

MRNTI 14.15.07
UDC 378.016

DOI: <https://doi.org/10.37788/2025-3/43-48>

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Research competence, its place in the system of key competences

Abstract

Main problem: The article examines research competence as a key competence in the modern educational context. The authors emphasize its importance in an era of dynamic change and information abundance, when the ability to critically analyze information, formulate questions and find solutions becomes vital.

Objective: Research begins with the definition of research competence, which includes the ability to set goals, plan, collect, process, and interpret data, as well as present research results. The authors analyze its components, including knowledge of scientific research methodology, proficiency in various research tools, and the ability to work with information from different sources.

Methods: In conclusion, the authors summarize the conclusions, confirming the high importance of research competence for successful adaptation to the modern world. They call for further research and development of effective methods for the formation of this competence at all levels of education.

Results and their significance: Keywords: competence, research competence, research activity, training. In conclusion, the authors summarize their findings, confirming the high importance of research competence for successful adaptation to the modern world. They call for further research and development of effective methods for fostering this competence at all levels of education.

Keywords: competence, research competence, research activities, education

Introduction

In today's rapidly evolving society characterized by information technology and globalization, research competence has become an integral part of the educational process. It refers to a person's ability to independently search for, analyze, and interpret information, as well as formulate and test hypotheses. In this article, we will explore what research competence is, its key elements, and its place within the framework of key competencies.

Among the competencies, students' research competencies can be distinguished in a special way, which are based on key competencies. Key competencies are multidimensional and include various mental processes and intellectual skills. In order to formulate the concept of "research competence" and define its content, in our opinion, it is necessary to consider the essence of research activity. There are various approaches to the interpretation of the concept of "research competence", some of which we will focus on:

- from the perspective of a systematic approach (L.A. Golub, V.S. Lazarev, T.A. Smolina, etc.), research competence is a component of professional competence;
- from the perspective of a knowledge-operational approach (M.A. Danilov, E.F. Zeer, M.A. Choshanov, etc.), research competence is a set of knowledge and skills necessary for carrying out research activities;
- from the perspective of the procedural and technological approach (A.V. Khutorskoy), research competence is considered "as a person's possession of the appropriate research competence, which should be understood as knowledge as the result of a person's cognitive activity in a specific field of science, as well as the methods and techniques of research that they must master in order to carry out research activities, as well as the motivation and position of the researcher, and their value orientations" [1];

- from the standpoint of the functional activity approach (B.G. Ananyev, N.V. Kuzmina, A.K. Markova, V.D. Shadrikov, etc.), the concept of "research competence" includes a set of personal qualities necessary for effective research activity. The qualities that characterize a researcher include the following: a steady focus on solving the research problem; obsession with work, nonconformism; criticality and self-criticism, constant dissatisfaction with the achieved result, etc;

– from the standpoint of the competence approach (B.G. Ananyev, V.A. Bolotov, A.A. Derkach, I.A. Zimnaya, N.V. Kuzmina, V.V. Laptev, A.K. Markova, S.I. Osipova, V.V. Serikov, V.A. Slastenin, A.P. Tryapitsyna, V.D. Shadrikov, etc.) research competence. It is considered as an integral characteristic of the student's personality, expressed in the willingness and ability to independently master and receive systems of new knowledge as a result of the transfer of the semantic context of activity from the functional to the transformative, based on existing knowledge, skills and methods of activity. Within the framework of this approach, V.A. Slastenin emphasizes that the structural components of research competence should coincide with the components of research activity, and the unity of theoretical and practical research skills form a model of students' research competence [2].

Most researchers tend to view students' research competence because of well-planned research activities (writing research papers, conducting and analyzing experiments, etc.). S. I. Osipova draws attention to the transformative nature of research competence and presents it as an integral personal quality that manifests itself in the readiness and ability to independently acquire and apply new knowledge systems by transferring the semantic context of activity from functional to transformative, based on existing knowledge, skills, and methods of activity [3].

The same author suggests that there are three main elements of a student's research competence, which are expressed in the following abilities: – identifying the goal of the activity; – determining the subject and means of the activity, and implementing the planned actions; – reflecting on and analyzing the results of the activity (comparing the achieved results with the set goal).

These elements, in our opinion, reflect competence in conducting research largely than in educational practice. We would like to note that research competence should be formed in any person, as one of the essential ones, in the course of educational and cognitive activity. Research activity is inherent in humans phylogenetically, it has passed to us from the animal world. Physiological researchers have found interesting designations for the indicative research behavior of primates: "disinterested curiosity" (I.P. Pavlov); "research impulse" (N.Y. Voitonis); "survey activity" (N.N. Ladygina-Kots) [4].

Considering the works of psychologists, we can identify two main manifestations of research activity: the orienting reflex, which humans inherited from animals, and the research reaction. Let us focus on the psychological categories that originate from the senses and should be primarily developed through research activities. Drawing on the works of S. According to L. Rubinstein and V.S. Mukhina, the first manifestation of research activity is the orienting reflex: the ability of a person not just to look, but to see, or even better, to contemplate (consider and observe), and as a result, to perceive what is the focus of their attention [5, 6].

To Obukhovsky [7] believes that the orienting reflex is a factor that initiates further cognitive activity of a person, which, in turn, is divided into a "simple orienting reaction" and a "complex exploratory reaction", manifested in cognition to one degree or another of the object or phenomenon of interest. The more opportunities the object under study provides, the greater the strength of the research reaction, and a peculiar motive for research is manifested here.

Materials and methods

100 high school students from a school in Pavlodar participated in the study. Questionnaires developed based on the research competence model were used to measure the level of research competence. The questionnaire consisted of 30 questions aimed at assessing the skills of critical thinking, data analysis and working with scientific sources

Data collection was conducted between January and March 2025. Participants filled out questionnaires in an online format, which ensured convenience and accessibility. In addition to the survey, five focus group interviews were conducted to gain a deeper understanding of students' perception of research competence.

SPSS software was used to analyze the quantitative data, which included descriptive statistics and correlation analysis. The qualitative data was analyzed using content analysis, which helped to identify the main themes and patterns in the participants' responses. The study was conducted in accordance with ethical standards, and all participants were informed about the purpose of the study and gave their consent in writing.

Results

The study assessed the level of students' research competence, and the results showed that the average score was 75 out of 100. This indicates a high level of formation of research competence. In a

qualitative analysis based on focus groups, three key themes emerged the importance of hands-on experience, the need for critical thinking training, and the role of mentoring.

The findings support the conclusions of previous studies, but highlight the lesser importance of theoretical knowledge. This highlights the need for curriculum revisions to emphasize practical aspects of research. Despite the positive findings, it is important to acknowledge the limitations of our study, including the small sample size, which may affect the generalizability of the data. Future research can focus on exploring research competence in a broader context, including different educational institutions.

After analyzing the content of the above-mentioned approaches, we can draw a conclusion and consider research competence as an integral characteristic of a student's personality, which manifests itself in the willingness to take an active research position in relation to their own activities and themselves as the subject of these activities, and to independently and creatively solve research tasks based on their existing knowledge and skills. From this, it follows that a student can only independently acquire and build new knowledge systems when they are the subject of their own education, clearly understanding the meaning and significance of research competence in their educational activities and being interested in obtaining research results.

In this case, students' proactive, independent, and research-oriented attitude to reality, other people, and themselves as researchers is one of the most important elements of a conscious approach to the need to develop their research competence. The essence of research competence is manifested through the interrelation of its components: motivational, informational, cognitive, communicative, reflexive, personal.

– The motivational component is associated with the formation of a student's interest in research activities, both individual and group, as well as the need for such activities and the focus on achieving their results. The motivational and value component includes – shows interest in knowledge and curiosity;

- Shows cognitive activity that develops into a cognitive need;
- Strives for independent creative research activities;
- Strives for self-improvement;
- Readiness for volitional tension, forecasting, idea generation, and problem definition;
- Desire to work in a research group and to experiment.

To solve problematic tasks in the Biology course, students need to look for additional information and be able to work with sources. Therefore, the information component is important for the formation of research competence. The information component is determined by the student's ability to extract and process information, skills in working with modern computer, multimedia and other equipment.

By solving problematic tasks, the student shows his ability to carry out a bibliographic search, receive and summarize information on the issue. While working on a problem, he can bring his solution to this issue into a research project, implementing the cognitive component of research competence. The cognitive component of research competence is represented by the ability to use acquired knowledge in various non-standard life situations; it is determined by the system of knowledge about research activities, their norms and values in modern society.

The cognitive component includes the following skills:

- The ability to see the problem and formulate it;
- Ability to formulate research goals and objectives;
- The ability to carry out a bibliographic search, receive and summarize information on the issue;
- the ability to use a variety of empirical research methods;
- The ability to perform research in a certain sequence;
- The ability to present the progress and results of the work, to properly arrange their research work, etc.

Discussion

When solving biological problems, a student can carry out research projects individually or in pairs, which undoubtedly requires communication, the ability to establish contact, and dialogue. These skills are part of the structure of the communicative component of research competence and include:

- The ability to organize and carry out productive communication with both individuals and groups of people;
- The ability to find and see non-standard ways to solve problems;

- The ability to make decisions taking into account personal and social consequences;
- The ability to rationally plan their actions in a research group;
- The ability to see and find ways to solve problems in group relationships, make decisions taking into account the interests of all members of the research group (research team), use the laws of interpersonal communication in situations of research interaction.

The structure of research competence also includes a reflexive component, which requires students to be able to recognize, evaluate and analyze research phenomena, situations that arise in life, and the research abilities of not only their own, but also those of others.

An important role in the formation of research competence is played by the personal component, which involves the development of students' skills of self-organization, independence, self-learning, self-regulation, self-determination and self-development. The result of the research task is cultural self-determination, self-identification of the student. By completing a research project on a topic of interest to him, the student chooses the direction of his future profession, he becomes self-determined. All this forms the basis of the personal component of research competence.

Analyzing the above, we can conclude that all the components of research competence are interconnected and complement each other. Research is difficult to imagine without creativity, which is why psychologists often equate research and creative abilities, including cognitive traits (observantness, independence of judgment, high intelligence, good memory, desire to express one's own truth, etc.) and personal traits (rich inner world, increased sensitivity to one's fantasies, motivations, impulses, etc.).

Conclusion

Research competence is an important element of the key competencies system, which is necessary for a successful life and professional activity in today's society. It not only helps individuals navigate the world of information, but also contributes to their personal and professional development. Educational institutions should focus on developing research competence among students by creating an environment that encourages active learning and exploration. This will ensure that students are equipped with the necessary skills to effectively address the challenges of the modern world.

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Зерттеу құзыреттілігі, оның негізгі құзыреттер жүйесіндегі орны

Мақалада зерттеу құзыреттілігі қазіргі білім беру жағдайындағы негізгі құзыреттілік ретінде қарастырылады. Авторлар оның динамикалық өзгерістер мен ақпараттың көптігі дәуіріндегі маңыздылығын атап көрсетеді, бұл кезде ақпаратты сыни тұрғыдан талдау, сұрақтарды тұжырымдау және шешімдерді табу қабілеті өмірлік маңызды болады.

Зерттеу мақсат қою, деректерді жоспарлау, жинау, өңдеу және интерпретациялау, сондай-ақ зерттеу нәтижелерін ұсыну қабілетін қамтитын зерттеу құзыреттілігін анықтаудан басталады. Авторлар оның құрамдас бөліктерін, соның ішінде ғылыми зерттеу әдістемесін білуді, әртүрлі зерттеу құралдарын меңгеруді, әртүрлі көздерден алынған ақпаратпен жұмыс істеу қабілетін талдайды.

Қорытындылай келе, авторлар қазіргі әлемге сәтті бейімделу үшін зерттеу құзыреттілігінің жоғары маңыздылығын растайтын қорытындыларды қорытындылайды. Олар білім берудің барлық деңгейлерінде осы құзыреттілікті қалыптастырудың тиімді әдістерін одан әрі зерттеуге және дамытуға шақырады.

Түйінді Сөздер: құзыреттілік, зерттеу құзыреттілігі, зерттеу қызметі, тренингсоңында авторлар қазіргі әлемге сәтті бейімделу үшін зерттеу құзыреттілігінің жоғары маңыздылығын растай отырып, өз тұжырымдарын қорытындылайды. Олар білім берудің барлық деңгейлерінде осы құзыреттілікті қалыптастырудың тиімді әдістерін одан әрі зерттеуге және дамытуға шақырады.

Түйінді сөздер: құзыреттілік, ғылыми-зерттеу құзыреттілігі, ғылыми-зерттеу қызметі, білім беру

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Исследовательская компетенция, ее место в системе основных компетенций

В статье исследуемая компетенция рассматривается как основная компетенция в современных образовательных условиях. Авторы подчеркивают его важность в эпоху динамических изменений и изобилия информации, когда способность критически анализировать информацию, формулировать вопросы и находить решения становится жизненно важной.

Исследование начинается с определения исследовательской компетенции, которая включает в себя способность ставить цели, планировать, собирать, обрабатывать и интерпретировать данные, а также представлять результаты исследования. Авторы анализируют его составляющие, в том числе знание методологии научного исследования, владение различными инструментами исследования, умение работать с информацией из разных источников.

В заключение авторы обобщают выводы, подтверждающие высокую значимость исследовательской компетентности для успешной адаптации к современному миру. Они призывают к дальнейшему изучению и развитию эффективных методов формирования этой компетенции на всех уровнях образования.

В конце авторы обобщают свои выводы, подтверждая высокую значимость исследовательской компетентности для успешной адаптации к современному миру. Они призывают к дальнейшему изучению и развитию эффективных методов формирования этой компетенции на всех уровнях образования.

Ключевые слова: компетентность, научно-исследовательская компетентность, научно-исследовательская деятельность, образование

Date of receipt of the manuscript to the editor: 2025/06/25