PEDAGOGICAL CONDITIONS OF FORMATION OF MATHEMATICAL COMPETENCE OF FUTURE SPECIALISTS OF AGROINDUSTRIAL COMPLEX

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Abstract

Dibrivna E. I. Pedagogical conditions of formation of mathematical competence of future specialists of agroindustrial complex

The article describes the pedagogical conditions of formation of mathematical competence of future specialists in agriculture. Professional competence of specialist of agroindustrial complex is based on fundamental education, which involves mastering the natural sciences and, in particular, mathematical knowledge. The efficiency of formation of professional competence and its components in future specialists largely depends on the pedagogical environment. The author identifies four pedagogical conditions, namely, ensuring professionally applied orientation in mathematics education, the implementation of information and methodological support at all levels and forms of mathematical education, the integration of mathematical and engineering disciplines, and creation of a positive emotional background by teacher based on learning situations. The author calls attention to details of implementation of certain pedagogical conditions of formation of mathematical competence of future agrarian specialists. The implementation of the aforementioned conditions will enable teachers to increase the effectiveness mastering the knowledge, abilities and skills of general engineering disciplines.

Key Words: *mathematics education, mathematical competence, pedagogical conditions, student.*

General formulation of the problem. Professional competence of specialist of agroindustrial complex is based on fundamental education, which involves

mastering the natural sciences and, in particular, mathematical knowledge. The efficiency of formation of professional competence and its components in future specialists largely depends on the pedagogical environment.

Analysis of recent researches and publications. Various aspects of the formation of mathematical competence have been the subject of researchers, in particular, such scholars as N. Vilenkin, M. Davydov, V. Dzyadyk, A. Kolmohorov, P. Korovkin, L. Kudryavtsev, O. Kurant, M. Luzin, G. Poya, D. Raykov, O. Hinchyn, M. Shkil etc. However, the question of the definition and implementation of pedagogical conditions of the mathematical competence of specialist agricultural sector has not been the subject of a separate study.

Purpose is to consider pedagogical conditions of mathematical competence of specialist of agroindustrial complex.

The main material of research. Based on the scientific achievements of the researchers such pedagogical conditions of professional mathematical competence of future specialists in agriculture are theoretically grounded:

• ensuring professional and applied orientation in mathematics education;

• implementation of information and methodological support at all levels and forms of mathematical education;

• integration of general engineering and mathematical sciences;

• creation of a positive emotional background by teacher based on learning situations.

Let us consider in details each of the teaching conditions mentioned above. Ensuring *professional and applied orientation in mathematics education* is the basis of the concept of didactic training of future professionals in most universities as teaching of engineering disciplines must be professionally applied and based on a combination of general and applied of professionally meaningful mathematical knowledge aimed at motivated, purposeful students who would like to obtain necessary knowledge and skills that contribute to the formation of a scientific outlook and positive attitude towards chosen specialty and professionally significant qualities of the individual.

Professional orientation of studying in higher education has been research subject of V. Zahvyazynskyi, V. Molostova, A. Kahanova, Y. Kudryavtseva, R. Nizamova.

This issue has been discussing for a long time in details in the thesis A. B. Kaganova for technical colleges [2]. The initial hypothesis of the author is that a systematic introduction to the student’s profession and meetings with the best representatives of the chosen speciality intensifies the process of forming a professional orientation, enriching experience in professional development. But this hypothesis does not cover all the conditions necessary for the successful formation of students' professional orientation. A. Kaganov singles out six groups of factors that affect the process of forming a professional student orientation.

The principle of professional orientation was more fully investigated by M. Mahmutovym [4]. In its methodological form it is defined as a form of social relationship and technical aspects of work in the structure of education, built on the basis of formation of orientation as a leading power of personality. The implementation of the mentioned principle solves the contradiction among: individual integrity and professionalism, the theoretical nature of general education engineering knowledge, skills and polytechnics comprehensive development of personality, on the one hand, and the specific nature of practical knowledge, skills and professionalization of certain professions, on the other hand. The learning factory in higher education mainly reflects not the subject of the future professional activity. N. Talyzina fairly believes that it is worth to have plan of the activities necessary for this knowledge: ".during enlightening the content of training it is necessary to envisage all basic types of activities, necessary for chalenge solutions of training purposes "[7, p.9].

We agree with P. Luzan [3, p.12] on steady transformations of educational activities in education. Such logical specialists training expects steady knowledge mastering, abilities and formation of practical skills and abilities, professional qualities due to not only gradual change of rofessionally oriebted activities but also phased implementation of teaching and cognitive students activities.

According to this approach, cognitive and teaching types have as well as reproduktive and productive forms, which is consistent with the model of activity development.

According V. Zahvyazynskyi the principle of professional orientation deserves attention "under the condition of its widespread usage as a guide for the training of advanced and versatile professional social and activ specialist" [1, p. 51].

Thus, summarizing all mentioned above it can be affirmed that the principle of professional orientation expresses: professional orientation of general education, professional orientation of vocational education and professional orientation of the individual to a particular profession.

Therefore, to ensure professional orientation one should: create a stock of mathematical models that describe phenomena and processes studied in different disciplines, term papers, thesis design, generate the knowledge and skills that are necessary for the study of selected mathematical models, teach students to build and explore simple mathematical models of real phenomena and processes as well as meaningfully interpret the results of these studies.

The second condition is *the implementation of information and methodological support at all levels and forms of mathematical education*.

Formation of professional and mathematical abilities of students can be provided with regular, systematic, continuous training with the appropriate techniques and forms orientation. This study contributes to the development of self-mastering of new experience, new knowledge, new ways and actions.

In the context of our study focused application of methods and forms of education is to develop students' competence, purposeful work and adaptive flexibility. New capacity formed by such organization of educational process can turn to specific professional activities with a high level of self-organization and understanding in the future.

Formation of professional mathematical competence requires students to identify appropriate methods and forms that would help to achieve this goal in the

training of future professionals. In this context one considers appropriate according to the researchers, teachers who pay attention to the necessity of directing the learning process for the formation of students' skills to search and find the information needed, not only to use innovative teaching technologies based on active and emotive forms and methods of training [5, p.175].

ICT is a means of ensuring qualitative changes in the forms and methods of training, a significant expansion of the scope and nature of the available human data, means of their obtaining and processing. The possibility of audiovisual presentation of various reports, especially in combination with color and movement, often has significant advantages over text, graphics or other traditional message. The impact of these messages on a man is much more efficient, they are perceived and memorized in another way and they help to form complex associative ties with other messages media.

The use of computer technology allows to process large amounts of information as soon as possible, take into account a large number of factors that affect the state and development of natural systems. Acquirement of concepts of modern information technology and GIS analysis, optimization and forecasting economic and natural processes on the basis of general and specific knowledge forms the basis for the development of systems thinking, make a comprehensive approach to the environmental, economic and social aspects of professional activity with regard to development opportunities, globalization of production and market economy.

Thus, students in agriculture study mathematical models of plants, loss of biological yield, plant diseases simulation models, optimization of crop rotation and acreage, raw materials, manpower employment, economic efficiency of growing certain crops, productivity and energy efficiency field crop rotation, making the volume fertilizers and so on.

The third condition is *integration of teaching general engineering and mathematical sciences.*

In order to provide a solid, strong systematic knowledge it is "required to implement an integrated approach to learning, which apart from other things envisages unity in any methodical system of all components of the educational process: objectives, content, methods, organizational forms and methods of training under the leadership of learning objectives "[6, p.27 -28].

As the process of training is a complex nonlinear system man has an opinion that it is necessary firstly to identify and characterize the integrating systematic factors that help efficiently implement the idea of integration.

In own study A. Yanzina examines the integration system of vocational agricultural education as a set of inherent elements that are presented in separate blocks of subjects, items, material support of the educational process, a set of legal and regulatory provisions, economic factors as elements of the whole system of education in the system agricultural education complex [10].

Implementation of a comprehensive approach to integrating mathematical and special training of future specialists in agriculture in universities involves the following steps: analysis of normative documents, study trends of activities of farms aimed at training specialists, analysis of the elements of educational content, namely disciplines involved in the integration, establishing dependences among elements of these disciplines, determine their nature, identificate forms, methods and means of their demonstration, product integration training technology; disclose dependances of the installed system under external conditions and evaluation of training quality that has integrated nature.

Thus, systematic mastering of the set of facts, concepts and judgments while learning mathematics is in accordance with the logical connection and rational continuity of knowledge on specific subjects, reflecting the logic of training. This integration of mathematical knowledge and special disciplines is the basis for the formation of an integrated system of vocational significant qualities of future specialists.

The necessity for integration of mathematical and special training taking into account personal qualities and characteristics of future specialists in agriculture has

been the subject of research of the synthesis of knowledge elements from different disciplines on meta-level. In particular, A. Khutorskyi offers to add to the structure of the educational standard of subject content "basic educational facilities - the key essence, reflect the world unity and are the center of the reality of life, which is known as the nodal points of the main educational areas. They are the basis of real domain of cognitive knowledge; they are the means of construction the perfect system of knowledge about it" [9, s.198].

Thus, increasing the effectiveness of vocational training in agricultural higher education institutions is achieved by the implementation of training on an integrated basis, primarily while studying complex mathematical and special subjects.

The fourth condition is *the creation of a positive emotional background by teacher based on learning situations.*

Analysis of the psychological and educational literature shows that the focus of the learning process of students is given to the saturation of information and its logic processing; so there is a tendency of intellectual dominance principle over emotional. Due to the high prestige of having knowledge and intellectual abilities the emphasis is made on the development of thinking, its conceptual apparatus, inductive and deductive processes. Much less attention is paid to the emotional side of the cognitive process. This violation of the dialectic relationship in teaching principles of rational and emotional elements deprives him of creativity and makes it less productive. Moreover, it leads to the impoverishment of all the emotional sphere of student, poses a risk of unilateral, affects the harmonious development of the whole person.

An outstanding teacher K. Ushinsky emphasized the role of emotions and feelings. They were given an important place in his system of views on the psychology of learning. Great importance was given to the creation of techniques that are aimed at keeping positive emotional mood, which promotes interest in the discipline. They also include techniques that enliven learning [8, p. 405-406].

Mental performance of students in the classroom and self-study depends not only on the work of conceptual, logical and figurative mental health thinking. Emotional sphere has significant impact on the cognitive performance of students and, consequently, the formation of stable knowledge. Emotional sphere itself does not work with the understanding of information, but its influence is able to provide with "easy" exercise, or conversely, to reduce cognitive activity.

Conclusions and recommendations for further research. Thus, pedagogical conditions of formation of professional mathematical competence of specialists in agriculture in the study of engineering disciplines are defined. The implementation of the aforementioned conditions will enable teachers to increase the effectiveness mastering the knowledge, abilities and skills to learn engineering disciplines. Prospects for further research may be related to the specification of the structure of mathematical competence of future specialists in agriculture and study the issues of its formation.

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