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# THE MODEL OF FORMATION OF TEACHERS' READINESS FOR SCIENCE SPECIALTIES FOR DEVELOPMENT OF ENTREPRENEURIAL COMPETENCE OF HIGH SCHOOL STUDENTS IN POSTGRADUATE EDUCATION

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## Abstract

The success of educational reform is directly dependent on the professional readiness and professional skill of teachers of general secondary education institutions, who are at the epicenter of the New Ukrainian School Concept. That is why the task of institutions of postgraduate pedagogical education is now urgent to search for different approaches and to develop models of forming teachers' readiness, including natural sciences, for the development of key competences of students

In the article was analyzed the theoretical and methodological sources on the studied problem, clarifies the essence of such concepts: "entrepreneurial competence", "model", "modeling", "pedagogical model", "cross-cutting learning".

The effectiveness of a linear structural model of forming the readiness of science teachers for the development of entrepreneurial competences of high school students in postgraduate education has been developed and substantiated. interrelated tasks between them.

**Keywords: entrepreneurial competence; model; modeling; pedagogical model; through training.**

# МОДЕЛЬ ФОРМУВАННЯ ГОТОВНОСТІ ВЧИТЕЛІВ ПРИРОДНИЧИХ СПЕЦІАЛЬНОСТЕЙ ДО РОЗВИТКУ ПІДПРИЄМНИЦЬКОЇ КОМПЕТЕНТНОСТІ ШКОЛЯРІВ СТАРШИХ КЛАСІВ У ПІСЛЯДИПЛОМНІЙ ОСВІТІ

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**Анотація**

Успіх освітньої реформи напряму перебуває у залежності від фахової готовності та професійної майстерності вчителів закладів загальної середньої освіти, які перебувають у епіцентрі реалізації Концепції Нової української школи. Тому актуальним є зараз для закладів післядипломної педагогічної освіти пошук різних підходів та розроблення нових моделей формування готовності вчителів, у тому числі і природничих спеціальностей, до розвитку ключових компетентностей школярів.

У статті проведено аналіз теоретико-методологічних джерел з досліджуваної проблеми, уточнено сутність таких понять: «підприємницька компетентність», «модель», «моделювання», «педагогічна модель», «наскрізність навчання».

Розроблено та обгрунтовано дієвість лінійної структурної моделі формування готовності вчителів природничих спеціальностей до розвитку підприємницьких компетентностей школярів старших класів у післядипломній освіті, що включає чотири блоки: цільовий, теоретико-методологічний, змістово-процесуальний, критеріально-

результативний, кожен з яких має визначені складові із чітко взаємопов'язаними завдання між ними.

**Ключові слова: підприємницька компетентність; модель; моделювання; педагогічна модель; наскрізність навчання.**

**Relevance of the topic and problem statement.** Given the requirements of the reform process in the field of education to modern teachers, including teachers of natural sciences to ensure their preparation in the system of postgraduate pedagogical education for the development of entrepreneurial competence of high school students, as priority areas to address this problem should be considered choice of educational technologies and methods for the implementation of these requirements. At the same time, postgraduate education institutions should search for modern approaches and develop an updated model of forming the readiness of science teachers in the system of postgraduate pedagogical education to develop entrepreneurial competence of high school students, which is one of the most important factors in achieving high results in training highly competent teachers.

**The purpose of the article** is to scientifically substantiate the effectiveness of the structural model of formation of readiness of teachers of natural specialties for the development of entrepreneurial competencies of high school students in postgraduate education.

Presenting main material. In pedagogical practice, scientists consider modeling as a general scientific method of cognition, which is widely used in postgraduate pedagogical education (V. Zagvyazinsky, I. Kolesnikova, V. Kraevsky, N. Kuzmina, V. Shtoff, G. Shchedrovitsky, etc.).

In the scientific literature, the definition of "model" (from the Latin modulus - measure, measure, sample, norm) is considered as:

• artificially created sample in the form of a scheme, description, physical structures or formulas, similar to the object (process, phenomenon), which is studied, and reflects or reproduces in a simpler form the structure and relationship between elements of the object (process, phenomenon) ( I. Kolesnikov) [1];

• an analogue of a thing or process, designed to reproduce those of their features that can be identified, but for various reasons can not be investigated on the original material [2, p. 50].

• system of elements that reproduce certain aspects, connections, functions of the subject of study (V. Kraevsky) [3, p. 8].

The development of the model is accompanied by a modeling process, defined as:

• construction and study of a model of any object (original, prototype) in order to obtain knowledge about the latest method of analogy [4];

• the process of creating a hierarchy of models, in which some system that actually exists is modeled in different aspects and by different means [5].

Analysis of the scientific literature on the problem of modeling, shows the exceptional diversity of its forms and types, which complicates the analysis process. Our goal was to create a pedagogical model.

The main and determining source of professional pedagogical activity are the needs of society, its requirements for the individual who receives education. These requirements are primarily outlined in the content of education. M. Skatkin calls it a pedagogical model of social order [6].

I. Lipsky considers the pedagogical model as a simplified example of the object of pedagogical practice, which retains only its essential features. The pedagogical model must meet certain requirements: objectively meet the modeled object of pedagogical practice; have the ability to replace it to some extent; it could be interpreted in terms of pedagogy [7].

Taking into account the interpretation of the terms "model" and "modeling", we have established a modeling procedure, which provides for: outlining the determinants of levels of readiness, which must have a teacher of natural specialties; establishing the relationship between them and the pedagogical conditions aimed at their formation. The design of the model should take place in the direction from the activity as a whole to its constituent parts and further to the elements.

When modeling the process of forming the readiness of teachers of natural specialties for the development of entrepreneurial competence in the system of postgraduate pedagogical education, we proceeded from the fact that the model should:

be based on compliance with the requirements and principles of modeling,

reflect conceptual principles (principles and approaches),

take into account the specifics of training, during which its implementation will be carried out, as well as take into account the structure of the teacher's readiness for this type of professional activity, which includes components, criteria, indicators and levels,

to be realized through a complex of certain organizational and pedagogical conditions,

be carried out when teaching a special course in the air defense system,

to reveal the peculiarities of the combination of different forms (formal, non-formal and informal education) of the formation of such readiness.

display implementation over time.

Taking into account the above, the following blocks were included in the model: target (goal, task), theoretical and methodological (scientific approaches and didactic principles), content-procedural (structure of readiness, forms, methods, means of forming teacher readiness for high school students' entrepreneurial competence), criterion-effective (criteria, indicators, levels, determinants) (Fig. 1).

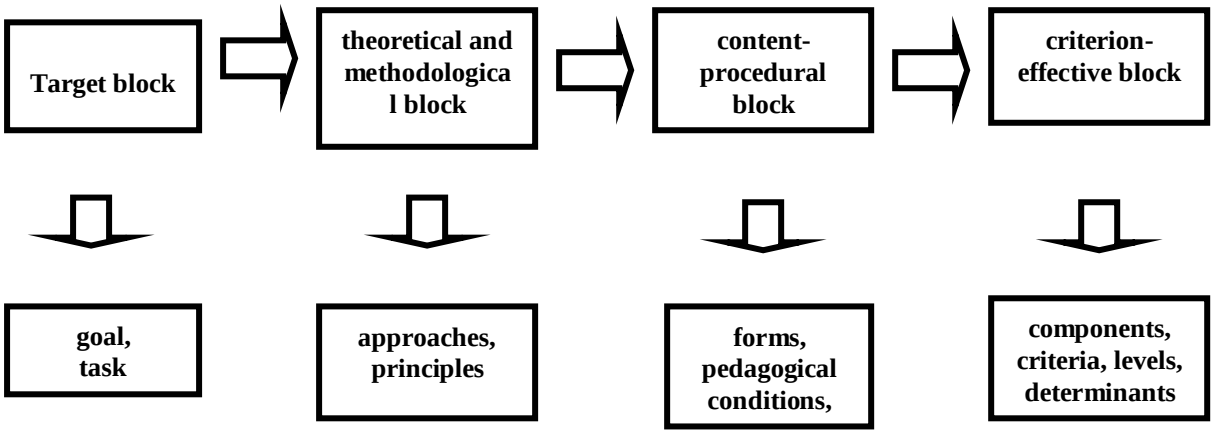


**Fig. 1.** Schematic model of formation of readiness of teachers of natural specialties for the development of entrepreneurial competencies of high school students in the system of postgraduate education

The target block is a system-forming component of the model related to the need to determine the goals of air defense teachers and science teachers, which increase the level of entrepreneurial competence in postgraduate pedagogical education, aimed at achieving the goal: to prepare science teachers for the development of entrepreneurial skills. defined tasks: to build an individual educational trajectory of development of entrepreneurial competence of teachers ryrodnychyh specialties in postgraduate education; to form knowledge, skills and abilities of entrepreneurial competence; take a creative approach to modeling the educational process using entrepreneurial content. This block represents the implementation of the planned result by establishing a correspondence between the peculiarities of the educational process in postgraduate education and the teacher's educational request to the system of postgraduate pedagogical education aimed at forming the readiness of science teachers to develop entrepreneurial competence of high school students.

The theoretical and methodological block includes:

1) scientific approaches: retrospective, systemic, andragogical, acmeological, axiological, competence;

2) principles of formation of readiness of teachers of natural specialties to development of business competence of pupils of senior classes in postgraduate education: variability, mobility, flexibility and throughness of educational process.

The offer of a wide choice of in-service training programs, their modularity and variety of forms of training provides the principle of variability, which allows teachers to choose those courses and topics that will contribute to their professional growth.

The ability to quickly restructure in accordance with regulations and customer requests allows institutions of postgraduate pedagogical education to be guided by the principle of mobility, as evidenced by the transition to a cumulative system of training and development of updated programs focused on the competency approach.

The principle of flexibility of the educational process in postgraduate education, especially for science teachers who read several subjects, is provided through the implementation of individual or integrated educational programs.

The continuity of teaching in postgraduate education is carried out through the combination of ideas, scientific theories, learning technologies in the process of coordinated activities of teachers of natural sciences. The pervasiveness of teaching natural subjects is realized through the prism of the competence approach.

The principle of end-to-end teaching of entrepreneurial competence of teachers of natural specialties is:

conducting classes with the addition to the main content of the educational material of certain practical tasks related to the formation of life skills and abilities, leadership qualities of the individual;

adjusting the content of individual topics with an emphasis on the problem approach, personal development, game teaching methods;

introduction of non-traditional forms into the content of education, for example: trainings, master classes, workshops, problem seminars, etc .;

introduction of project learning technologies in the educational process.

During the development of the content-procedural block, we proceeded from the fact that: the content of education combines objective and subjective components of building an individual educational trajectory of forming the readiness of teachers of natural sciences to develop entrepreneurial competence of high school students; the structure of the content of postgraduate pedagogical education includes conceptual knowledge about the essence of entrepreneurial competence and the product of activity (educational process).

In the context of the above, the content of the process of forming the readiness of teachers of natural specialties to develop entrepreneurial competence of high school students should include elements of knowledge, skills and abilities of entrepreneurial competence and experience in its implementation. To determine the list of these elements, we used the results of a study of the process of entrepreneurial competence of teachers of natural sciences, as well as the results of analysis of the State standard of basic and complete general secondary education and curricula of natural sciences in educational institutions. possession of which will ensure the development of entrepreneurial competencies in senior lasnykiv, according to modern requirements.

The content of theoretical and practical training of teachers of natural specialties for the development of entrepreneurial competence of high school students is determined by pedagogical conditions, especially the practical significance in the developed author's special course " to the development of entrepreneurial competence in the participants of the educational process, owned forms, means, methods and technologies of competence training.

The content-procedural block also provides the formation of the operational-activity component of the readiness of teachers of natural specialties for the development of entrepreneurial competence in high school students and provides experience in performing this type of professional activity of teachers. To this block we include the technology of organizing training of teachers of natural specialties of entrepreneurial competence in the educational process of air defense, which includes a system of interactive methods, forms and means of organizing this process combining formal, non-formal and informal education.

The analysis of interactive teaching methods from the standpoint of the requirements of the conceptual foundations of research and accounting of activities that must be mastered by the teacher, allowed to identify methods: level differentiation, collective teaching methods, development of critical thinking and analysis of educational material, responsibility, conducting and evaluating choices. The use of these methods in the classroom will ensure productive activities and the achievement of each goal, which are fixed in the individual educational trajectory of development.

The criterion-effective block of the model of formation of readiness of teachers of natural specialties for development of business competence of senior pupils in system of postgraduate pedagogical education includes the description of components, criteria, indicators, levels of model of formation of this component of professional skill of the teacher. This block provides an assessment and the possibility of timely correction of the activities of the subjects of the educational process in air defense.

This block determines the effectiveness of the process of formation of readiness of teachers of natural specialties for the development of entrepreneurial competence of high school students in the system of postgraduate education, which is determined on the basis of: dynamics of positive changes in all components of readiness for entrepreneurial competence. The assessment of these changes is the determinants that contribute to the further self-improvement of teachers.

**Conclusions.** Thus, the success of the implementation of the developed linear model in the practice of teaching teachers of natural specialties in postgraduate pedagogical education for the development of skills of entrepreneurial competence of high school students depends on:

- organizational and pedagogical conditions that ensure compliance with the requirements for the development of entrepreneurial competence, laid down in the methodological principles of the study;

- systems of interactive methods, forms and means of organizing this process combining formal, non-formal and informal education;

- scientific and methodological support to ensure the training of teachers of entrepreneurial competence and their preparation for work in an educational institution.

The developed model of formation of readiness of teachers of natural specialties for development of business competence of senior pupils in postgraduate education allows to consider both obvious professional needs of the teacher (in mastering of business competence), and hidden (in social contacts, professional self-affirmation, etc.), has reflexive character and promotes professional and personal development of the teacher. As a result, teachers of natural specialties with a high level of readiness to develop entrepreneurial competence in high school students will have high motivation and ability for future professional activity, for continuous professional growth and professional self-development, are able to use creative and creative approaches to creative approach. In their professional activity, interactive teaching methods have their own experience in the development of entrepreneurial competence and independently skillfully build an individual educational trajectory in the system of postgraduate education.

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