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**TRAINING OF NATURAL SPECIALTY TEACHERS  
FOR THE DEVELOPMENT OF ENTREPRENEURSHIP COMPETENCE  
AS A MODERN SCIENTIFIC AND PEDAGOGICAL**

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*In the context of reforming the Ukrainian education industry, an important task of education is preparing a person who possess entrepreneurial competence, as a key competence of the future, which plays a fundamental role in the process of increasing the education and competitiveness of society. So, training teachers is obligatory.*

*The article theoretically substantiates the basic approaches to solving the scientific and pedagogical problem of preparing teachers of natural sciences to develop the entrepreneurial competence of high school pupils.*

*The necessary knowledge, skills, attitudes and five components of professional competence of science teachers have been identified, which effectively contribute to the formation of entrepreneurial competence of high school pupils.*

*It had revealed that teachers of natural sciences, preparing for the implementation of the competence approach, must change the stereotypes that have been laid for decades, adapt to such changes.*

*It had outlined requirements for teachers of natural sciences, for the development of entrepreneurial competence of high school pupils in particular: to define the goals: the training should be aimed at developing the ability of teachers to use the knowledge obtained during the course preparation, self-education, in non-standard situations; to content selection: the content should be in line with today's realities, accessible to teachers, meet the needs of educational reform and promote teacher education, first and foremost practical orientation and life-based solutions; to the selection of methods, forms and means of training, which should provide: increasing the motivation of teachers' professional activity through the implementation of the model "learning with enthusiasm"; professional growth and development of teachers.*

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## ПІДГОТОВКА ВЧИТЕЛІВ ПРИРОДНИЧИХ СПЕЦІАЛЬНОСТЕЙ ДО РОЗВИТКУ ПІДПРИЄМНИЦЬКОЇ КОМПЕТЕНТНОСТІ СТАРШОКЛАСНИКІВ ЯК СУЧАСНА НАУКОВО-ПЕДАГОГІЧНА ПРОБЛЕМА

I. М. Шоробура, Н. К. Куриш

В умовах реформування української освітньої галузі важливим завданням освіти є підготувати особистість, яка перш за все володітиме підприємницькою компетентністю, як ключовою компетентністю майбутнього, яка відіграє фундаментальну роль у процесі зростання освіченості та конкурентноздатності суспільства. Для цього необхідно перш за все підготуватися педагогам.

У статті теоретично обґрунтовано основні підходи до вирішення науково-педагогічної проблеми підготовки педагогів природничих спеціальностей до розвитку підприємницької компетентності старшокласників.

Визначено необхідні знання, вміння, установки та п'ять складових професійної компетентності вчителів природничих спеціальностей, які ефективно сприяють формуванню підприємницької компетентності старшокласників.

Виявлено, що вчителі природничих спеціальностей готуючись до реалізації компетентнісного підходу до навчання змінюють стереотипи які були закладені десятиліттями, по різному адаптуються до таких змін.

Окреслено наступні вимоги до педагогів природничих спеціальностей, щодо розвитку підприємницької компетентності старшокласників, зокрема: до визначення цілей: навчання повинні бути спрямовані на розвиток у вчителів здатності використовувати знання, отримані в ході курсової підготовки, самоосвіти, у нестандартних ситуаціях; до відбору змісту: зміст повинен відповідати сьогодинішнім реаліям, бути доступним для учителів, відповідати особливостям реформування освітньої галузі та сприяти підвищенню рівню освіченості учителів, мати, перш за все, практичну спрямованість та базуватися на розв'язуванні життєвих ситуацій; до відбору методів, форм і засобів навчання, який має забезпечувати: підвищення мотивації професійної діяльності педагогів шляхом реалізації моделі «навчання з захопленням»; професійному зростанню та становленню педагогів.

**Ключові слова:** компетентнісний підхід, ключові компетентності, базові компетентності, підприємницька компетентність, емоційний інтелект.

**Introduction of the issue.** The current state of development of science and education, the reform processes in Ukraine and around the world imply new demands on education and the educational process. It must be ensured that a broad range of key competences, as defined in the Recommendations of the European Parliament and of the Council of the European Union "On lifelong learning competences" (2006) and the Concept of the New Ukrainian School (2016), are formed in the younger generations, in order to let them adapt to the fast-

paced world. Education also includes social and economic foundations, that play a fundamental role in enabling citizens to acquire the key competences needed to adapt flexibly to corresponding changes.

**Current state of the issue.** Many aspects of the problem of preparing teachers for the implementation of modern processes of reforming the educational field are revealed in the works of many domestic and foreign scholars, in particular: formation of the professional competence of teachers of natural sciences (T. Belofastova,

L. Gaida, L. Danylova, V. Dukelsky, I. Kalynychenko, O. Karpenko, O. Karamanova, Yu. Kliuchka, Yu. Omelchenko, Yu. Pavlenko, B. Stoliarova, M. Yukhnovich, etc.) [4].

In this complex, fast-changing reality, only an enterprising person ready to undergo the difficulties and adapt to the changes of the environment and treats changing socio-economic conditions as an opportunity to grow and succeed. Therefore, the task of education is to prepare such a person, first and foremost, by forming entrepreneurial competence as a key competence of the future specialist, which plays a fundamental role in the process of improving the quality of education and ensuring the competitiveness of society. For it is necessary to train the teachers, especially those who already have a well-established teaching methodology and developed teaching technologies. Currently it is extremely important to find the ideal model for a teacher of a new era formation, the one who has to meet the new educational challenges.

Analyzing the curriculum of general secondary education institutions for grades 5-9 [13], with 22 subjects identified in the plan, about 30% are science subjects (science, biology, ecology, geography, physics, chemistry), which form students' integrity of knowledge about nature, the naturalistic picture of the world, the "image of nature", reveal the nature and essence of processes occurring in the environment through key competences as cross-cutting content. At the same time, it is an important condition for the reorientation of science education to the goal of sustainable development of society, to a competent model of science education in high school. For it the natural science courses teachers must have a methodological system of competency training, especially the formation of entrepreneurial competence.

Therefore, the teachers of natural science subjects must by constantly working on their development in the following way [11]:

- individual competences ("I as a person");
- interpersonal competences ("I as a member of the team and in relations with others");
- social competences ("I as a member of the local community and society");
- educational competences ("I as a teacher");
- leadership competencies ("I as an educator");
- special competencies ("I am an expert in the field of my subject");
- organizational competencies ("I as a member of the school staff and the school as an organization").

Preparing a natural science teacher for the development of entrepreneurial competence of high school pupils is a modern scientific and pedagogical problem that arose in September 2017 with the adoption of the new Law of Ukraine "On Education", which contains provisions on the need to develop 11 key competences of students:

- fluency in the official language;
- ability to speak native (in case of difference from national) and foreign languages;
- mathematical competence;
- competence in the field of natural sciences and technology;
- innovation;
- environmental competence;
- information and communication competences;
- lifelong learning;
- civic and social competences related to the ideas of democracy, justice, equality, human rights, well-being and a healthy lifestyle, with an awareness of equal rights and opportunities;
- cultural competence;
- entrepreneurship and financial literacy;

- other competences stipulated by the standard of education [3].

**The outline of unresolved issues brought up in the article.** The analysis of scientific publications gives grounds to claim that the implementation of the competency approach starts from primary school and will be successful under the conditions of comprehensive provision of all components of the educational process – the goals of learning, building a competency-oriented content of education, appropriate development of methodological support, professional training of teachers, etc.

Organization of the educational process in elementary school is carried out on the basis of the State standard of primary education that was approved by the Cabinet of Ministers of Ukraine on February 21, 2018 № 87, which outlines the formation of key competences in the educational sectors [2].

In the context of natural education of primary school pupils, key competences are the mastery of knowledge, skills and methods of activity, development of abilities that ensure successful interaction with nature, formation of the basis of scientific worldview and critical thinking, formation of responsible, safe and environmental-friendly behavior of educators, as well as the awareness of sustainable development principles.

**Aim of research** to reveal the main approaches to solving the scientific and pedagogical problem of preparing teachers of natural sciences and develop the entrepreneurial competence of high school pupils.

**Results and discussion.** The need to prepare teachers for the development of entrepreneurial competences of schoolchildren is primarily caused by the necessity to meet the needs of the modern labor market, which requires the graduation of all life competencies necessary for functioning in society, but

it turns out that all categories of competences are closely related. These are the positions disclosed in the article "How has Succeed at Work?" In one of the Polish newspapers: "... We get job in 70% because of our skills and in 30% thanks to interpersonal skills, instead we lose it in 30% due to lack of skills, and in 70% – due to lack of interpersonal skills" [7]. May be this opinion too categorical, but it illustrates well trends in the labor market where there is a need to possess social and entrepreneurial competences and the desire for continuous improvement of professional skills [11].

One of the first researchers who had created the most complete concept of entrepreneurship was the Austrian economist Joseph A. Schumpeter, who noted that entrepreneurship is close to creativity. It begins when the procedure is completed once, that is, when it is necessary to act in a new way. Entrepreneurship is a special feature, the carrier of which does not belong to a certain class. [8] According to Yu. Belovoi [1], entrepreneurial competence is an integral psychological quality of a person, manifested in the motivated ability to creatively search for and realize new economic ideas and to solve various problems in everyday professional and social life.

This competence is a support for educators are not only in their daily private and public life, but also in their workplace, helping them to understand their work context and ability to take chances; it is the basis for more specific skills and knowledge necessary to exercise or to take part in events of a public or commercial nature. Entrepreneurship also promotes awareness of ethical values and implies good governance.

Three approaches have been developed to solve the scientific and pedagogical problem of preparing teachers of natural specialties for the development of entrepreneurial

competence of high school pupils: historical, sociological, psychological and pedagogical.

The historical approach includes the training of teachers through the disclosure of the process of transformation of the teaching profession on the background of different social systems and modern processes of reforming the educational sector, which makes possible to understand the importance of the teaching profession at every stage of development of society, especially, in the modern-forming entrepreneurial competence of the individual.

The sociological approach of teacher training for natural science subjects is realized through the description of teachers' professional situation, their position, background, qualification, social roles, which alter in the course of modern reforms and acquire the character of tutors, coaches, mentors, facilitators and educators.

One of the most important approaches to teachers' training for the development of entrepreneurial competence of high school pupils are psychological and pedagogical, focusing on the personality of each teacher, taking into account the praxeological, creative and communicative skills, ensuring the establishment of individual trajectories of professional readiness of the educators.

Pilot studies confirm that both educators and students in the process of development of entrepreneurial competence must have the corresponding knowledge, skills and attitudes, associated with the particular competence.

Knowledge covers the ability to identify opportunities available in personal, professional or economic activities (including broader issues that are relevant to the context of work and life of the individuals, such as a common understanding of the principles of the functioning of the

economical system, as well as the chances and challenges that employers and organizations are facing). Individuals also need to be aware of the ethical issues associated with businesses and how they can bring positive change, such as fair trade or social action.

Skills relate to proactive project management (covering: planning, organizing, managing, managing and assigning tasks, analyzing, communicating, reporting, evaluating and reporting), effectively presenting and negotiating, as well as being able to work individually and in collaboration with the team. It is also necessary to be able to assess and identify their own advantages and disadvantages (as well as to assess risks), and to be able to take risks in justified cases.

The entrepreneurial setting is characterized by initiative, activity, independence and innovativeness as in personal and public life, as well as in work. It also encompasses motivation and determination to pursue personal and shared goals (in private ones and common).

The conducted research revealed that in order to prepare the teachers of natural sciences for development of entrepreneurial competence of high school pupils, it is necessary to form five components of professional competence of a teacher:

The first component is pragmatic, which is determined by the effectiveness of the educator in planning, organizing, controlling and evaluating the educational process, while developing entrepreneurial competence;

*The teacher can:*

- \* design a general concept of entrepreneurial competence development for a class in whole, or for the individual student;

- \* assess the student's level of knowledge and determine the factors

that stimulate the learning of new topics;

- \* analyze the overall goals of training program contents in the educational process, using the entrepreneurial component;

- \* use the basic elements of the didactic workshop (including methods, organizational forms of teaching and work of students in the classroom, choosing them appropriately to ensure the development of entrepreneurial competence);

- \* encourage and support students' positive motivation for competency learning;

- \* develop and use different methods, forms, tools for teaching, controlling, analyzing and evaluating students' achievement;

- \* interpret and evaluate students' achievements, including their individual capabilities;

- \* identify the causes of pedagogical failures and suggest ways to avoid them;

- \* evaluate the effectiveness of teacher's own work and suggest ways to improve it;

- \* plan educator's concept of professional development and continuous self-education.

The second component is the partnership, which is characterized by the effectiveness of prosocial behavior and the effectiveness of the integration of a teacher into the educational process.

*The teacher deals with it when he/she:*

- \* understands the relationship between professional attitude and one's own personality traits, the benefits of interactive style of teaching and social processes in the classroom;

- \* prefers rules of responsibility for standards of obedience in interpersonal contacts and knows how to act in accordance with this preference;

- \* can handle conflict through negotiation and finding compromise;

- \* releases and uses the education initiative, assessing its subjective capabilities and directing them to collaborative learning;

- \* establishes and knows how to keep in touch with the class through various techniques;

- \* develops and implements group forms of work aimed at uniting the team and developing the leadership qualities of students;

- \* can shape the social positions of their pupils.

The third component is communicative, it is being expressed in the effectiveness of linguistic behavior in educational situations.

*The teacher has the knowledge of interpersonal communication, the ability to listen to students and to empathize with the intentions and content of their statements:*

- \* can think dialogically and develop this ability in the pupils;

- \* knows how to use different discussion methods and non-verbal language in educational communication;

- \* communicates with students and teaches others;

- \* understands the diversity of their students' language code and its use;

- \* elicits the linguistic sensitivity of minors, protecting the values of cultural heritage and the function of language as a tool for thinking and communication;

- \* improves the correctness, readability and simplicity of his/her own linguistic behavior (language ethics).

The fourth component is creative, it characterizes by innovative and non-standard activities:

*The teacher can substantiate the benefits of activities in order to stimulate student development processes (development of interests, learning skills) over learning activities:*

- \* inspire creativity and independent thinking in the educational process;

- \* use research methods in the study of pedagogical phenomena and the creation of subjective knowledge;

- \* think critically and stimulate the development of this type of thinking in students;

- \* use techniques to solve problems creatively.

The fifth component is IT and media, which requires efficient use of modern information sources.

*The teacher knows and is able to:*

- \* use information technology to support his/her own and pupil's learning processes (for example, being able to use the databases, the Internet, e-mail),

- \* create and share his/her own educational programs online.

It is expected that teachers who successfully master certain components of professional growth will be better prepared to demonstrate the ability to integrate entrepreneurial content into the subject, as well as being able to effectively use innovative teaching methods, identify and solve pedagogical problems, view learning as a process, etc.

**Conclusions and research perspectives.** Summarizing everything mentioned above, we can outline a number of requirements to the process of preparation of natural sciences teachers for the development of entrepreneurial competence of high school pupils.

First of all, a set of demands is designed to the major goals established, including the following: the goals of education must meet the new opportunities and possibilities of teachers, reflecting the growth of their professional potential; learning objectives should be aimed at developing in teachers the ability to use the knowledge gained during the course preparation, self-education, independent activity in non-standard situations.

The second set of requirements is applied to educational content selection: defining the purpose of studying the subject must precede the selection of its content: first, the teacher must identify the spheres of application of the particular subject, and only then select the content, the development of which will produce the desired results. The content should be in line with today's realities, accessible to teachers, responsive to educational reform and promote teacher's practical life-based education and experience.

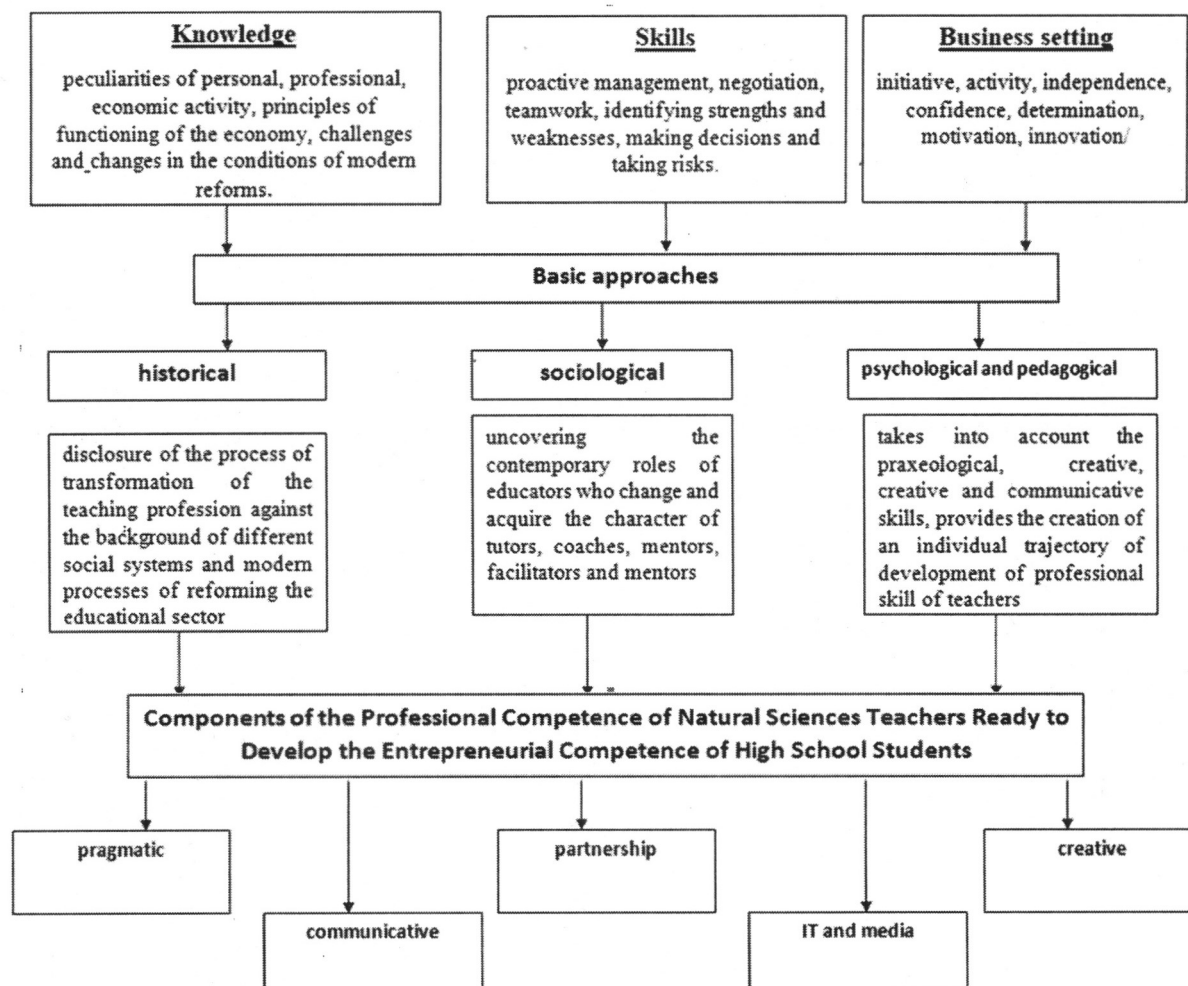
The third set of requirement is developed to regulate the selection of methods, forms and means of training, which should provide: increase of motivation of teachers' professional activity through the implementation of the model "learning with enthusiasm"; professional growth and development of educators.

Formation of entrepreneurial competence of teachers of natural sciences involves the development of various skills that will allow them to act effectively in possible future situations of personal, professional and social life. The ability to deal with new, problematic situations that do not have the appropriate means of solving issues in advance is of particular importance.

Analyzing the conducted researches, we have come to the conclusion that the solution of scientific and pedagogical problem of preparation of teachers of natural specialties for the development of entrepreneurial competence of high school pupils involves the following: historical, sociological, psychological and pedagogical approaches and formation of five components of professional competence of teachers, which are pragmatic, creative, collaborative communication and IT & media.

Table 1

**Preparation of teachers of natural specialties for development of entrepreneurial competence of high school pupils**



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