colehium" (Chernihiv, Ukraine)  
ORCID ID: 0000-0002-6267-6693  
Oshagro@ukr.net*

**Iryna Mirosnyk,**

*Ph.D. in Pedagogy, Associate Professor,  
Head of the Department of Languages and Teaching Methods,  
T. H. Shevchenko National University "Chernihiv Colehium" (Chernihiv, Ukraine)  
ORCID ID: 0000-0001-7600-1112  
iv\_mirosnyk@ukr.net*

**Abstract.** The article reveals the ways of the future primary school teachers' ecological competence formation. The theoretical analysis of the normative documents of Ukraine, psychological, pedagogical and methodological literature, the curricula for primary school and curricula for the primary school teachers' training revealed the main directions of a complex approach to the ecological competence formation. Much attention in the article is focused on the methodological aspect of the future teachers' training in the process of teaching such disciplines as "Ecology" and "Educational Practice (Field)". It is shown that in the process of the teacher's ecological competence formation it is necessary to use traditional and non-traditional forms of conducting classes – binary and integrated lectures, trainings, excursions, to involve students in ecological actions and nature conservation activities. The survey revealed that the use of such methodological approaches not only forms the future primary school teacher's ecological competence, but also promotes his professional self-development and growth.

**Key words:** ecological competence, future primary school teachers, the academic course of "Ecology", ways of formation, methodological aspect.

**Introduction.** The contemporary human habitat has recently been trying the humanity's strength – climate changes (melting glaciers, increasing the area of deserts, hurricanes, floods, fires), the spread of epidemics (bird flu, Ebola fever, coronavirus COVID-19); the consequences of the military actions related to the russian invasion of Ukraine; accelerated absorption of resources and accumulation of waste. The cause of the ecological unhappiness of people and, accordingly, the growth of the ecological crisis is the human being himself, who is focused on the immediate result in his strivings after well-being and is not able to think globally, see the long-term prospects and consequences of his actions in care of nature. The destruction of nature is so rapid that it is witnessed by the people of one generation. The violation of the ecological balance in the biosphere is becoming a leading factor not only in the deterioration of human health, but also in the destruction of national economy. Therefore,

the problem of renovation of the content of higher education, both in Ukraine and around the world, in the context of global problems caused by the environmental degradation, the crisis in the relations between the human being and nature, the application of knowledge in life while solving the environmental problems concerning increasing the level of the environmental safety of the modern society.

The environmental education of youth is among the priority directions of educating the modern generation. The foundations of ecological thinking, scientific worldview, ecological culture, responsibility for one's own deeds are laid in childhood. "School education serves as a basis for the development of the individual, provides the individual's maximum development of his intellectual abilities and the formation of his universal qualities, especially the spiritual development of the individual, who leads the ecological lifestyle" (Sichko, 2013: 205).

In addition, "the actuality of the environmental education is caused by a number of factors:

- the need to increase citizens' environmental culture;
- the need to constantly preserve and improve the human living conditions on the planet;
- the need to solve the actual problems related to the reduction of the living space per person;
- the need to preserve, restore and rational use of the natural resources;
- the low level of human perception of the environmental problems as personally significant;
- insufficiently developed skills and abilities of the practical participation in nature conservation activities" (Lokshyna, 1999).

The key role in upbringing the younger generation is played by a primary school teacher, so the future teachers' professional training, their environmental education, culture, readiness to work with children and, after all, environmental competence is an important component of the modern teacher training. The low level of students' ecological consciousness and culture, due to the children's age and psychological characteristics, makes certain requirements to the teachers' professional training, the system of which would meet the requirements of the modern school, society and ensure the formation and development of a harmonious personality with a high level of the ecological consciousness.

Therefore, the purpose of the article is to reveal the ways of the future primary school teachers' ecological competence formation (methodological aspect).

**Materials and methods.** To achieve the goal of the study a set of methods was used: the theoretical analysis of the normative documents of Ukraine, psychological, pedagogical and methodological literature, curricula for primary school and curricula for primary school teachers' training in order to determine the state and prospects of the problem; questionnaires and observations – to determine the level of the future primary school teachers' ecological training. The study was conducted at the Faculty of Preschool and Primary Education and Arts, "Primary Education" specialty at T.H. Shevchenko National University "Chernihiv Colehium". In order to check the level of the future primary school teachers' ecological competence formation, a questionnaire of the fourth-year students was organized after studying the course of "Ecology" and the main disciplines of the natural and mathematical and general pedagogical cycles. 41 students of the full-time department and 23 students of the part-time department aged 18 to 24 took part in the survey.

**The results and discussion.** The National Strategy for the Development of Education in Ukraine for 2012-2021 states that the content and organization of modern education are insufficiently oriented on the young people's vital competences formation, their active socialization. Under the conditions of modernization of education and the threat of the ecological crisis, the young people's ecological competence formation, which is a component of the life competence, is especially important (Pro Natsionalnu..., 2013). At the same time, the State Standard of Primary Education (2018) identifies 11 key competences. Among them there is the ecological competence, which includes the awareness of the principles of the ecological management, following the rules of the environmental behavior, economical use of natural resources, understanding the importance of nature conservation for sustainable development of the society (Derzhavnyi standart...).

Consequently, the citizens' ecological competence formation is one of the most important tasks of the sustainable development education. The ecological competence gives a modern person the opportunity to responsibly solve life situations, subordinating the meeting of his needs to the principles of sustainable development (Pustovit, 2008).

There are several approaches to the ecological competence formation, the most commonly used are complex and activity. A complex approach to the conditions for the ecological competence formation proposed by Yu.P. Shapran includes:

- ensuring a holistic system of influence on students throughout the study period;
- special ecological disciplines and courses, which are harmoniously combined with the worldview orientation and greening of all spheres of the university life and activity;
- the interaction of a lecturer and a student, students with each other, the productive discussion of the environmental issues, which teaches to think and act independently (Shapran, 2012).

“High results in the students' acquisition of the environmental competences can be achieved by actively involving various teaching methods in the educational processes and implementing various educational models and projects in the process of studying biological and ecological subjects” (Yakub, 2022: 241). In addition, one more way is filling the disciplines with the ecological content, which ensures the integration and continuity of the ecological education.

The analysis of the curricula and programs on training the bachelors of the “Primary Education” specialty of some universities of Ukraine (T.H. Shevchenko National University “Chernihiv Colehium”, L. Ukrainka Eastern European National University, B. Hrinchenko Kyiv University, National Pedagogical Dragomanov University) revealed that the future teacher's ecological competence formation mainly occurred in the process of teaching the disciplines of the natural and mathematical bias, such as: “Bases of Natural Science”, “Ecology”, “Educational Practice (Field)”. Certain methodological aspects are considered during teaching the general scientific and pedagogical disciplines such as: “Philosophy”, “History of pedagogy”, “Bases of Pedagogy”, “Didactics”, “Theory and Methods of Upbringing”, “Teaching Methods of the “Natural Science” Branch of Learning”. But such the disciplines as “Ecology” and “Educational Practice (Field)” have the greatest potential for the future teachers' ecological competence formation. Let's consider the peculiarities of the teachers' ecological competence formation in detail.

The purpose of the course of “Ecology” is to form the future primary school teachers' ecological competence, acquaint them with the global ecological crisis, which is connected with the negative consequences of the scientific and technical revolution, the formation of organizational skills for the pupils' ecological education, teaching them to love nature, carefully treat it, rationally use its resources.

The main tasks of studying the “Ecology” discipline are:

- the worldview knowledge formation about the main trends of interaction between the society and nature at the present stage, the interdependence of economy and ecology;
- revealing the bases of nature management, the formation of knowledge about the traditions of nature management in different regions of the world, the main principles of the international sustainable development strategy;
- teaching understanding of modern ecological problems, awareness of their importance, urgency and universality;
- bringing up a sense of responsibility for the environment, awareness of the man's place in nature, the need to adhere to the nature conservation legislation;
- the development of the personal responsibility for the state of the environment at the local, regional level, the ability to predict the personal activity and the activity of others;
- the development of the system of intellectual and practical skills, emotional experiences in relation to the study, assessment and preservation of the native land nature and one's own health;

– future teachers’ mastering the technologies and methods of primary school pupils’ ecological education.

As a result of studying the discipline a student must know:

- the subject, tasks, meaning of the course of “Ecology”;
- the main causes of the global environmental crisis;
- the causes of the “demographic explosion” in the world and demographic problems in Ukraine;
- the main environmental problems of the hydrosphere, lithosphere, atmosphere, the main measures to protect them from pollution;
- the basic laws and statutes in the field of the environmental protection;
- the main types of the environmental pollution and ways of getting them into the environment;
- the impact of abiotic, biotic, anthropogenic factors on a human being;
- the main environmental problems of Ukraine;
- the need for rational use and protection of resources;
- the main environmental factors and their role in the life of organisms.

After studying the course of “Ecology”, future teachers must acquire the skills:

- to use the knowledge on the course of “Ecology” to form the young learners’ ecological worldview;
- to use basic scientific and natural and humanitarian knowledge, which is necessary to form the ecological worldview, ecological culture and ecological thinking;
- to conduct observations in nature, to determine the main ecological problems of the region;
- to assess the impact of biotic and abiotic factors on the functioning of the biosphere;
- to be able to analyze ecological maps;
- to use the knowledge of ecology to organize young learners’ work on nature conservation.

We analyzed the State Standard of General Primary Education (Derzhavnyi standart...), Standard educational programs of primary education (Typova osvitalia..., Typovi osvitalia...) and school textbooks “I Explore the World” (Bibik, 2020, Hilberh, 2019, Hrushchynska, 2018), which implements the ecological component of the natural educational branch, in order to identify the topics of the school curriculum that need to be focused on by future teachers. The most important topics of the “Ecology” discipline in the primary school teachers’ professional training are identified:

1. Within the topic “Geoecology” to acquaint students with global ecological problems of the present time, the reasons for their emergence and prospects for their solution.

2. Concerning the topic “Bioecology” it should be noted that it is mostly revealed in the school year, especially in the 2nd grade (it is the adaptation of organisms to the environmental conditions). It is well known that the basis of the ecological knowledge is the study of natural connections, patterns of living systems’ development, the interdependence between objects and phenomena of nature. Therefore, the problems of “Adaptation of plants and animals to different living conditions”, “Life forms of organisms”, “Types of connections in biocenoses”, “Food chains”, which are examined in lectures and practical classes, are the most important in this topic.

3. The topic “Nature Conservation” is of great importance for the future primary school teachers’ training. It is a comprehensive topic of the school subject “I Explore the World”. Students must master the basic terminology, know the difference between “the reserve” and “the National Park”; get acquainted with general measures aiming at the preservation of the geographical covers and biological diversity; get acquainted with the plants and animals recorded in the Red Book.

4. One of the most important issues of the course of “Ecology” is “Primary school children’s ecological education”. Considering various methods and technologies of pupils’ ecological education, it is necessary to focus students’ attention on the research method, activating the pupils’ cognitive interest, stimulating their motivation; working out creative tasks, ecological actions and projects for primary school pupils.

5. An actual topic for students is “Human Ecology”. In this topic it is necessary to concentrate the attention on the factors forming the children’s health, and especially on their lifestyle, which includes: proper nutrition, adherence to the conditions of work and rest, diseases and bad habits prevention; separately determine the safety of children at school, in relation to the impact of the anthropogenic factors on a young learner and its consequences.

6. Another important point of teaching the “Ecology” discipline is to introduce information based on the local region material. The same principle is specific in teaching the school subject “I Explore the World”, it stipulates a systematic study of the pupil’s region: nature, culture and traditions of the people in the place where the child lives. The effectiveness of the local region material use at the lessons in primary school largely depends on the teacher’s knowledge and ability to use it. It should be emphasized that this principle should be implemented in all topics of the course of “Ecology” (Koval, 2017: 375-376).

Regarding the organization of the classes in the “Ecology” discipline, traditionally in the learning process an important role is played by lectures and practical classes, which contribute to the professional development of the future specialist. In addition, students get acquainted with the content of school education, which “includes didactically defined four components, without which it is impossible to form ecological competence:

- 1) the system of knowledge about nature, society, a human being, etc.;
- 2) the experience in implementing already known in the society ways of activity;
- 3) the experience of the creative activity, which can provide readiness to find solutions to new problems, creative transformation of the reality;
- 4) the experience of the emotional and valuable attitude to the world” (Savchenko, 2012).

The non-traditional classes which we use in our work include binary and integrated lectures. The combination of topics of different disciplines, such as “Ecology” and “Mathematics”, “Ecology” and “Theory of Upbringing” or “Teaching Methods of Natural Educational Branch” helps future teachers to understand the ecological component better; contributes to the deepening of students’ ecological and natural knowledge, and allows them to orient freely in a causal connection and provides a practical acquisition of certain professional skills. At the same time, the involvement of two or three teachers in such classes leads to a deeper mastering of special (pedagogical and methodological) knowledge on an interdisciplinary basis and contributes to the activation of students’ cognitive interest.

A considerable attention is paid to the organization of the individual and group tasks of the ecological bias for the students’ independent work. The tasks are of the creative and reproductive or creative (productive) nature, contribute to a more effective way of organizing the learning process. Students create various educational and methodological projects, courses of the lessons, educational hours, make their own didactic games, crossword puzzles, select riddles, fairy tales of the ecological bias for schoolchildren to be used at the lessons (Fig. 1). Future teachers present their creative projects first to their classmates, and then the best ones are implemented in schools in practice.

Conducting practical classes using a variety of technologies in the form of trainings allows to offer students the tasks of various complexity and direct them to developing their professional skills such as independence, the ability to express their opinions, work in a team, the ability to analyze information and think critically.

At the same time, the use of the ecological trainings is an innovative form of the socio-pedagogical work (Koval, 2022: 74). They combine a variety of interactive methods and forms of teaching students – mini-lectures, brainstorming, group discussions, modelling the situation, games, presentations, analysis of situational tasks. The ecological trainings increase interest, in general, to the learning process; ensure the consolidation of the information on the environmental problems and ways of solving them; contribute to the development of the global ecological thinking, and develop organizational and methodological skills of work with children. Besides, the state documents in accordance



**Fig. 1. Students' creative works on ecology: A. Didactic game "Merry seeds"; B. Educational and methodical manuals for the students of ecological and natural bias; C. Appendix to the project "What is Ukraine famous for?"**

with the concept of the New Ukrainian School states that to form the pupils' ecological competence it is necessary to use new teaching technologies that help increase pupils' motivation. Therefore, their implementation into the future teachers' learning process is appropriate.

Among the non-traditional classes of the course of "Ecology" there is an excursion to the regional landscape park "Yalivshchyna" to the agrobiostation of the T.H. Shevchenko National University "Chernihiv Colehium". During the excursion, students get acquainted with the collection of the collected, imported from different parts of Ukraine and the world plants (ornamental, evergreen, medicinal, rare, introduced and the plants of industrial importance). Future teachers study the plants recorded in the Red Book, learn to create ecological trails and conduct excursions with young learners.

"Educational Practice (Field)" plays an important role in the future primary school teacher's ecological competence formation. This discipline helps to carry out the following tasks of the ecological content:

- deepening and broadening the students' knowledge obtained in the process of studying theoretical courses, the creative use of this knowledge in practice;
- training students for the organization of the excursions to the nature, formation of skills of doing regional studies work, management of youth circles;
- educating students to care for the nature of their native place and introducing the ways and methods of the environmental protection;
- understanding the aesthetic value of nature.

"Educational Practice (Field)" gives the opportunity to reveal the parts of "Ecology" more detailed (Fig. 2).

The educational topics of "Educational Practice (Field)" include the following parts of the ecological knowledge (Fig. 3).

New knowledge should help a future primary school teacher to acquire the following skills and abilities of the ecological content:

- to observe and study plants and animals in natural conditions in accordance with the goal;

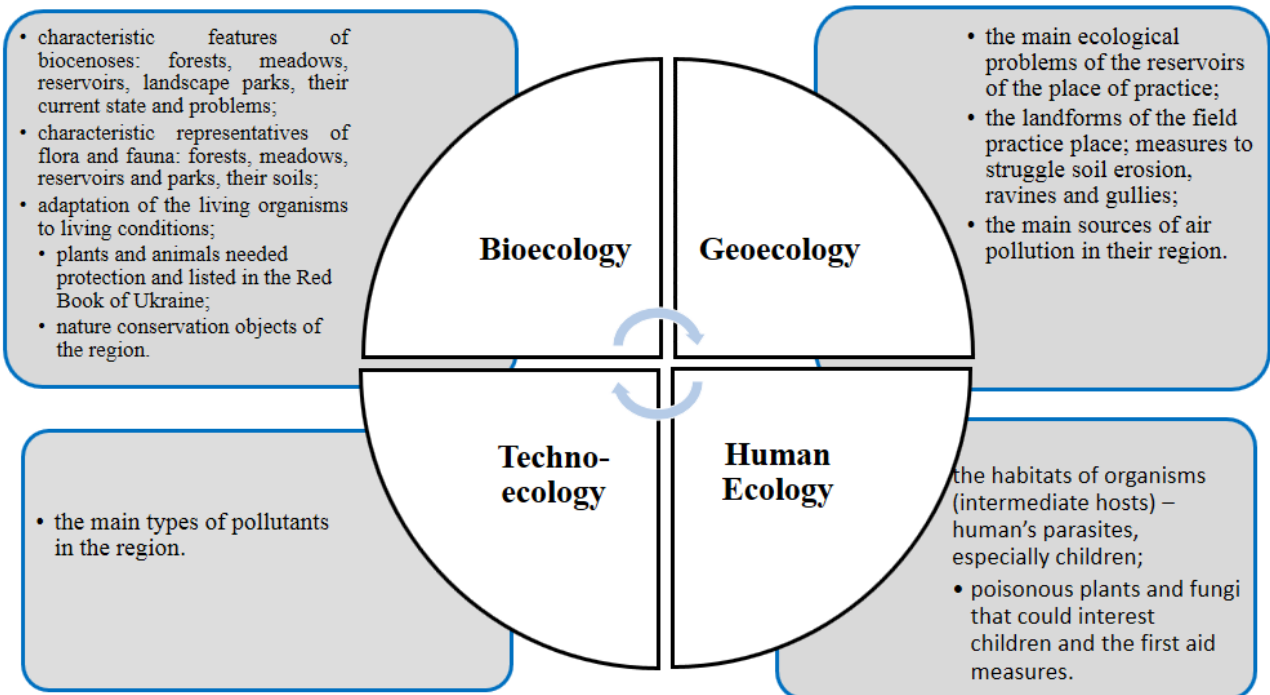


Fig. 2. Integration of the “Ecology” and “Educational Practice (Field)” subjects

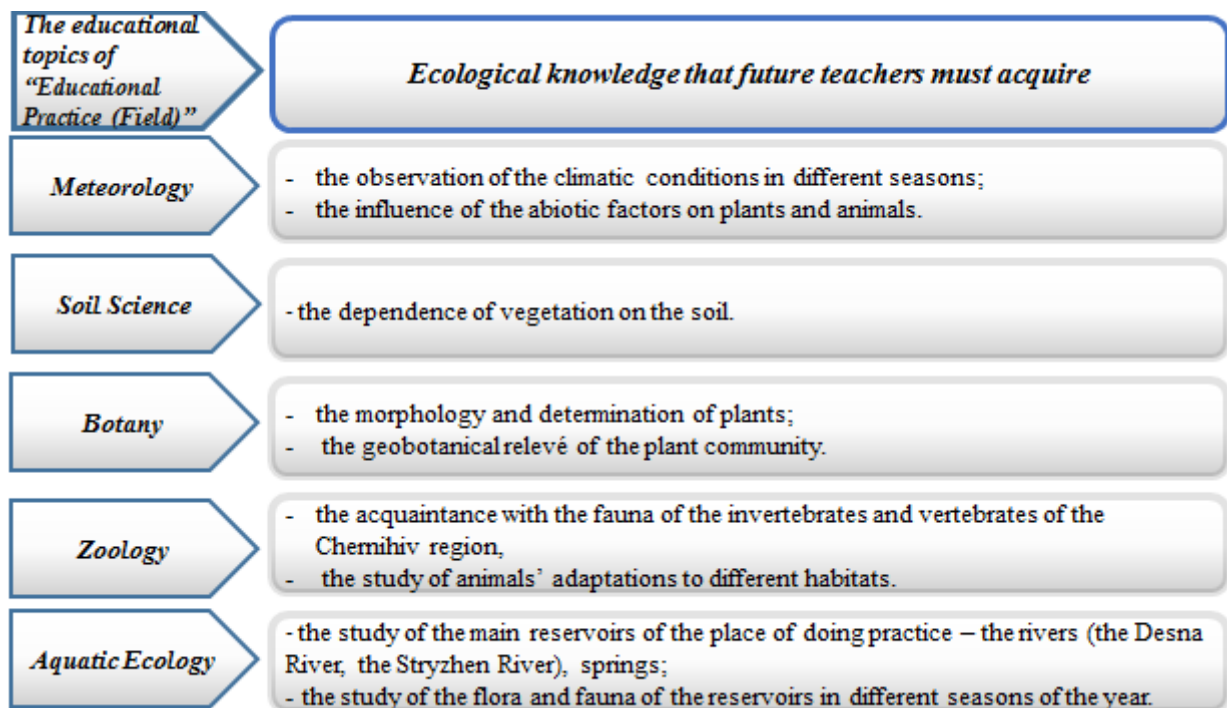


Fig. 3. Educational topics of “Educational Practice (Field)”, which include the ecological knowledge

- to follow the rules of communication with plants and animals and the rules of personal safety;
- to observe the weather and forecast it for the day, month, season, using signs;
- to determine natural and territorial complexes by the nature of vegetation and relief;
- to monitor the condition of the place of practice;

- to define the objects of the organic and inorganic nature that need protection;
- to treat natural objects with care, without damaging them during the observation.

One of the directions of the comprehensive approach to the ecological competence formation and ensuring a holistic system of influence on future teachers throughout the period of studying at the university is to involve students in non-traditional forms of work. Students-volunteers, for several years in a row, actively participate in the ecological city events: “Life in the ECO-style”, “The Desna Day”, “Scientific Picnics”, cleaning the town territories (Fig. 4). Within the framework of the projects, students together with the lecturers made and conducted the ecological master classes for children: the motanka doll “The amulet with your own hands”; the origami “The Red Book of Ukraine”; ecological experiments; the aqua make-up “The favourite animal”.

Involving students in these actions primarily promotes the popularization of the ecological knowledge among the population (bringing up children), drawing the attention to the ecological problems of natural complexes and finding the ways to their joint solution. And secondly, it helps future teachers to grow professionally and acquire the pedagogical skills.

In order to check the level of the future primary school teachers’ ecological competence formation, a survey of the fourth-year students was organized. A continuous monitoring of the state of the students’ ecological competence formation as future primary school teachers contributes to rising the quality of the ecological education, making new additional proposals for the changes and components of its content. The analysis of the questionnaires showed that most students mastered the basic material at a sufficient level. So answering the question “What ecological problems of Ukraine do you know?” future teachers named such as: “The Chernobyl accident” – 61%; “air and water pollution” or “general environmental pollution” – 68.7%; “deforestation” – 39%; “a high level of pollution in some regions of Ukraine – the Donetsk region” 44%; and 3.1% – “the extinction of some species of plants and animals”, “the reduction of the area of the lands suitable for farming”; and “the environmental pollution by metallurgical plants”.



**Fig. 4. Participation of students-volunteers in the ecological festival “Life in the ECO-style”**



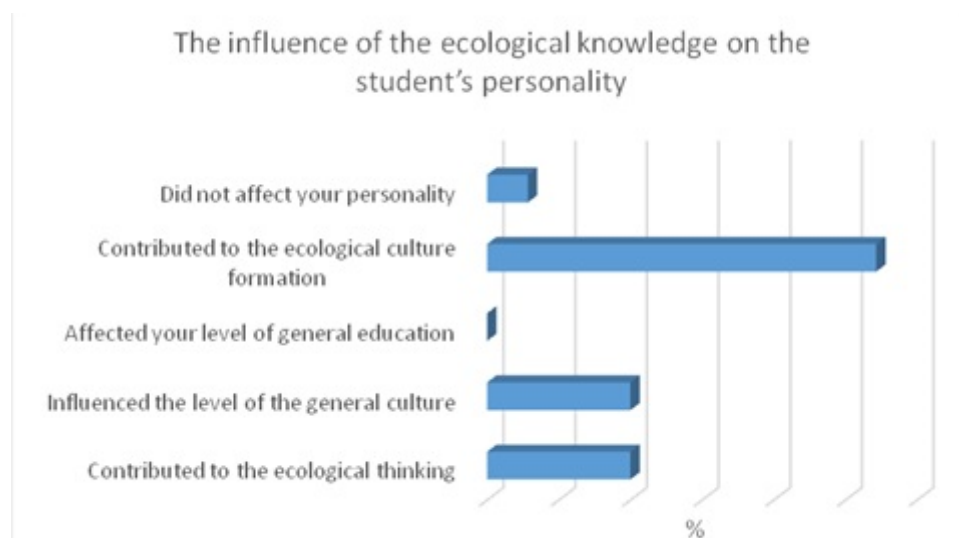
To the question: “What did you learn from the course of “Ecology”? the respondents replied (here are a few examples): “This subject was very interesting and informative for me. I learned a lot about the ecological state of Ukraine, the main causes of the environmental pollution and its consequences”. “I got acquainted with the species of plants and animals recorded in the Red Book of Ukraine”; “I learned how to organize the ecological work in schools”.

To the question: “Have your personal characteristics changed after studying the “Ecology” discipline? How?” 40% of the students answered (here are the examples of the answers to the questionnaire): “Yes, they have changed. I was thinking over how much we affected our environment”, “I began to pay more attention to the ecological problems of our town and Ukraine. I think I learnt to analyze the ecological information in detail. I began to pay more attention to the conservation of nature, to that in which state it is now”. “I wanted to do something useful for the environment”. “After studying some topics, I realized how much we harmed nature. So now I will take into account my actions that may affect the environment”. “I began to appreciate nature and the world around me more”.

One of the questions of the questionnaire was a request to name the ecological measures (projects) that are (were) carried out in the region, town, village in which the students participated. The majority of the respondents (90%) listed various projects: “Plant the Christmas tree”, “Cleaning the local springs, rivers”, “Life in the ECO-style”, “Green gang”, “The houses for younger brothers”, “Ecological school quizzes”, “Excursions”, “Collecting batteries”, “The future of the forest is in your hands”, “Cleaning parks, squares”, “Let’s make the environment cleaner”.

The results of the final research testified that the majority of students (53.1%) determined that the acquired environmental knowledge in the process of study influenced their environmental culture (Fig. 5). Therefore, we are aware that our work requires further expansion of the search for new ways of the environmental competence formation.

**Conclusions.** Analyzing the experience of our scientific body and the university as a whole, we can conclude that the leading role in the ecological competence formation is given to the student’s own experience; the acquisition of the research pedagogical activities that gives the opportunity to form the future teacher’s emotional and valuable attitude to nature, contributes to the creation of the future teacher’s own methodical style of work. This approach requires a change in teaching methods of the subject, strengthening the role of practical and individual work, organizing work in small groups, allowing the time to work with information, implementing the student’s own working ups,



**Fig. 5.** The influence of the ecological knowledge on the student’s personality

involving students in ecological actions and projects. In addition, it is very important to include excursions in the educational process, future teachers' direct acquaintance with natural and protected objects of the environment. All this contributes to the future primary school teachers' ecological competence formation.

Thus, the primary school teachers' training in higher pedagogical institutions is aimed at providing secondary schools with skilled teaching staff who are able to organize and conduct environmental excursions, use a variety of techniques and methods of educating a caring attitude to nature, involve children in the activities aimed at the environmental protection. The academic courses of "Ecology" and "Educational Practice (Field)" should be not only introductory and give the general ecological knowledge, but also professionally oriented at the future profession of a teacher.

### References:

1. Bibik, N.M. & Bondarchuk, H.P. (2020). *Ya doslidzhuiv svit [I explore the world]: pidruch. dlia 3 kl. zakl. zahal. sered. osvity (u 2-kh ch.)*. Kharkiv: Vyd-vo "Ranok" [in Ukrainian].
2. Derzhavnyi standart pochatkovoiv osvity [State standard of primary education]. Retrieved from: <https://www.kmu.gov.ua/npas/pro-zatverdzhennya-derzhavnogo-standartu-pochatkovoyi-osviti> [in Ukrainian].
3. Hilberh, T., Tarnavska, S. & Pavych, N. (2019). *Ya doslidzhuiv svit [I explore the world]: pidruch. dlia 2 kl. zakl. zahal. sered. osvity (u 2-kh ch.)*. UOVTS "Heneza" [in Ukrainian].
4. Hrushynska, I., Khytra, Z. & Drobiazko, I. (2018). *Ya doslidzhuiv svit [I explore the world]: pidruch. dlia 1 kl. zakl. zahal. sered. osvity (u 2-kh ch.)*. UOVTS "Orion" [in Ukrainian].
5. Koval, V.O. (2017). *Profesiine spriamuvannia kursu "Ekolohiia" dlia maibutnikh vchyteliv pochatkovoiv shkoly [Professional direction of the course of "Ecology" for the future primary school teachers]*. Ternopilski biolohichni chytannia – *Ternopil Bioscience* – 2017. Materialy Vseukrainskoi naukovo-praktychnoi konferentsii z mizhnarodnoiu uchastiu, prysviachenoiv 20-richchiiu naukovoho fakhovoho vydannia Ukrainy "Naukovi zapysky Ternopilskoho natsionalnoho pedahohichnoho universytetu imeni Volodymyra Hnatiuka. Serii: Biolohiia". Red. kol.: M.M. Barna (vidp. red.) ta in. Ternopil: TOV "Terno-hraf". S. 373–376 [in Ukrainian].
6. Koval, V.O. & Kysla, O.F. (2022). *Vykorystannia treninhovoiv tekhnolohii v ekolohichnomu vykhovanni studenskoiv molodi [Use of training technology in the environmental education of student youth]*. Prosotsialna osobystist u hendernomu vymiri: teoretikometodolohichni ta prykladni aspekty: materialy V Vseukr. nauk.-prakt. konf. z mizhnar. uchastiu, m. Uman, 31 trav. 2022 r. / M-vo osvity i nauky Ukrainy, Umanskyi derzh. ped. un-t imeni Pavla Tychyny; redkol.: O.O. Kravchenko, A.I. Voitovska. Uman, pp. 73–74 [in Ukrainian].
7. Lokshyna, O. (1999). *Suchasni tendentsii ekolohichnoiv osvity [Modern tendencies of ecological education]*. Shliakh osvity, no 2, pp. 27–29 [in Ukrainian].
8. *Pro Natsionalnu stratehiiu rozvytku osvity Ukrainy na period do 2021 roku. [About the National strategy of the development of education of Ukraine for the period till 2021]*. Retrieved from: <http://zakon0.rada.gov.ua/laws/show/344/2013> [in Ukrainian].
9. Pustovit, N.A., Prutsakova, O.L., Rudenko, L.D. & Kolonkova, O.O. (2008). *Formuvannia ekolohichnoiv kompetentnosti shkolariv [Schoolchildren's ecological competence formation]: nauk.-metod. posibnyk*. Kyiv: Pedahohichna dumka. 64 s. [in Ukrainian].
10. Savchenko, O.Ya. (2012). *Dydaktyka pochatkovoiv osvity [Didactics of primary education]: pidruch. K.: Hramota*. [in Ukrainian].
11. Shapran, Yu.P. (2012). *Ekolohichna kompetentnist maibutnikh uchyteliv biolohii: yii sutnist ta diahnostyka [Future biology teachers' ecological competence: its essence and diagnostics]*. Zbiór raportów naukowych. "Postępy w nauce w ostatnich latach. Nowych rozwiązań" (28.12.2012–30.12.2012). Warszawa: Wydawca: Sp. z o.o. "Diamond trading tour". 100 p. [in Ukrainian].
12. Sichko, I. (2013). *Ekolohichna kompetentnist yak profesiina skladova pidhotovky maibutnikh vchyteliv pochatkovykh klasiv [Ecological competence as a professional component of the future*

- primary teachers' training]. *Problemy pidhotovky suchasnoho vchytelia*, no. 7, pp. 205–209 [in Ukrainian].
13. Typova osvithnia prohrama dlia zakladiv zahalnoi serednoi osvity (3–4 klasy) [A typical educational program for general secondary education (forms 3-4)] pid kerivnytstvom Shyian R.B. Retrieved from: <https://mon.gov.ua/ua/osvita/zagalna-serednya-osvita/navchalniprogrami/navchalni-programi-dlya-pochatkovoyi-shkoli> [in Ukrainian].
  14. Typovi osvithni prohramy dlia zakladiv zahalnoi serednoi osvity: 1–2 klasy. (2018). [Typical educational programs for general secondary education institutions: forms 1–2]. Kyiv. TD “Osvita-Tsentr+”. 240 p. [in Ukrainian].
  15. Yakuba, M.S. (2022). Teoriia i praktyka formuvannia ekolohichnoi kompetentnosti studentiv u zakladakh vyshchoi osvity [Theory and practice of the students' environmental competence formation in higher educational institutions]. *Suchasni metody ta formy orhanizatsii osvithnoho protsesu u zakladakh vyshchoi osvity: zbirnyk materialiv Vseukrainskoi naukovo-metodychnoi konferentsii*. Odesa: Universytet Ushynskoho, pp. 241–243 [in Ukrainian].