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FIELD PRACTICE AS A TOOL OF DEVELOPING STUDENTS' RESEARCH SKILLS (BASED ON THE MATERIALS OF SCIENTIFIC INTERNSHIP IN SOFIA)

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The article is devoted to the Studies of the experience of implementing educational practice (fieldwork) in teaching of bachelors of Education of the Akhmet Baitursynuly Kostanay Regional University (Kazakhstan) and bachelors of Ecology and bachelors of Landscape Design of the University of Forestry, Sofia (Bulgaria). Pedagogical approaches, concepts of research skills, research competencies in the papers of Kazakhstani and foreign authors are considered. One of the modules of the educational process that develops students' research skills is educational practice (fieldwork). The content of the educational practice (fieldwork) is compiled as a system of educational and field tasks: to master the methods and techniques of research; to master the methodology of conducting research in field and laboratory conditions; to apply basic methods for the study and study of natural objects (observation, description, chemical experiment); to master the skills to present the results of research work. The article materials show the geography of the practice bases of the two universities, methodological recommendations of educational practice (fieldwork). The authors analyzed results of an online survey of students using the Google Forms platform, in which 119 respondents participated to determine their research skills and competencies.

The students develop their research skills when completing term papers, research and practical tasks in the senior courses of study.

Key words: *research skills, research competencies, pedagogical approaches, field material, catalog-identification guide, herbarium, quantitative analysis.*

ДАЛАЛЫҚ ПРАКТИКА БІЛІМ АЛУШЫЛАРДЫҢ ЗЕРТТЕУ ДАҒДЫЛАРЫН ДАМЫТУ ҚҰРАЛЫ РЕТІНДЕ (СОФИЯ ҚАЛАСЫНДАҒЫ ҒЫЛЫМИ ТАҒЫЛЫМДАМА МАТЕРИАЛДАРЫ НЕГІЗІНДЕ)

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Мақалада Ахмет Байтұрсынұлы атындағы Қостанай өңірлік университетінің (Қазақстан) болашақ білім бакалаврларын және София қаласындағы (Болгария) Орман-техникалық университетінің экология және ландшафттық дизайн бакалаврларын даярлау барысында оқу (далалық) практикаларын іске асыру тәжірибесі қарастырылды. Қазақстандық және шетелдік авторлардың еңбектеріндегі педагогикалық тәсілдер, зерттеу дағдылары, зерттеу құзыреттіліктері қарастырылды. Студенттердің зерттеу дағдыларын дамытатын оқу процесі блоктарының бірі – оқу (далалық) практикасы. Оқу (далалық) практикасының мазмұны келесі міндеттер жүйесі ретінде құрастырылған: зерттеу жұмысының әдістерін және әдістемесін меңгеру; далалық және зертханалық жағдайларда зерттеу жүргізу әдістемесін меңгеру; табиғи объектілерді зерттеу және зерттеудің негізгі әдістерін қолдану (бақылау, сипаттау, химиялық эксперимент); зерттеу жұмысының нәтижелерін ұсыну дағдыларын меңгеру. Мақала материалдарында екі университеттің практика базаларының географиясы, оқу (далалық) практикасының әдістемелік нұсқаулықтары ұсынылған. Білім алушылардың зерттеу дағдыларын дамытуда оқу (далалық) практикасының рөлін

анықтау үшін Google Forms платформасында онлайн сауалнама жүргізілді және оған қатысқан 119 респонденттердің нәтижелері талданды. Сауалнама нәтижелерінен білім алушылардың зерттеу дағдыларының дамуы жоғары курстарда курстық, жобалық, зерттеу, дипломдық жұмыстарын, практикалық тапсырмаларды орындау барысында жүзеге асырылатынын байқауға болады.

Түйінді сөздер: *зерттеу дағдылары, зерттеу құзыреттіліктері, педагогикалық тәсілдер, далалық материал, анықтаушы каталог, гербарий, сандық талдау.*

ПОЛЕВАЯ ПРАКТИКА КАК СРЕДСТВО РАЗВИТИЯ ИССЛЕДОВАТЕЛЬСКИХ НАВЫКОВ ОБУЧАЧЮЩИХСЯ (ПО МАТЕРИАЛОМ НАУЧНОЙ СТАЖИРОВКИ г. СОФИЯ)

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В статье рассматривается опыт реализации учебных (полевых) практик в подготовке бакалавров образования Костанайского регионального университета имени Ахмет Байтұрсынұлы (Казахстан) и экологии и ландшафтной архитектуры Лесотехнического университета г. София (Болгария). Рассмотрены педагогические подходы, понятия, исследовательские навыки, исследовательские умения, исследовательские компетенции в работах казахстанский и зарубежных авторов. Одним из блоков учебного процесса, развивающий исследовательские навыки студентов, является учебная (полевая) практика. Содержание учебной (полевой) практики составлено как система учебно-полевых задач: овладеть методами и приемами исследовательской работы; овладеть методикой проведения исследования в полевых и лабораторных условиях; применять основные методы по изучению и исследованию природных объектов (наблюдение, описание, химический эксперимент); представлять результаты исследовательской работы. В материалах статьи представлена география баз практик двух университетов, методические рекомендации учебной (полевой) практики. С целью определения исследовательских умений, навыков проведены и проанализированы результаты онлайн анкетирования студентов на платформе GoogleForms, в котором участвовало 119 респондентов. Развитие исследовательских навыков обучающихся реализуется при выполнении курсовых, проектных, исследовательских работ, практических заданий на старших курсах обучения.

Ключевые слова: *исследовательские навыки, исследовательские компетенции, педагогические подходы, полевой материал, каталог-определитель, гербарий, количественный анализ.*

Introduction. Modern global society requires a qualified specialist with independent critical thinking, capable of creativity in solving a problem and possessing professional competencies, including research ones. In the state compulsory standard of higher and postgraduate education (SCS HPE RK), one of the key descriptors is knowledge and application of research methods in dealing with issues in the field under study. Successful acquisition of a bachelor qualification, like that of any other specialist, is a long and labor-intensive process, so it should start from the first year of studies at a university. Students become researchers by participating in research activities, which, in addition to mastering their scientific skills, contributes to the development of their professional independence, vision of ways to carry out future work taking creative approach, as well as the need for constant learning and self-improvement [1, p.15].

G.I. Chizhakova points out that research competence refers to major ones. It is interpreted as a body of knowledge and research skills: formulating a problem, putting forward a hypothesis, setting a research goal, planning research activities, collecting and analyzing data, identifying and scientifically justifying research methods, planning and implementing experimental work, analyzing research outcomes [2, p. 245].

Practical work, laboratory work, training, fieldworks and apprenticeships, active participation in research activities play an important role in mastering students' research skills.

Among active forms of learning, one should single out field research, which is carried out as part of the learning process. Such an activity provides direct interaction with nature; develops professional competencies, research skills, ecologically-friendly behavioral patterns; involves in environmental protection activities, which is relevant in the framework of sustainable development Goals implementation [3].

The importance of conducting fieldworks for future teachers of natural sciences is considered in the works of Kazakhstani scientists P. Yessenbekov, K. Dauitbayev, G. Ormanov, T. Bragina, M. Rulyeva, B. Demessenov, G. Taurbaeva, B. Zhumagaliyeva, O. Borodulina, Zh. Suyundikova, etc. The issues of mastering research skills via arrangement of fieldwork of students are considered in the works by T. Kusharbai, V. Pogodina, A. Dzhumanov, M. Samirsokov, S. Allayarov and others [4, p. 217; 5, p.43; 6, p.1177].

The study of landscape complexes, monitoring the state of atmospheric air and water, soil species and biological diversity are presented in the fieldwork curricula by Bulgarian researchers M. Doncheva-Boneva, S. Bogdanov, S. Damyanova, A. Tashev, P. Pavlov, K. Petrova, etc. [7, p.45; 8, p.1050].

Educational practice (fieldwork) of future teachers of natural sciences of Akhmet Baytursynuly KRU is held in the vicinity of Kostanay and on the basis of the university field station located in the Arakaragai forest in the Altynsarinsky district of the Kostanay region. The fieldwork bases of students of the University of Forestry-Sofia are located in the village of Barzia on the northeastern slopes of the Western Stara Planina on the training and educational forestry enterprise (TEF) “Petrokhan”, and in the pass between the Rila mountains and the western Rhodopes in the village of Yundola TEF.

The contents of fieldwork of bachelor's degree training in the group of educational programs 6B012-Chemistry teacher training, 6B013-Biology teacher training, 6B014-Geography teacher training correlate with the curricula of the following courses: "Invertebrate Zoology", "Vertebrate Zoology", "Plant anatomy and morphology", "Plant taxonomy", "Soil Geography", "Physical geography", "Basics of Meteorology and Climatology", "Cartography with the basics of topography", "Chemical Ecology", "Analytical Chemistry: a qualitative and quantitative analysis", "Phytochemistry", "Physical and Chemical methods of analysis", etc. [9, p.6; 10, p.8].

The curriculum of educational practice (fieldwork) of the University of Forestry-Sofia has been compiled in accordance with the requirements of the National Qualification Framework of the Bulgarian Republic. In preparation of bachelors of Ecology and landscape architecture at UF in Sofia, fieldwork is aimed at studying and complementing the following courses: "Air Pollution and Impact on Ecosystems", "Landscape Conservation", "Water Pollution and Impact on Ecosystems", "Soil Studies", "Landscape Studies", "Decorative Dendrology", etc. [11, p.10].

Having analyzed the curricula of educational practice (fieldwork) of the Department of Natural Sciences Disciplines (DNSD) of Akhmet Baitursynuly KRU and the Faculty of Ecology and Landscape Architecture of the University of Forestry-Sofia, we noticed that there is an identical approach toarrangement, conducting, and final stages of fieldwork. At the preparatory stage of the training (fieldwork), a routewith marked reference points is worked out. The length of the walking route is 3.5-4.5 km daily, as well as that with the use of transportation 35-40 km. The main research methods during fieldwork are group natural science observations (geological and geomorphological changes in relief), measuring, and independent collection of field material (plants, invertebrates, water samples, soil layers along the horizons) by students (individually or in mini-groups) with subsequent analysis and their in-house processing. Inlaboratories qualitative and quantitative tests are held; systematization and storage conditions of chemical reagents as well as devices and tools designed for laboratory tests are studied.

The ***goal*** of current study is to consider the contents and conditions of training (fieldwork), which masters research skills for the development of professional competencies of future teachers of the Department of Natural Sciences Disciplines (DNSD) of Akhmet Baitursynuly KRU and bachelors of the Faculty of Ecology and Landscape Architectureof the University of Forestry-Sofia, Bulgaria.

To achieve the goal methods of theoretical analysis of scientific pedagogical sources, educational documents of the Republic of Kazakhstan and the Bulgarian Republic, collection and processing of statistical data, empirical methods through online questionnaires on the Google Forms platform were applied. The questionnaire method is one of the main research methods in all fields of activity. "The received information must be subjected to processing, comparison, comprehension, research." The questionnaire is a kind of research survey method, based on written answers to the proposed questions that allows to identify points of view and trends taking place in a group of respondents. The results of the study, which has been conducted on the basis of Akhmet Baitursynuly KRU NSD and the Faculty of Ecology and Landscape Architecture ofthe University of Forestry-Sofia for the period of 2020-2023 are presented.The main research methods are pedagogical observation, analysis of the level of knowledge and skills as well as reporting documentation on fieldwork, which allowed registering positive developments in practical research skills of students.

Methods and materials. Educational practice (fieldwork) is a basic component of the curriculum in higher education system, contributing to mastering students' research skills.

The goal of educational practice (fieldwork) is to consolidate theoretical knowledge; to train the application of methods of chemical and ecological analyses, skills of collecting field materials; to analyze landscape complexes; to develop ecological culture within the framework of acquisition of students’ professional competencies.

There are several approaches to defining the concept of “research skills”. I. Zimnyaya and Ye. Shashenkova argue that “research skills are the ability of independent observation, experiments, search acquired in the process of solving research problems,” N. Sychkova, P. Romanov, and others consider research skills as the ability to take action necessary to carry out research activities. Judging by works of A. Savenkova, by general research skills we mean the following abilities and skills: to identify problems, ask questions, put forward hypotheses, define concepts; classify, compare, observe, conduct experiments; draw inferences and make conclusions; establish cause-and-effect relationships; structure the material; work with text; prove and defend one’s suppositions [12, p. 34; 13, p.189].

The issues of developing scientific research skills in the university education system in recent years have been considered in the works by G. Myshbayeva, A. Mizimbayeva, A. Zheksembinova, A. Syzdykova, who emphasize that an intended specialist should possess both knowledge and research skills. The possible solutions of the issues discussed above are put forward within the frames of the following pedagogical approaches: research, system-activity, personality-oriented [14, p.10].

Research activities of students include search and selection of data, experimental research, interdisciplinary, project, technical, creative, and other types of activities carried out during learning and extracurricular hours.

The research approach contributes to the development of the intellectual sphere of an individual, mastering skills and abilities of self-education, i.e. formation of ways of active cognitive activity. This approach activates the ability to analyze scientific reference literature (atlas of plants, insects, minerals, etc.); classify rocks, soils, etc.; perform laboratory chemical experiments (determine chemical composition of water, soil, etc.) while performing fieldwork assignments. Educational practice (fieldwork) is a favorable environment for student research learning. In its most complete, expanded form, the research approach assumes the following: the student identifies and poses a problem that needs to be resolved; offers possible solutions; tests these possible solutions taking into account the data available; draws conclusions in accordance with the results of the study; applies conclusions to new data; makes generalizations. The developed research skills are necessary forfurther learning while writing coursework, projects, and diploma papers [15, p.150].

A person-oriented approach is a system of interrelated concepts, ideas and methods of action to ensure and support the processes of self-knowledge, self-realization of the student’s personality, and the development of their unique individuality. In the process of completing tasks of fieldwork, students develop self-management abilities; individual characteristics (leadership, public speaking, creativity, etc.) are activated; emotional and value perception of the environment is enhanced through the arrangement of educational activities (eco-challenge, “March of the Parks” eco-movement, tourist excursions, etc.), which is important in training of intended bachelors. A person-oriented approach helps to increase motivation for education and personal development of the student, as well as a humane attitude to the learning process; and development of the student’s social and communicative abilities (work in micro groups, person-person relationships, person-nature relationships, etc.). In the process of communication, students are introduced to the value consciousness of nature and society as a whole. Communication thus allows one to experience and comprehend a community of values. A value-based approach to learning is a way of organizing and performing educational activities, obtaining and using its results viewed from the perspective of certain values. The study of natural objects in the area (field stations) perfectly shapes the national values and moral consciousness of students [16, p.6].

The system-activity approach is the arrangement of independent educational and cognitive activities of students to master knowledge, skills, and abilities. This approach is combined with problem-based learning, critical thinking technology, research, and design activities, which is important when solving problems during educational practice (fieldwork). While doing the assignments given, students develop critical thinking (calibration of chemical instruments, drawing up a calibration graph, working with atlas-determinant, scientific papers, etc.), a systematic view of the geographical shell (familiarization with the objects of the lithosphere, hydrosphere, atmosphere, biosphere), project activities (registration of collection material, drawing up a topographic plan of the area, etc.). Project activities develop professional competencies of students – knowledge, skills, and abilities that allow intended bachelors to address professional issues with confidence. Such competencies include activity planning (keeping a fieldwork diary), reflection and self-analysis (performing research and field tasks), presentation (fieldwork final report), information search (working with scientific papers), practical application of academic knowledge, self-study, research, and creative activities [16, p.6].

Educational practice (fieldwork) is carried out in accordance with the academic calendar and approved schedule. At the preparatory stage of educational practice (fieldwork), safety instructions and first aid training are carried out, as well as an orientation conference. Students study research papers, specialized scientific sites, and get acquainted with the geographical data of field stations. Students' work during fieldwork is arranged in mini-groups of 4-5 people, doing the assigned tasks in collaboration.

During educational practice (fieldwork), students learn about the diversity of flora and fauna, study the structure and functioning of natural ecosystems, methods of field, and scientific research work on the study

of fauna, flora, landscape, and environmental objects. Master the basic methods of collecting materials in the field and processing them in office (laboratory) conditions. They practice skills in working with tools (level, theodolite, pH meter, oximeter, gas analyzer, photometers, electronic microscope), as well as with chemical glassware, collecting biomaterial (plants, invertebrates).

Fieldwork is also necessary to develop skills in conducting field trips and observations in nature, which is important for future teachers.

Future teachers of Biology study the biodiversity of the region, identify species and families; carry out biomorphological descriptions of plants (morphological and anatomical-ecological analysis of plants); master methods of herbarization of plants; collection of insects; gain skills of processing the results of observations by making drawings, diagrams, and analytical tables.

Future teachers of Geography at the field stage conduct meteorological, hydrological, and geomorphological observations and study the landscape of the area. They get acquainted with meteorological instruments and their work at the meteorological station in the village of Zarechny of the Kostanay region. Field topographic and geodetic work (leveling survey, theodolite) is carried out on the landscape area. A soil section (soil profile) and a study of the physical and chemical properties of the soil are required.

During educational practice (fieldwork), future teachers of Chemistry take water samples from natural sources, such as the Tobol River (Kostanay, Kostanay region), Lake Kamenoye (Zarechny village, Tobyl of the Kostanay region), as well as samples of tap and bottled water. At the initial stage, students become familiar with the current regulatory standards for water sampling and quality control, as well as with methodological recommendations for the storage of chemical reagents. In the selected water samples, the pH value is determined using a pH meter, total mineralization (dry residue) by gravimetry (GOST 18164), and total hardness by titration (GOST 4151).

Intended Bachelors of Ecology and Bachelors of Landscape Architecture of the University of Forestry-Sofia as part of their fieldwork study monitoring of atmospheric air condition in experimental areas; physical and chemical properties of surface-flowing waters (the Lom River), artificial water bodies; geology, geomorphology of landscape complexes; origin and development of soil, its composition and properties, reclamation and measures to increase fertility; types of degradation processes in soil; classification and distribution of soils in Bulgaria; flora of the area; environmental standards of industrial enterprises in the region.

Field materials of educational practice (fieldwork) are processed by students in educational laboratories. They analyze the results and arrange the obtained data in the form of a report.

Results and discussions. During the study, students were asked to complete an online survey with general and specific questions regarding educational practice (fieldwork), where 81 students from the Department of NSD participated. The data obtained during an online survey are presented in Table 1. The descriptors were compiled taking into account the specific features of the field of study and fieldwork curricula.

Table 1 – Research skills acquired during training (fieldwork).

Future teachers of Biology						
Descriptors	Low		Medium		High	
	Quan.	%	Quan.	%	Quan.	%
collect and identify insect species	3	9.37	3	9.35	26	81.2
collect plants, install a herbarium, and work with a determinant	3	9.37	6	18.7	23	71.9
systematize field materials	4	12.5	8	25.0	20	62.5
Future teachers of Geography						
determine the mechanical composition of the soil	9	45.0	7	35.0	4	20.0
distinguish rocks by origin	9	45.0	7	35.0	4	20.0
creating a site plan	7	35.0	6	30.0	7	35.0
carry out geodetic work	9	45.0	8	40.0	1	5.0
Future teachers of Chemistry						
conduct qualitative analysis of objects	4	13.75	11	37.9	14	48.3
carry out quantitative water analysis	3	10,3	12	41.4	14	48.3
classify chemical reagents into classes	3	10,3	8	27.6	18	62.1
collect water samples and determine temporary and permanent water hardness	3	10,3	9	31.0	17	58.6

According to Table 1, more than 60% of biology students have excellent skills in collecting and processing field material, and 6% of students rated their skills are at a low level. 45% of geography students rate their skills and abilities to work with instruments at a satisfactory level, which requires mastering these skills. According to the descriptor of drawing up a site plan, students did better, which is 65%. More than 85% of chemistry students show excellent use of analytical skills in laboratory work. Only 3.45% of students rated their skills at an unsatisfactory level. Thus, teachers note a high level of development of research and practical skills in field training conditions.

The results of the analysis of the online survey of students of the Department NSD on the use of research skills acquired during fieldwork are presented in Figure 1.

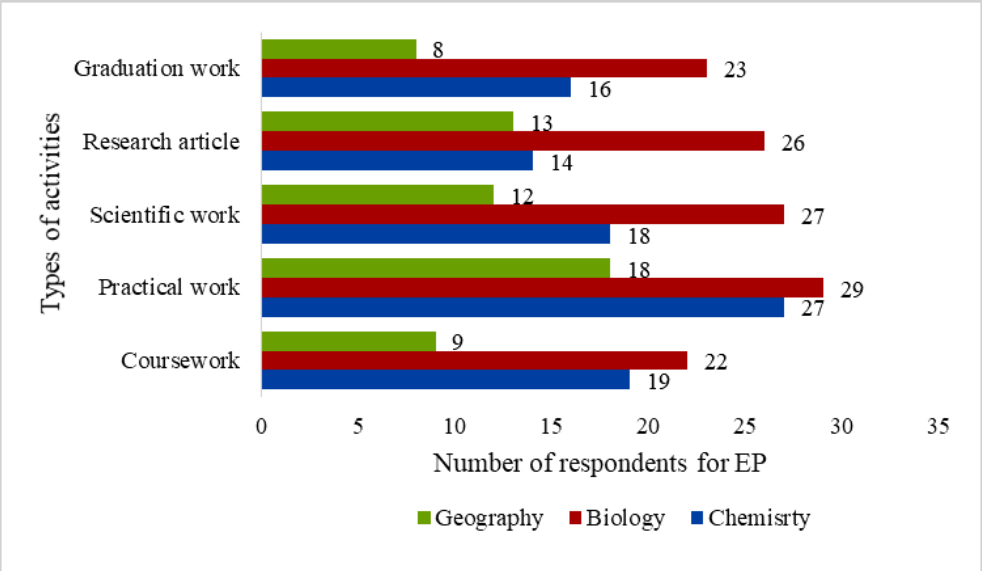

Figure 1a. – Using students' skills in the learning process (used)

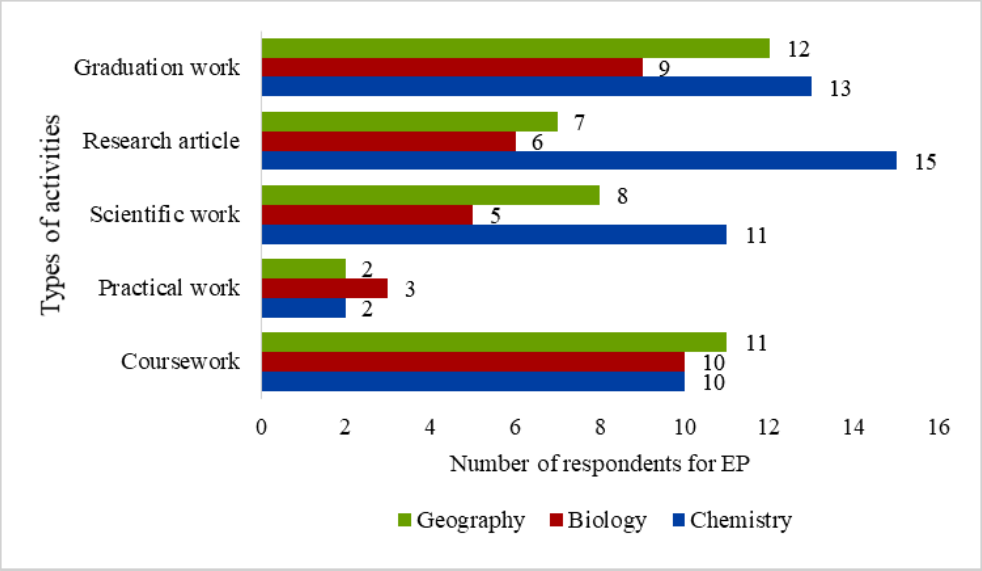

Figure 1b. – Using students' skills in the learning process (unused)

Diagram 1 shows that the use of research and practical skills shows a positive tendency. When performing laboratory and practical work, 90% of students responded by actively using the developed skills during training (fieldwork). When writing research projects, 70% of students report positive experiences using research skills. However, 40% of students note the difficulty in applying research skills when writing diploma papers, which include the analysis and structuring of voluminous scientific data. It is noteworthy that under the guidance of a supervisor, 65% of students cope with compiling research and methodological articles. Analyzing the results of an online survey of 81 respondents,it is possible to make a conclusion that the skills acquired during fieldwork are applied in the learning process. However, there are students for whom the use of research skills is challenging, and to resolve this issue, it is recommended to create a “focus group” and

conduct professional discussions in the student environment, ensuring high student involvement in the process.

The next stage of the study consisted in conducting an online survey of 4th year students of the Natural Sciences Department and the Faculty of Ecology and Landscape Architecture, in which 28 and 38 took part, respectively. The survey data are presented in Figure 2.

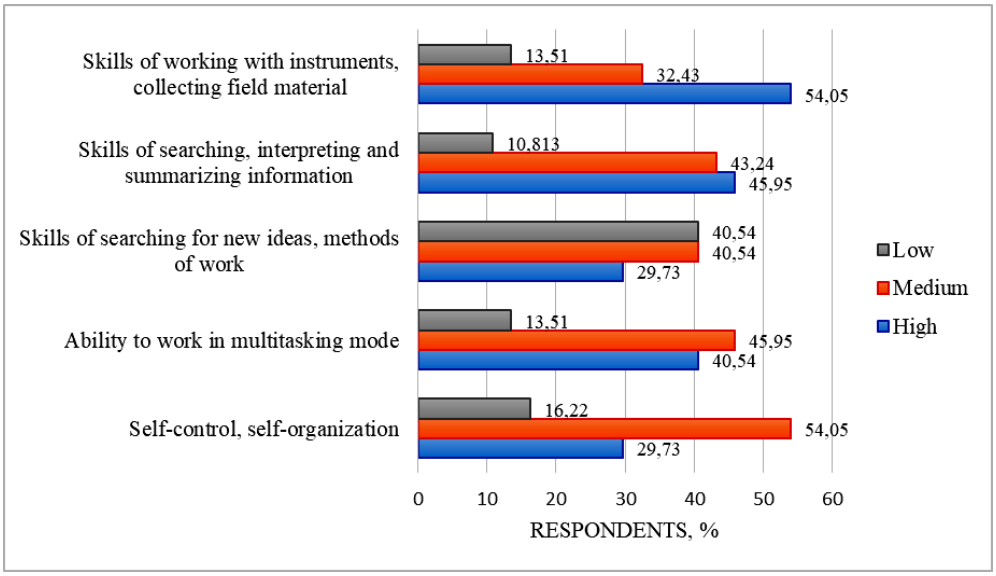

Figure 2a. – Indicators of research skills of students of Forestry University, Bulgaria

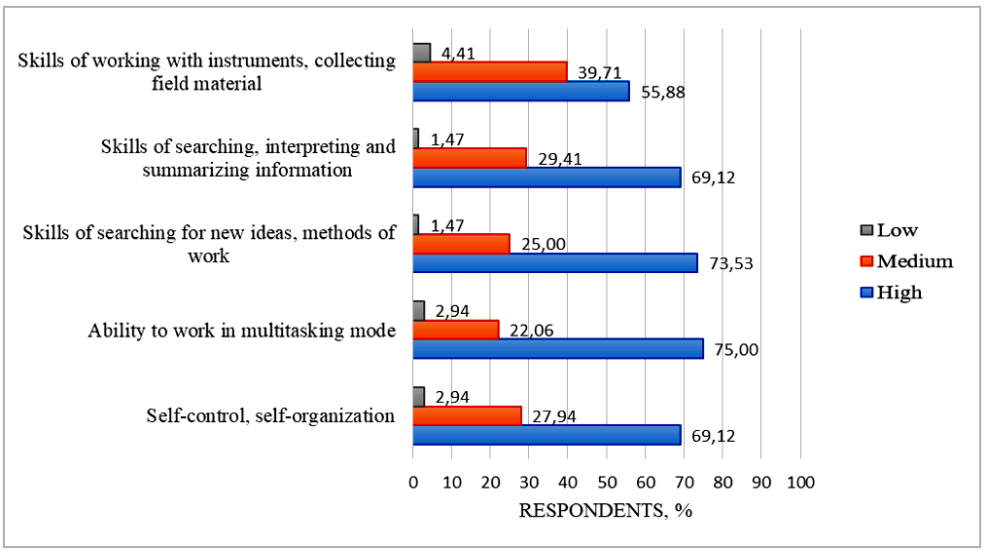

Figure 2b. – Indicators of research skills of students of the Akhmet Baytursynuly KRU, Kazakhstan

Based on the data in Figure 2, it can be seen that students show adequate skills in solving research problems. Among which the following indicators are to be singled out:

- the ability to independently arrange one's activities was rated at a good level by 82% of students, and for 18% of respondents this skill causes difficulties in implementation;
- 83% of students believe that they have mastered the methods of collecting, processing, storing, and analyzing field material, whereas 17% of students experience difficulties when working with some tools;
- the ability to analyze and summarize scientific datais developed enough with 88% of students and 12% of students state low skill in implementing this indicator;
- diverse tasks can be performed by 84% of respondents, while 16% experience difficulties.

Analyzing the students' responses shown in Figure 2, one indicator was identified as that with a low level of implementation of research skills, with 43% of the students stating that the choice of new methods and ways to solve practical problems is quite difficult for them.

Thus, educational practice (fieldwork) contributes to the development of research skills while teaching students.

As part of the study, students were asked to give their recommendations on arranging and conducting training (fieldwork). The results that were obtained from the students' responses to the open-ended question can be seen in Figure 3.

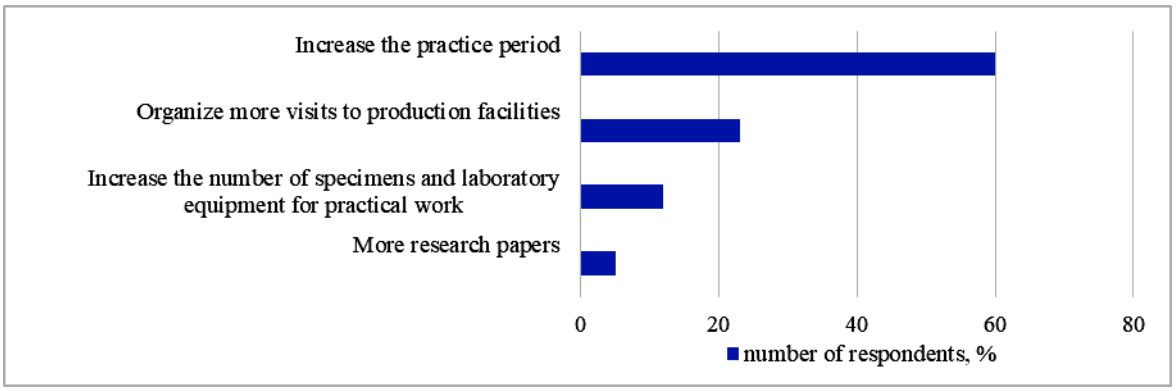

Figure 3. – Students' recommendations on arranging and conducting educational practice (fieldwork)

The responses were analyzed and generated into four main indicators, with the most popular response being increased practice time (60%). 5% of students would like to do more research during their fieldwork.

The analysis of the study led to the conclusion that educational practice (fieldwork) masters, stimulates and activates students' research skills, increases learning motivation, the effectiveness of assimilation of educational data and the effectiveness of students' independent work.

Conclusions. The goal of the current study was to consider the contents, conditions of implementation, and analysis of long-standing pedagogical experience in conducting training (fieldwork), mastering research skills for the development of professional competencies of intended natural science teachers and bachelors of ecology and landscape architecture. It was ascertained that practical field and research tasks of educational practice (fieldwork) influence mastering research skills in a positive way. When completing assignments, students activated the following research and practical skills: working with a catalog, preparing microsamples, and collections of insects; determine the physical and chemical composition of soil and water; analyze geomorphological changes in landscape complexes; reporting the results of the study. Based on the results of the study, it was revealed that students effectively use the acquired skills when solving applied problems, carrying out research projects, and writing articles, which contributes to setting up individual development trajectory of students. The extensive use of pedagogical strategies such as project technology, critical thinking technology, case teaching methods, and the method of higher order thinking skills (HOTS) in the learning process consolidates and develops students' research skills. Thus, educational practice (fieldwork) has always been an effective tool for developing the research skills and professional competencies of intended bachelors.

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ТЕОРЕТИЧЕСКИЙ АНАЛИЗ ИЗМЕРЕНИЯ И ИНТЕЛЛЕКТУАЛЬНОГО РАЗВИТИЯ ДЕТЕЙ МЛАДШЕГО ШКОЛЬНОГО ВОЗРАСТА

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В статье рассматривается интеллектуальное развитие детей младшего школьного возраста на основе шахматной игры. Игра в шахматы рассматривается в контексте ее влияния на развитие умственных способностей, интеллектуальных и практических качеств у младших школьников, а также на формирование когнитивных навыков.

Подчеркивается социальный и культурный запрос на интеллектуальное развитие личности и общества Казахстана в целом. Отмечается повышенный интерес к шахматам как средству всестороннего развития детей. Авторы видят решение данного вопроса в повышении уровня интеллектуальной культуры.

Проводится теоретический анализ измерения и интеллектуального развития детей младшего школьного возраста и обосновывается актуальность проблемы в настоящее время. В соответствие с поставленным вопросом и особенностями возрастного развития младших школьников предлагается ряд психодиагностических методик, направленных на изучение основных индикаторов интеллектуального развития – психических процессов: оперативная память, объем и устойчивость внимания, абстрактно-логическое мышление.

Описывается процесс экспериментального исследования интеллектуального развития детей младшего школьного возраста с учетом внедрения шахмат в начальные классы 42 общеобразовательных школ Казахстана за счет часов вариативного компонента учебного плана.

Ключевые слова: *интеллект, гибкость мышления, быстрота мышления, когнитивные способности, пространственное мышление.*