

# Formation of Research Competence Using Innovative Technologies to Improve the Quality of Training Future Specialists

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## Summary

Analyzing the psychological and pedagogical literature, we showed the interest of researchers in the problem posed. The concept of competence is considered, which is interpreted as giving the key to solving a wide range of educational and life tasks. Research competence implies the ability to cooperate, enter into contacts, readiness for changes, for self-determination and is an integral quality of the individual, expressed in the readiness and ability to independently search for solutions to new problems and creative transformation of reality based on a set of personal and meaningful knowledge, skills, methods of activity and value attitudes. The article offers conditions that certify the improvement of forms and methods of training students in the formation of research competence of future specialists. The use of innovative technologies contributes to improving the level of training of future specialists: students are better prepared for classes, take an active part in the assimilation of program material in laboratory classes. It is noted that this creates a subject-subject relationship between the student and the teacher, and changes the attitude of students to classes. In the process of such organization of educational activities, students are convinced of the need for knowledge and its effectiveness, learn to compare, generalize, classify, establish cause-and-effect relationships, express opinions, defend their point of view, they ensure success in their studies, and develop research competence. It is proved that in order to apply the latest technologies, the teacher himself must know them well, that is, constantly improve himself, master new methods, techniques, ideas, which will help him create new pedagogical technologies and implement them in the educational process.

## Keywords:

*formation of research competence, future specialists, improving the level of training future specialists, the latest technologies, educational process, integrative personality characteristics, readiness and ability to independently search for solutions to*

*problems.*

## 1. Introduction

According to the Laws of Ukraine on Education, the main task is to form a creative personality, so first attention is paid to the development of his abilities and talents.

A Real School of personality formation is a school for developing individuality, identifying capable and talented students, enriching their intellectual and creative potential, and forming the research competence of future specialists.

The more a teacher can provide students with an individual approach to them in the creative process, develop their natural inclinations in many ways, the more gifted they will show in their later life.

Integration of Ukraine into the pan-European educational space, drastic changes in the labor market require a revision of traditional approaches to training specialists in higher education and monitoring the effectiveness of the activities carried out. [9].

The peculiarity of the modern socio-economic and socio-cultural situation in the state is a change in the qualitative requirements for a specialist of any profile, ensuring his demand in the labor market, successful and qualified professional activity, promotion, Social Security and fruitful life in general.

The problems related to the formation of research competence of future specialists are not isolated from economic and political phenomena, which clearly reflect the contradictions of our society. Ensuring the future of a

specialist, including through the formation of research competence of future specialists in relation to the requirements for professional activity, is one of the most important tasks of pedagogical science.

To meet modern requirements for a specialist, a new approach to the problems of educating a person of a new formation, creative, mobile, competitive, morally mature, professionally cultural, ready for active life in the conditions of modern socio-cultural realities, which are formed in the process of training.

**Purpose of the article.** Consider the content of the concept of "research competence" in domestic and foreign literature and the main features of the formation of research competence in future specialists using innovative technologies.

## 2. Analysis of recent research and publications

To train a new generation of specialists who are able to think creatively, develop and implement new training technologies, master new methods of activating independent work, new books, manuals, collections, etc. are created.

The book "Education and Science of Ukraine: Ways of Modernization" notes: "Education should acquire an innovative character, and its pupils – the ability to an innovative type of life and vital activity". [8].

In the textbook "Preparing a future teacher for the introduction of pedagogical technologies", the problem of preparing a future specialist for the introduction of pedagogical technologies during pedagogical practice and in future professional activities is considered. [18].

Kravchenko, T., Varga, L., Lychanko-Kovachyk, O., Chinchoy, A., Yevtushenko, N., Syladii, I., & Kuchai, O. underline the features of the modern education system in Poland, reveals the peculiarities of improving the professional competence of a specialist in Poland through the implementation of multimedia technologies [7].

Plakhotnik, O., Strazhnikova, I., Yehorova, I., Semchuk, S., Tymchenko, A., Logvinova, Ya., & Kuchai, O. reveal the importance of multimedia teaching tools is shown, which are promising and highly effective tools that allow the teacher not only to present an array of information in a larger volume than traditional sources of information, but also to include text, graphs, diagrams, sound, animation, video, etc. in a visually integrated form [16].

Shchyrbul, O., Babalich, V., Mishyn, S., Novikova, V., Zinchenko, L., Haidamashko, I., & Kuchai, O. show the essence of the concept of multimedia is clarified. In the context of media education, multimedia lists a number of functions: informational, interpretive, cultural, entertainment, and educational [21].

The educational and methodical manual "Educational Technologies" introduces modern approaches to the

organization of the pedagogical process in an educational institution, focuses on their personality-oriented character. [15].

Content of the methodological manual "Interactive Learning Technologies: theory, practice, experience" [17] provides for consideration of the pedagogical basis of education in Higher and Secondary Schools, organization of the educational process, taking into account the interests and abilities of students. According to the authors of the manual, explanations and demonstrations alone will never provide real, sustainable knowledge. This can only be achieved through active (interactive) learning.

As Mazaraki A. notes, for a teacher who focuses on the pedagogy of co-creation, such knowledge is very important when choosing forms and methods of teaching in a particular discipline, when creating an appropriate microclimate in the student audience. [10].

A significant place is occupied by the problems of modernization of education in Ukraine in the collection of scientific papers dedicated to the 10th anniversary of the APN of Ukraine. Introduction of Educational Innovations is one of the priority areas of the state policy for the development of Education. The task of higher education institutions is to provide training of personnel capable of mastering and implementing new technologies and forming the research competence of future specialists. [20]. This literature provides the acquisition of skills in preparing and conducting various forms of classroom classes, creating scientific and methodological support for the educational process, organizing practical training of future specialists. Due to the need for innovation in education, the teacher plays an exceptional role. It is necessary to find new methods of training future teachers in order to form the research competence of future specialists.

Yevtukh M. considers the teacher's organization of the creative process in the classroom and attracting students to actively participate in it to be an important prerequisite for the formation of research competence of future specialists. This is facilitated by role-playing didactic games, which give students the opportunity to maximize their creative abilities, their vision of the problem, test themselves for professional competence, strengthen motivation, etc. [23].

Recently, leading scientists have assigned a significant role to interactive technologies in increasing the level of student activity and forming the research competence of future specialists. Among them, an important place in the psychological and pedagogical literature is occupied by the question of group forms of educational activities, because they open up opportunities for individuals to cooperate, communicate, and learn about the environment. [15].

Nikorak Y. describes approaches to the definition of the concept of "research competence", points out the best ways of its formation in future teachers of humanitarian specialties during their training in institutions of Higher Education. The author revealed the relevance of the

problem of forming research competence among future teachers of humanities in the modern educational space. He emphasized that the competence approach in education allows us to consider research competence as a key component of teacher professionalism [12].

According to the results of the analysis of literature sources, a significant number of scientists are working to solve this problem. However, many issues have not yet been resolved, especially in terms of developing the research competence of future specialists.

Taking into account the above, the main areas of research, we refer to the formation of research competence of future specialists, the development of their creative abilities with optimal scientific, methodological and educational-didactic resources, in particular, the intensification of the educational process based on active teaching methods.

### 3. Research methods

To achieve this goal, the following research methods were used: scientific and theoretical method, which includes the analysis and synthesis of scientific sources that made it possible to systematically characterize the situation in education (the method was used for the characterization of the theoretical and methodological basis of the study). Comparative historical and pedagogical analysis of domestic and foreign scientific, methodological literature, which allowed identifying trends in modern education, studying modern labor market requirements; linguistic method (the method was used in the study of content analysis and structural and frequency analysis of basic concepts).

### 4. Results and discussion

Analyzing the psychological and pedagogical literature, we showed the interest of researchers in the problem posed. It is worth focusing on some definitions of the concept of "competence", which have different accentuations. In particular, UNESCO publications interpret the concept of "competence" as a combination of knowledge, skills, values and attitudes applied in everyday life. As for the industry standards of higher education, according to the methodological recommendations for the development of components of industry standards of Higher Education, the competence approach "includes knowledge and understanding, skills of how to act, knowledge of how to be". The subject area in which the individual is well aware and in which he shows readiness to perform activities". [11].

It should be noted that Bekh I. considers it inappropriate to identify educational abilities (knowledge and skills) with the corresponding competencies. These academic achievements need to be transformed into life competencies.

The scientist interprets the essence of the concept of "competence" as the subject's experience in a certain sphere of life. He insists that it is the semantic emphasis on experience, and not on awareness, the subject's awareness in a particular field, that should be taken into conceptual "armament". [2].

Baibara T. notes that competence is the student's possession of competence, combined with his personal attitude to it and to the subject of activity. [1]. The agreed category became the basis for the provisions of the state standard of education, in which competence is formulated as an integrated ability of the individual acquired in the course of training, which consists of knowledge, experience, values and attitudes that can be holistically implemented in practice. [14].

Recently, there have been other studies devoted to this problem (O. Gura [6], G. Sombamania [22] etc.) Thus, O. Gura scientifically substantiated the essence, structure of psychological and pedagogical competence of a teacher of a higher educational institution, described the requirements for scientific, educational, methodological and organizational and educational work. The scientist defined the psychological and pedagogical competence of a teacher of a higher educational institution as a complex personal and professional system quality that ensures the teacher's self-organization at the personal level in accordance with the requirements of professional activity in a higher educational institution. [6].

A. Savchenko's key competencies are interpreted as those that "provide the key to solving a wide range of educational and life tasks, so they are formed on an intersubject basis", [19] as "a specially structured set of characteristics (qualities) of the individual, which makes it possible to effectively participate, act in various life spheres of activity and belongs to the industry-wide content of educational standards". [14].

The industry-standard of Higher Education (ISHE) provides for the development of the social and personal component in the system of competencies [11], after all, only a professionally and socially competent specialist can become a direct "engine" of qualitative changes in society.

At the present stage, the traditional approach is changing to a competence approach, so we will consider research competence, which is one of the key ones in training specialists.

Research competence is considered key and it is believed that research competence is formed based on an innate quality of the individual.

Scientists present their research competence as:

- an integral personal quality, expressed in the willingness and ability to independently master and receive systems of new knowledge. This occurs as a result of the transfer of semantic context from functional activity to transformative, based on existing knowledge, skills, abilities and methods of activity;

- it is defined as the possession of a person's appropriate research competence, as the result of cognitive activity of a person in a certain field, methods, research methods that he must master in order to carry out research activities;

- as a component of competence related to human activity;

- as an integral quality of the individual, expressed in the readiness and ability to independently search for solutions to new problems and creative transformation of reality. This process takes place on the basis of a set of personal and meaningful knowledge, skills and abilities, methods of activity;

- as an integral characteristic of the student's personality, which is manifested in his conscious readiness and ability to take an active research position in relation to his activities and himself as its subject, independently and creatively solve research problems based on existing knowledge and skills; [3]

- as " a holistic, integrative quality of the individual, combining knowledge, skills, experience of the researcher, value attitudes and personal qualities and is manifested in the willingness and ability to carry out research activities in order to obtain new knowledge through the application of methods of scientific knowledge. The application of a creative approach in goal setting, planning, analysis, decision-making and evaluation of the results of research activities. Moreover, although research competence is a product of learning, it does not directly follow from it, but is a consequence of the self-development of the student's personality, his personal growth, integral self-organization and synthesis of his cognitive, activity and personal experience". [5].

Research competence is considered a component of a person's self-improvement competence. It is aimed at mastering the ways of intellectual and spiritual development of a person, as a structural component of cognitive competence, which includes "elements of methodological, super-subject, logical activity, ways of organizing goal setting, planning, analysis, reflection". [3].

The relevance of the problem of forming research competence among future specialists is constantly growing. The educational environment of a higher education institution is an effective means of forming the research competence of future specialists, since it allows you to systematically apply: educational resources, forms, teaching methods, encourage students – future specialists – to work independently and, in particular, to research activities.

Political and socio-economic transformations in Ukraine have set new challenges for both the educational system and higher education in particular. This industry is a powerful factor in the formation of research competence of future specialists, the reproduction of the productive forces of Ukraine. Solving the problems of higher education is

based mainly on the quality of the staff of the institution of Higher Education, on the level of professional competence of teachers.

A special feature of the research competence of specialists is that it is a component of professional competence, and is aimed primarily at developing research skills and realizing the creative capabilities of the individual. [4].

For the full formation of students' research skills, it is advisable, first, to apply active teaching methods, develop their search skills, correlate the stages of scientific search; prove conclusions, and so on.

We believe that the main trend that should manifest itself when teaching disciplines in a higher education institution is the creation of appropriate pedagogical conditions for improving the quality of training specialists. Today, when the issue of forming the research competence of future specialists, activating the thinking activity of the individual is brought to the fore, it is important to prepare future specialists for such activities so that they can organize the entire educational process in a new way. Therefore, we believe that it is necessary to apply a set of conditions that will contribute to improving the level of training of specialists. We define the following conditions: creating a set of new-generation manuals to help students and teachers; using new technologies in the educational process.

New requirements for the training of specialists determine the new content of training, which can be implemented using appropriate methods, tools and organizational forms of training.

During lectures, students master theoretical knowledge about the methodology of teaching disciplines. When conducting laboratory classes, tools and methods are used that, arouse the greatest interest among students and contribute to the development of creative thinking. In laboratory classes, students learn to navigate new pedagogical technologies and search for new methodological ideas. At the same time, they master knowledge and skills to speak, reflect, and prove, which in the future will allow them to independently acquire knowledge.

We share the opinion with K. Nor that group learning activities are a form of organizing training in small groups of students united by a common educational goal with indirect guidance by a teacher and in cooperation with students. [13].

In order to apply interactive teaching methods, it is necessary to adjust the thematic planning, content and structure of classes, and create options for tasks with students to work in the process of group learning activities. Students in the context of group work quickly master effective ways to solve educational problems.

The study of the topic ends with a discussion in groups on the content of the material studied with the help of tasks,

questions, and so on. The group form is used in laboratory classes to create an atmosphere in the classroom that promotes cooperation, goodwill, and allows you to truly implement personality-oriented learning.

When organizing group-learning activities, the teacher must ensure the activity of each student. For this purpose, it is advisable to conduct the conversation in the form of a discussion. In the group, everyone expresses their opinion and proves its expediency. Because of discussions, they come to a common opinion. [3].

The discussion should best ensure the solution of the educational tasks put forward at this stage. It differs from a normal conversation in that students enter into indirect communication with each other. If in a conversation the teacher evaluates, and often explains, the position expressed by the student, then in the discussion the future specialist has to independently justify his point of view. [15].

Group guidance is provided through memos, tasks, and instructions. On the eve of classes, consultants receive instructions on how to organize work in the group. To solve problems, students are offered a memo on working in a group:

1. Do not argue in vain.
2. Listen to each other.
3. Evaluate the originality of the solutions proposed by other students.
4. Review your information. Do you support other people's information? Why?
5. Give an assessment of everyone's performance.
6. Analyze ways to solve the problem.
7. Determine the overall result. Who will report the results to the academic group?

Considerable attention is paid to the preparation of tasks for group work that encourage students to be active, creative thinking, and the formation of research competence of future specialists. Tasks are selected that require the ability to compare and analyze, generalize and systematize already acquired knowledge. This creates conditions for the development of interest in attracting future specialists to solve the tasks set.

The teacher directs the work of groups: finds out how the consultant manages the task completion process, listens to how the discussion is going, whether all students take part in it, conducts the necessary advice, and organizes student cooperation. At the same time, he pays more attention to the group that has more difficulties in organizing polemics when performing a common task.

Analyzing the work carried out, the teacher together with students concluded that coordinated group educational activities allow us to find the most appropriate solution, show creativity, support each other to form the research competence of future specialists. In group-learning activities, students show high results in the assimilation of knowledge and the formation of skills. [3].

We asked students to answer the question: "What do you think are the advantages of the group form of educational activities in comparison with other organizational forms?" The answers were as follows:

1. Over the same period, the amount of work performed is significantly higher (10%).
2. High efficiency in mastering knowledge and developing skills (7%).
3. Skills to defend your opinion are acquired (12%).
4. All students (15%) participate in solving the problem.
5. Interest in learning increases, because with such an organization of work, immersion in the solution of the question quickly occurs (20%).
6. Logical thinking develops (26%).
7. The research competence of future specialists is formed (10%).

The analysis of students' responses shows that with such an organization of work in a laboratory lesson, students develop the ability to analyze, integrate and synthesize information, they feel like accomplices in the educational process, and the research competence of future specialists is formed.

In the group form of work, students view tasks from different angles and bring the joint work to its logical conclusion. In addition, when the final information includes a grain of an individual student, he has confidence in his abilities as a future specialist. [8].

Only with such an organization of work in a group, when all students enter the discussion and the level of active thinking of each participant in the educational process increases, in the classroom the future specialist will reject the usual. Template and make his own independent decision in the process of discussing this problem in the group, because the student has passion, he seeks to get into the essence of what is known and discussed. The research competence of future specialists will be formed.

The correct use of business games in the classroom develops not only the knowledge of future specialists, activates and sharpens the perception of the material, makes it possible to play specific pedagogical situations. Forms the ability to establish contacts, show an attitude to pupils, but also allows you to study and generalize the achievements of pedagogical science and practice, update, deepen the content and technologies of professional training of students. Role-playing games contribute to the development of creative analytical thinking of students, the ability to convincingly express their opinion, discuss, and defend their point of view. [23].

The proposed conditions certify the improvement of forms and methods of training students in the formation of research competence of future specialists.

The experience of working in higher education institutions gives grounds to assert that students who are purposefully engaged in research activities differ markedly

from others in their qualitative characteristics and formed skills and abilities that form the basis of their research competence. They are characterized by cognitive activity, the desire not only to acquire professionally important knowledge and skills, but also to explore the educational process at school. To study the age, psychological, individual characteristics of students, the specifics of their relationships with each other, with teachers, ways of applying innovative methods and forms of learning in the organization of the educational and cognitive process at school. This leads us to the conclusion that research competence is formed in the conditions of innovative educational space of a modern institution of higher education because of successful implementation of collective research activities and independent search (writing Scientific Reports, preparing individual research tasks. The implementation of which involves the study of certain academic disciplines ("Pedagogical Deontology", "Basic scientific and educational research", "Pedagogical Technologies", "Pedagogical Innovation", "Pedagogical Management", "Methodology of Scientific Research", etc.) and individual research search (presentations with Scientific Reports and reports at conferences, preparation of research materials, writing essays, reports and articles in scientific journals. The leading forms of research activity of students also include term papers, scientific circles, conferences, Olympiads, problem groups, competitions of scientific student papers. Thus, under the research competence of students-the humanities profile of training, we define a certain quality of personality, which includes knowledge, skills and abilities of conducting research activities, which allows us to conduct scientific work to solve educational problems, in accordance with certain goals and objectives of professional training. Since during the training of future teachers in higher education institutions, there is a rather low level of formation of research competence in the performance of educational and research tasks and the preparation of Scientific Reports, research and project work, coursework and Bachelor's qualification works. This gives grounds for generalization that pedagogical research mainly uses a set of general scientific methods. Pedagogy in this case performs a system-forming function, integrating knowledge from various sciences. Taking into account its own specifics and in order to obtain comprehensive information about the development, training and education of a certain object of pedagogical influence. At the same time, it is particularly difficult for students of Humanities to apply mathematical and statistical methods of scientific and pedagogical research in scientific research and search activities. Mathematical methods are used in pedagogical research to process a large array of data obtained by observation and experimental methods, as well as to establish quantitative dependencies and qualitative indicators between the phenomena under study. The essence of mathematical

methods is to describe pedagogical phenomena and processes using quantitative characteristics, use cybernetic models to determine the optimal conditions for managing the process of learning and education. Their use for describing and reproducing pedagogical phenomena and processes is possible if the phenomena are mass, typical, and measurable. When conducting pedagogical research, there is a repeated need to compare and contrast pedagogical facts, phenomena and processes according to certain characteristics and parameters. To do this, certain numerical indicators indicate the levels of qualitative characteristics of these parameters. They help the teacher correctly evaluate the results of the experiment, increase the reliability of conclusions, and give grounds for theoretical generalizations. The most commonly used mathematical methods in scientific and pedagogical research include methods of registration, ranking, rating, measurement. [12].

## Conclusions

Research competence implies the ability to cooperate, make contacts, easy compatibility, readiness for change, and self-determination. It is considered as an integrative characteristic of the individual, which provides for the possession of methodological knowledge, technology of research activities, as well as recognition of their value and readiness for their use in professional activities. Research competence is a key basis for the development of other competencies, as it helps a person to learn throughout life, become competitive, and successful in later life.

The use of interactive technologies helps to improve the level of training of future specialists: students are better prepared for classes, take an active part in the assimilation of program material in laboratory classes. We note that this creates a subject-subject relationship between the student and the teacher, and changes the attitude of students to classes. In the process of such organization of educational activities, students are convinced of the need for knowledge and its effectiveness, learn to compare, generalize, classify, establish cause-and-effect relationships, express opinions, defend their point of view, they ensure success in their studies, and develop research competence.

To apply the latest technologies, the teacher himself must know them well, that is, constantly improve himself, master new methods, techniques, ideas, which will help him create new pedagogical technologies and implement them in the educational process.

Prospects for further research. Our further research will be aimed at developing conditions that certify the improvement of forms and methods of training students in the formation of research competence of future specialists.

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