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Formation of future specialists research competence in the process of professional training

Формування дослідницької компетентності майбутніх фахівців у процесі професійної підготовки

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Abstract

The problem of forming the research competence of future specialists is presented as a factor of readiness for effective training in the process of professional training. The definitions of the concepts "competence" and "research competence" are given, the difference between these concepts is shown, and similar points are treated. The possibilities for the formation of research competence in the process of research activity are shown. The key concepts that show the important conditions in the educational institution for the organization of the research activity of the students of education are highlighted (independence, search, initiative, experiment, practical action, a situation of uncertainty, cooperation, the presence of different points of view, contradictions). Tasks are set and ways to solve them are shown in the process of organizing research activities. Pedagogical conditions are proposed, they are scientifically

Анотація

Проблема формування дослідницької компетентності майбутніх фахівців представлено як чинник готовності до здійснення ефективного навчання у процесі професійної підготовки. Дано визначення понять «компетентність» та «дослідницька компетентність», показано різницю даних понять та потрактовано подібні моменти. Показано можливості формування дослідницької компетентності у процесі дослідницької діяльності. Виокремлено ключові поняття, які показують важливі умови у закладі освіти при організації дослідницької діяльності здобувачів освіти (самостійність, пошук, ініціатива, експеримент, практична дія, ситуація недоозначеності, спільна робота, наявність різних точок зору, протиріччя). Поставлено завдання та показано шляхи їх

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substantiated, and they are laid as a basis for the methodology of the formation of research competence of education seekers in the educational process. The methodology is represented by the introduction of experimental technology of continuous pedagogical influence of teachers on the development of educational and research activities of students. Pedagogical approaches are singled out, as possible ways for the effective formation of the research competence of future specialists.

Keywords: research competence, future specialists, implementation of effective training, professional training, project technology.

Introduction

The need for mobility in our time requires high-quality professional training of competitive specialists, with formed research competence, capable of productive cooperation. With such an approach, the research activity of competitive specialists is aimed at educating a creative and responsible specialist who is aware of the need to acquire professionalism and is a true citizen who understands the importance of moral aspects of professional activity.

The scientific research activity of forming the competence of future specialists as a factor of readiness for effective training in the process of professional training of future specialists allows students to become an object of scientific reflection, analyze social phenomena, integrate knowledge when studying educational disciplines in a complex manner, applying different cycles in the development of individual education strategies, approach systematically the rethinking and creative application of the accumulated social experience through its practical application, improve research skills and activate the process of acquiring the competencies of future specialists. Here the teacher plays a special role, he is not a translator of scientific information, but a specialist who ensures the self-realization of the student professionally (Barabash et al., 2021).

By training competitive and highly qualified specialists, a necessary task of higher education institutions is the formation of specialist research competence. This will provide future employees with the opportunity and readiness for self-development and constant self-realization of the

вирішення у процесі організації дослідницької діяльності. Запропоновано педагогічні умови, науково обґрунтовано їх, покладено в основу методики формування дослідницької компетентності здобувачів освіти в освітньому процесі. Методика представлена упровадженням експериментальної технології безперервного педагогічного впливу педагогів на розвиток навчально-дослідницької діяльності здобувачів освіти. Виокремлено, педагогічні підходи, та розглянуто можливі шляхи для ефективного формування дослідницької компетентності майбутніх фахівців.

Ключові слова: дослідницька компетентність, майбутні фахівці, здійснення ефективного навчання, професійна підготовка, проектна технологія.

individual, to acquire the ability to make non-standard decisions in given situations, to be included in innovative processes, and to organize creative training, taking into account scientific and educational innovations (Levchenko, 2020).

Research competence is considered as integrated the personal and professional quality of a specialist, which reflects the motivation for scientific research, the level of mastery of the methodology of pedagogical research, personally significant qualities of the researcher, in particular, such as innovative thinking, the ability to be creative and innovative.

Scientific and research work is a component of professional and pedagogical work activity of a teacher of a higher educational institution and promotes integration of learning and science in the educational process of a higher school.

Its successful implementation ensures a modern level of the content and methods of teaching academic disciplines, the introduction of teachers' developments into the educational process as a necessary condition for the training of competitive specialists; broad involvement of gifted youth in research work, project development, conducting scientific experiments.

The article shows the possibilities provided by research competence, revealing research activity and the level of development of thinking processes. The elements of research competence, including the student's ability to act, are highlighted.

When organizing research activities, the article proposes the main tasks that must be solved. The components of research activity that affect the formation of research competence of future specialists as a factor of readiness for effective training in the process of professional training are revealed. Approaches that will contribute to the effective formation of research competence of future specialists as a factor of readiness for effective training are substantiated.

Project activity is successfully used during students' application of scientific research methods. Modeling scientific research, the article shows the effectiveness of acquired knowledge during project work. The main components of students' research activities are highlighted.

Literature Review

K. Vasylenko (2019) analyzed the main structural components of the research competence of the future teacher.

V. Matsyuk (2022) wrote out the means of formation of research competence of gymnasium students.

V. Barabash, L. Hlebova, & A. Meheda (2021) devoted their research to the justification and disclosure of the meaning of the concept of "research activity" and proved the need for the formation of professional competence among students of higher education.

L. Sushchenko (2022) substantiated the necessity and demonstrated the effectiveness of the implementation of didactic principles of the formation of research competence of education seekers in education.

A. Proskurin, & V. Stadnichenko (2023) showed the significance and revealed the content of scientific-research competence as the basis of readiness to carry out a clear selection of future coaches in sports.

O. Grechanyk, & O. Hryhorash (2021) proved the significance, and necessity and showed the possibility of involving managers-practitioners in the disclosure and justification of the content of scientific research work, which is necessary today, meets the modern needs of education, leads to creativity.

D. Zavhorodniy (2021) developed a model for the formation of research competence of future specialists and substantiated its effectiveness, showed the features of the model, which is based

on competence, system, activity, synergistic, project, personal development approaches, analyzed and showed the importance of general didactic and specific principles on which the model is based.

V. Fedorchuk (2022) identified the main indicators of the formation of research competence of future specialists in professional training.

N. Solodyuk (2018) giving his definition of "research competence", developed and analyzed the content of the concept, highlighted and showed the effectiveness of the features of the approach to the disclosure of the definitions of "competence" and "competence".

S. Belkina (2016) analyzed the model of the formation of the research competence of students, developed indicators of the readiness of specialists during the educational process for quality professional training.

O. Martynenko (2014) the content is revealed, the essence of research competence is shown, criteria, indicators, levels are developed, and various approaches are indicated, which are necessary for the formation of the professional competence of a future specialist.

I. Levchenko (2020) attributed research competence to universal, main, general, systemic competencies, substantiated research competence as one of the most essential components (can contribute to the formation of important abilities for a person and are not significantly tied to any specific subject area) of professional and pedagogical competence.

The purpose of the study: formation of research competence of future specialists as a factor of readiness for effective training in the process of professional training.

Methodology

To implement the research goal, a set of interrelated methods was used, in particular, theoretical: analysis of scientific literature, synthesis, systematization of philosophical, psychological-pedagogical, educational-methodical literature to substantiate the theoretical foundations of training future specialists, comparison, generalization of practical experience of research competence formation; terminological analysis to determine the essence and content of the key definitions of the study; structural-logical analysis to outline

the content-procedural foundations of the formation of research competence of future specialists in the process of professional training, induction, deduction to determine and justify the organizational and pedagogical conditions for the training of future specialists; empirical: observational (self-observation, observation, reflection) to find out motives, values, needs, level of knowledge, identify and eliminate shortcomings.

The leading idea of the research is carried out by increasing the level of readiness of future specialists and forming their research competence as a factor of readiness to carry out effective training in the process of professional training and professional activity based on the development and implementation of organizational and pedagogical system innovations in the educational process of higher education institutions, taking into account the developed educational and methodological support, key scientific approaches, specific and general didactic principles of education.

The formation of research competence of future specialists as a factor of readiness for effective training in the process of professional training is based on methodological, theoretical, and practical concepts.

The methodological concept reflects the relationship of fundamental scientific approaches:

- a systematic approach allows for the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training from the standpoint of mutual influence, integrity, the interdependence of structural components (content-organizational, whole-methodological, result-criterial), which make it possible to ensure the dynamics of positive preparation for professional activity;
- the axiological approach subordinates the content of the formation of the research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training to the formation of their professional and value orientations, which in turn create the necessary conditions for professional development and comprehensive fulfillment of the tasks of the educational sector;
- a person-oriented approach directs the orientation and organization of the

formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training for the development and disclosure of the individual characteristics of the applicants, their important professional qualities, cognitive capabilities;

- the competence approach directs the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training, directs professional competence to the improvement of professional knowledge and skills, develops professional and personal qualities taking into account integration processes;
- an integrative approach directs the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training to ensure holistic training of future specialists (mastery of tools, types of joint activities, integration of the content of disciplines in the profession, which will collectively ensure the formation of research competence of future specialists);
- a synergistic approach contributes to the improvement of the professional training of future specialists and the formation of their research competence, taking into account the main factors (self-development, self-organization, self-realization, openness, self-governance, management, non-linearity of thinking);
- the activity approach directs the formation of the research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training for differentiation and contributes to the separation of the educational and cognitive functions of the students of education, ensures the use of innovations in professional training.

The theoretical concept provides a system of conceptual provisions for the formation of the research competence of future specialists as a factor of readiness for effective training in the process of professional training, making it possible to identify the leading legislative and normative principles, ideas, theories, definitions laid down as the basis of key concepts, provides a generalization and synthesis, a description of the researched phenomena, their analysis, substantiation and development of a system for the formation of research competence of future specialists as a factor of readiness for effective training in the process of professional training,

which is based on specific and general pedagogical principles of the educational process.

The practical concept makes it possible to integrate theory with practice. Based on the selected methodology for the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training and the proposed provisions, the practical concept made it possible to update and integrate technologies, content, methods, forms of the educational process. This component shows the verification of the effectiveness of the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training, shows the results of theoretically grounded scientific provisions, isolated progressive conditions, and educational and methodological support.

Results and Discussion

First of all, we will consider the meaning of the definition of some concepts of research: "competence" and "research competence", which have different interpretations. In UNESCO publications, the concept of "competence" is presented as a systematic combination of values, attitudes, knowledge, and skills that we encounter every day. In the Sectoral Standards of Higher Education, the competency approach "includes knowledge and understanding, knowing how to act, knowing how to be. A subject area in which an individual is well-versed and in which he shows readiness to perform activities" (Gulo et al., 2013).

I. Bech (2012) suggests that knowledge and skills are inappropriate for equating educational abilities with corresponding competencies. All educational achievements should be transformed into life skills. He interprets the essence of the concept of "competence" as the subject's experience in a certain sphere of life. He notes that "it is the substantive emphasis that is placed on experience, and not on awareness, awareness of the subject in a certain field and should be taken on conceptual "armament".

Research competence assumes easy compatibility, provides an opportunity to enter into contacts, cooperate, forms readiness for self-determination, for changes. This is an integrative characteristic for an individual, which aims to master knowledge from the point of view of methodology, master the technology of research activities, as well as master values and readiness

for use in professional activities. O. Bida (2017) considers research competence "key, the basis for the development of other competencies, as it helps a person to learn throughout his life, to become competitive, successful in later life".

The essence of research competence can be seen in the manifestation of personal traits by students of education, which are in the ability and readiness to systematically acquire new knowledge independently, while the basis is a previously acquired set of skills, knowledge, and skills in ways of working.

Let's list the opportunities provided by research competence, revealing research activity and the level of development of thought processes:

- to recognize and highlight the problems of the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training and to make assumptions about ways to solve problems, the ability to correctly set a problem, to identify its necessary conditions in it;
- be able to make assumptions about the possible causes and consequences of the phenomena of the material and ideal world, put forward hypotheses for the formation of research competence of future specialists, and substantiate them;
- simultaneously hold several meanings of complex phenomena of formation of research competence, texts, events, statements, etc.

Due to the fact that research competence is manifested in the ability to act, its elements include the ability of the student to:

- clearly set a goal and set goals (personal activity goals);
- allocate means of activity, allocate the role of the subject, implement the goal (intended actions);
- analyze performance results, conduct constant quality monitoring, and compare set goals with achieved results (reflection) (Verbytsky, 2012).

In the process of research activity, research competence can be formed. Therefore, we will highlight the key concepts that will make it possible to find out and propose the main conditions for those seeking education in an educational institution when organizing this kind of activity: independence, search, initiative, experiment, practical action, joint work,

contradictions, a situation of uncertainty, different points of view.

When organizing research activities, the main tasks that should be solved are proposed:

- formation of research competence of future specialists as a factor of readiness for effective training in the process of professional training of education seekers on the example of real problems and phenomena that occur in life;
- training students to find answers to questions, identify and explain various situations and problems, evaluate activities, express their point of view and defend it, and make and implement decisions promptly;
- the use of comparison, analysis, various sources of information, and methods of systematization for the formation of research competence of future specialists;
- reinforcement of knowledge in the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training through practical actions, applying in this process specific methods of collecting, summarizing information, and analysis (Matsyuk, 2022).

During the process of professional training in the field of higher education, the formation of research competence of future specialists does not occur constantly. The main reason for this situation is the lack of a clear system of pedagogical conditions for the formation of research competence of future specialists as a factor of readiness for effective training in the process of professional training throughout the entire educational process (Levchenko, 2020).

The formation of the research skills of education seekers in the formation of the research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training should be helped by external circumstances that realize the essence of the nature of this process and make it possible to reveal the peculiarities of the educational formative influence on it. We offer the following pedagogical conditions.

1. Providing the educational process with a research focus on the formation of professional competence of future specialists as a factor of readiness for effective training in the process of professional training by creating an

environment in an educational institution of an active and research-oriented nature;

2. Realization of potential resources and opportunities of education seekers during the performance of search and research tasks for the formation of research competence of future specialists by applying a differentiated approach;
3. Acquisition of research experience by students of education through the actualization of the developing subject-subject interaction of students of education and the teacher;

We propose to take such pedagogical conditions as the basis of the methodology for the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training, which involves the application of experimental technology of continuous influence of education on the development of educational and research activities of education seekers (Sushchenko, 2022).

We will reveal the components of research activity that influence the formation of research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training:

- motivational-valued (a system of emotional-volitional and motivational-valued attitudes of education seekers to activities, the world, people, their abilities, to themselves is proposed);
- cognitive (a system of knowledge about society, nature, means of activity, thinking is provided for assimilation, ensuring the formation of a scientific picture of the world in the minds of students of education; mastering a dialectical approach to practical and cognitive activity);
- activity-practical (creative experience is provided, which has a system-building property, is based on mental operations of productive, reproductive, and heuristic types) (Kovalenko, 2017).

The components of the student's research competence perform value-oriented, motivational, cognitive, regulatory, and effective functions.

We substantiate the approaches that will contribute to the effective formation of the research competence of future specialists as a factor of readiness to carry out effective training in the process of professional training:

- a personal approach (implementation takes place through the implementation of an active educational and research position of the student);
- problem-based (based on the program material of professional disciplines, a way of selecting or developing educational and research tasks is proposed);
- operational (implementation is carried out by the logic of scientific research and by organizing the educational and research activities of students). Such approaches will contribute to the effective formation of the research competence of future specialists as a factor of readiness to carry out effective training in the process of teaching professional disciplines (Belkina, 2016).

From our own teaching experience, we would like to emphasize that students who constantly, systematically, and purposefully engage in research work differ from others in professionally formed skills that form the basis of their research competence and present competitive skills. During the formation of the research competence of future specialists as a factor of readiness to carry out effective training in the process of teaching professional disciplines, inherent cognitive activity, the desire to explore the educational process, and not just to acquire professionally significant knowledge and skills. Teachers need to pay attention to the individual characteristics of students, age, psychological capabilities, specifics of relationships with teachers, with each other, ways of applying innovative forms, teaching methods, etc. In such a process of forming the research competence of future specialists as a factor of readiness to carry out effective training in the process of teaching professional disciplines, we see the need to bring the structure, content of education, and methodical support in accordance to form the research competence of students.

One of the most effective educational technologies is project technology, which best contributes to the formation of research competence.

Let's name the victories of project technology:

- allows students to acquire knowledge independently, to use the acquired information to apply new cognitive tasks in their practical activities;
- promotes the acquisition of communication skills and abilities of future specialists, the application of promising principles of

- various educational cultures, and the expression of one's point of view;
- allows skillful use of research methods: put forward hypotheses, collect the necessary information, analyze it, and propose conclusions.

The goal of educational design is aimed at study the experience of practical activity, which not only encourages the motivated activity of students, taking into account age and educational interests but also transforms the role of the teacher in leading it. The teacher is no longer a carrier of ready-made knowledge but becomes an organizer of the cognitive activity of future competitive specialists, an adviser, coordinator, and consultant, who proves the correctness of his actions by his example from experience, uses weighty arguments with his wisdom, but not in an imperative form. Since the teacher has to change the work of students and his educational work by applying various types of independent activity, giving priority to activities of a search, research, and creative nature during the educational process, we observe a change in the psychological climate in the classroom.

Project activity is successfully used during the application of scientific research methods by students. Modeling scientific research, we observe the effectiveness of the acquired knowledge during project work. A group of students or each student chooses an arbitrary topic of research that he likes and in his opinion is relevant for research and society and in stages:

- 1) formulates relevance;
- 2) defines the categorical apparatus;
- 3) selects and compiles literary sources on the chosen topic;
- 4) models and describes the stages of experimental research;
- 5) presents the developed research.

All stages of scientific research take place by the order of mastering topics, which are studied during practical classes, and this process is gradual. As a result, students better reveal the essence and logic of research and combine the theory of studying the material with its practical application, which successfully forms research competence in specialists (Fedorchuk, 2022).

The research component, which is the basis of the formation of the research competence of the future specialist, is the main one in the structure of the training of the future specialist. The organization of students' research work must be carried out under the guidance of the teacher and

using the principles of continuity and perspective. With this approach, there will be a successful formation of the research competence of students, who should be involved in scientific research activities from the first years, which will allow them to develop harmoniously, deepen their knowledge, and improve their abilities and skills of a research nature.

Let's highlight the main components of students' research activity:

- the ability to formulate the purpose and hypothesis of the research (design component);
- the ability to process sources (informational component) to collect the necessary data;
- the ability to choose research methods: basic and auxiliary (analytical component);
- the ability to determine its practical orientation in research (practical component) (Bondarenko, 2021).

Research competence includes:

- an idea of the most relevant areas of research in science;
- professional knowledge of a foreign language (several languages) in the field of professional activity;
- application of philosophical concepts in the field of science;
- highlighting the methodology of the scientific field, regularities for the possibility of use in practical activities;
- formulation of the goal, object, subject, working hypothesis, research tasks, the essence of the researched problem, planning the stages of the experiment;
- practical application of methodological research principles;
- knowledge of scientific research methods;
- the ability of theoretical substantiation and experimental verification of the investigated problem;
- analysis of the results of research activities;
- personal participation in the organization of the experiment;
- the ability to engage in scientific discussion, to prove a point of view;
- analysis of experimental data using the methods of computer technologies and mathematical statistics;
- publishing a publication or speech based on one's research work results. This approach leads to the readiness and ability to carry out research activities and speaks of the

formation of research competence (Golovan, 2012).

Functional elements of research activity are at the same time components of the psychological structure of the teacher's activity, determining the possibility of analyzing the process of delivery of research tasks at the stage of their formation and interaction with students. Functional elements of research activity in the formation of research competence of future specialists as a factor of readiness for effective training in the process of professional training include: gnostic (or reflexive), projective, constructive, communicative, and organizational. Let us describe them:

- the gnostic (reflexive) element allows for the analysis of the research situation, contributes to the acquisition of new knowledge for the productive solution of the research situation and its analysis, and allows to compare of the obtained result with the real one;
- the design element provides an opportunity for modeling the teacher-researcher's activity, implementing actions related to the prediction of educational strategy: research problems, application of goals, means, and consequences of solving the system of scientific research tasks;
- the constructive element provides actions related to the selection and construction of the content of scientific information, the creation of means, forms, and methods of scientific-pedagogical interaction with students in the scientific-research process;
- the communicative element directs actions to establish optimal relationships with students, interaction with scientists of scientific research institutions, and teaching colleagues during the solution of research tasks;
- the organizational element organizes actions aimed at obtaining scientific research activities of students, scientific information in the process of its presentation, related to the assimilation of this information.

The selected functional elements are built according to the principle of enabling the functioning of each subsequent element, provided that all previous components are included, which can also be considered separately (Sydorчук, 2020).

Conclusions

The article examines the problem of the formation of research competence of future

specialists as a factor of readiness for effective training in the process of professional training.

The definitions of the concepts "competence" and "research competence", which have different positions, are given. The essence of research competence is proven, which consists in highlighting significant personal traits of future specialists, which are manifested in the ability and willingness to independently acquire and systematize the acquired knowledge, taking into account and relying on previously acquired skills, knowledge, methods of activity, and skills. The role of the research competence of students, the research activity of future specialists, and the level of development of thought processes in the process of professional research activity have been proven. The key concepts that determine the necessary conditions for the organization of this kind of activity of education seekers in an educational institution are independence, search, initiative, experiment, practical action, joint work, contradiction, a situation of ambiguity, and the presence of different points of view.

The components that perform motivational, value-oriented, cognitive, effective and regulatory functions are highlighted in the structure of the student's research competence. The conducted research does not cover all aspects of the problem under consideration. Prospects for further research consist in the expansion and improvement of tasks, and forms of scientific research work of students.

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