

PEDAGOGICAL SUPPORT FOR THE FORMATION OF RESEARCH COMPETENCE IN FUTURE ENGINEERS

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ANNOTATION

The article analyzes the main difficulties and obstacles in the research activities of students, organizational and pedagogical conditions for the formation of research competencies. The approaches to the construction of educational technologies that contribute to the effective development of research competencies of future specialists are substantiated.

Keywords: Students, research competence, research activity, cognitive barriers, needs for continuing education and self-development, intelligence map, individual styles, intellectual activity.

АННОТАЦИЯ

В статье анализируются основные трудности и препятствия в научно-исследовательской деятельности студентов, организационно-педагогические условия формирования научно-исследовательских компетенций. Обосновываются подходы к построению образовательных технологий, способствующих эффективному развитию научно-исследовательских компетенций у будущих специалистов.

Ключевые слова: Студенты, исследовательская компетенция, исследовательская деятельность, когнитивные барьеры, потребности в непрерывном образовании и саморазвитии, интеллект-карта, индивидуальные стили, интеллектуальная деятельность.

In psychological and pedagogical research, the concept of enrichment is understood as a pedagogical strategy. As a basic definition, we have V. We get the definition proposed by Ignatova V, V. Ignatova V considers this concept as an educational strategy, and argues that enrichment involves the complex of pedagogical conditions: "the introduction of something new into the personal or educational space, the fulfillment of forms, methods, techniques, tools, mechanisms that become their value, manifested in the process of life activity of an individual and the functioning of space"[1].

Thus, the enrichment of the experience of research activities of Future Engineers is understood in our opinion as an organizational and pedagogical condition that expresses a set of pedagogical actions aimed at the formation of tkSI for future engineers, the expansion of this experience of students through their participation in the conditions of independent creative application of initial research knowledge and skills in the.

The analysis of the theory and practice of higher professional education made it possible to substantiate the need for the implementation of the following organizational and pedagogical conditions that will help future engineers to form a research competence in the process of their professional training:

- directing future engineers to research activities, assisting in the formation of a positive attitude towards research activities;
- the inclusion of future engineers in research activities aimed at the conscious acquisition of basic knowledge and skills by students in the field of research activities;
- enriching the experience of research activities of future engineers, ensuring the strengthening and improvement of basic knowledge and skills in the field of research activities.

Thus, the results of the analysis of the theoretical material presented in this paragraph made it possible for us to draw the following conclusions.

First, the analysis of the concepts of "formation", "formation of skills" made it possible to concretize the pedagogical meaning of the process of formation of research competence of future engineers and present it as a targeted process of changing the quality of its main components: motives of research activity, external factors of Personality Development and as basic knowledge and skills in the field of This reflects the main stages of research activities of future engineers: the orientation of future engineers to the formation of research activities; the acquisition of basic knowledge and skills in the field of research activities; their processing in the process of carrying out research activities.

Secondly, as the main organizational and pedagogical conditions for the formation of Tksis of future engineers, the following were identified and substantiated: the orientation of future engineers to research activities helps to form an understanding and recognition of the professional importance of tksis of future Bachelors; the inclusion of future engineers in research activities aimed at the conscious acquisition of basic; enrich the experience of research activities of future engineers who provide for the strengthening and improvement of basic knowledge and skills in the field of research in the process of practical training.

As a result of our research, a set of pedagogical conditions was determined that ensure the effective formation of research competence of future engineers in the process of laboratory and practical training and research work. The set of pedagogical conditions includes: stimulation of the motivation of research activities; pedagogical assistance by students in mastering the main components of research competence; saturation of classes with active, creative forms of work; enrich the creative personal potential of the student in the process of performing scientific research work as close as possible to the conditions of future professional activity.

Determining the effect of these conditions was carried out in terms of didactic and psychological carrying out aspects of laboratory practice and scientific research work.

The didactic aspect of organization is associated with the need to create pedagogical conditions that are most favorable for the implementation of the most important goals of laboratory practice and it, as a means of developing an organizational form of educational and research work and research competence.

The psychological aspect, taking into account the psychic processes, characteristics and state of the individual, is considered in terms of the need for future engineers in self-independent educational activities to form a research competence and ensure its activity, motivation, cognitive interest of the student's personality.

We emphasize, as the most important and first condition, the motivation for research activities, which is manifested in the activity of mental activity, in the strengthening of cognitive interest in experimental research work, in the response of the researcher with interest to discuss

problems, tasks, in the framework of laboratory practice and ITI, in the desire and desire to expand, deepen experimental skills.

In our opinion, the formation and development of values and motives of professional activity is facilitated by:

- the need for self-determination in life and the foresight of plans, the need to understand the current state from this point of view;
- tendency to be aware of one's own worldview;
- formation of social motives;
- self-realization as a holistic person, assessment of one's own capabilities in choosing a profession, the need for self-independent awareness of one's own life position;
- formation of targeted decision - making;
- interest in all forms of independent study itself;
- stability of interests;
- clear articulation of motives and goals.

Motivation for research activities is not an invariable amount, nevertheless, there are ways to stimulate it. In educational and scientific research activities, there is a close relationship between the development of student independence within the framework of laboratory practice and ITI and the strengthening of motivation for research activities. At the same time, the control function by the teacher is replaced by various forms of self-control, the ability to organize independent creative searches in students is formed.

The fulfillment of the described condition provides a positive dynamics of motivational and personal criterion indicators, which made it possible to assess the development of research competence of students and the importance of organizing the cognitive activity of students in the framework of laboratory practice and research work in the performance of creative experimental work through independent research.

Analyzing the methods of organizing student research activities in search of the most optimal one, we brought to the surface the second condition for the effective formation of research competence. We have defined this condition as pedagogical assistance in the acquisition of research knowledge, skills and qualifications of students. Student support was done at the same time as the teacher improved his research culture and developed his own experimental efforts. We were sure that pedagogical assistance in the acquisition of research knowledge, skills and qualifications of students, first of all, stimulated the development of professional-diagnostic, scientific-rationalizing and experimental-evaluative components of student research competence. At the same time, the perception of personal growth helped to increase motivation for research. We understand pedagogical assistance as cooperation and relationship with students, in which the main task of the teacher is to organize the research activities of students in the process of students' own perception, to develop the student as a subject of knowledge of the research potential. Mastering the search information technology style, working with printed sources has positively influenced the level of research skills: generalization, concretization, abstraction, differentiation, etc.

A qualitative analysis of the data obtained showed that as a result of improving the skills of analysis, synthesis, comparison, similarity, generalization, concretization, abstraction, the subjective position of students was activated. This has been reflected in the understanding of

the deep meaning of the logic of experimental research, understanding its internal laws, analyzing the relevance of research, explaining, comprehensively describing the possible prospects of certain areas of research and strengthening the ability to personally assess. The mutual creative approach of the teacher and students in the cognitive activity of research, the creativity of future engineers, non-standard thinking and the development of an individual style of activity were realized. Simultaneously with the development of the creative cognitive abilities of future engineers, the development of a research culture as an indicator of the teacher's ability to creative pedagogical activity also took place. The formation of educational activities of the teacher was based on the adoption of his personality, which encouraged the formation of the subjective position of the student; creating a favorable psychological climate in laboratory and practical training, which ensures the attractiveness of the study of mechanical engineering cycle Sciences and includes immersion in research activities.

The saturation of laboratory and practical classes with forms of research and creative work determined the third condition for the effectiveness of the process of formation and development of research competence. The combination of traditional and innovative pedagogical approaches and teaching methods allowed students to optimize the formation of research competence by providing information selection, categorization, systematization and generalization experience, mastering various methods and techniques of Experimental Research.

Writing abstracts, coursework and diploma work on a topic proposed or independently compiled by a teacher by bachelors, participation of students in scientific and practical conferences, implementation of a set of educational tasks of a cognitive-research, research nature, often structured on an interdisciplinary basis, contributed to the formation of the experience of independent research activities. The complex of educational and Research tasks developed by us is aimed at developing a motivational-value attitude to research activities, analyticity, criticality and associativity of thinking.

This was facilitated by the choice to present the results of experimental work as part of training, the protection of the results of their own research, computer support for the presentation of the results of experimental work, participation in student work competitions, analysis or translation of special texts. Work in R & D Laboratories has contributed to the intensification of cognitive interest as a strong incentive for educational and research activities. As a result, the ability of future engineers to organize research work, independence in conducting experimental research was strengthened, which led to the formation of a creative personality focused on cognition and self-independent knowledge.

The fulfillment of the fourth pedagogical condition was aimed at actualizing the emotional-personal aspect in the formation of research competence, developing the style and communication of individual activities in joint research, creative work. This was manifested in the development of the ability to listen to a partner, accept his opinion or beautifully reject him, to state his position in the joint search for ways to solve the problem with evidence and proofs, to protect him in constructive communication. The students' mastery of the experience of dialogical communication influenced the improvement of the communicative personal characteristics of the future engineer. In addition, the emotional-value attitude towards reading, Subject and research has developed, the subjective experience of the development of self-correction and self-independent control has been enriched.

Our qualitative analysis of the results of the examination of the above pedagogical conditions showed that joint creative work in laboratory practice and ITI work contributed to the growth of positive elements in interpersonal communication and contributed to the development of the ability to adequately assess the product of its creative activity.

A clear connection of pedagogical conditions with the tasks to be solved and the content of the work is given in the table.

Thus, the pedagogical conditions for the formation of student research competence are aimed at revealing the individuality and research potential of each student in accordance with the need to know the logic of research and contribute to the students' acquisition of their experience in conducting experimental research.

The results of our research have shown that the high level of formation of research competence of students is characterized by conscious and motivated participation in research activities; a high level of interest in the research and cognitive process; the manifestation of independence in choosing a research topic; the ability to understand the problem and find suitable ways to solve it; the ability to organize; direction for the development of its own style of activity, the development of personal and research potential.

Thus, the set of pedagogical conditions that ensure the effective formation of research competencies in laboratory-practical training and research work of future engineers includes: stimulation of motivation for research activities; pedagogical assistance in mastering the main components of research competence by students; saturation of classes with active, creative forms of work; enrichment of the student's creative personal potential in the process of.

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