

**Hulivata I.,**

PhD in Pedagogical Sciences, Associate Professor

**Husak L.,**

PhD in Pedagogical Sciences, Associate Professor

**Kopniak K.,**

Senior Lecturer

*Vinnitsia Institute of Trade and Economics of Kyiv National University of Trade and Economics*

## **PECULARITIES IN THE FORMATION OF THE ECONOMISTS' MATHEMATICAL COMPETENCE**

The higher education in Ukraine has undergone fundamental changes in the content, forms, methods and technologies of teaching, but also in conceptual approaches to the effective management of the quality of education over the past decades. A system of higher education might be considered effective if at the end of training of specialists we have a competent person with the proper knowledge, with a high level of professionalism, high moral qualities, and also who is expected to work adequately in any situation, using all knowledge and taking responsibility for his actions.

The analysis of the prospects of economic and social development in Ukraine shows an increasing need for qualified economic specialists with advanced degrees and professional problem solving skills. Mathematical competence itself is a key component of professional competence, which plays an important role in the professional activity of students – future economists.

The problem of formation of mathematical competence of economics students is represented in works of such scientists as Ya.A. Barkulkova, E.Yu. Belianina, D.A. Kartiarov, N.M. Korablova, M.E. Manshina, S.A. Rakova, L.I. Zaitseva, V.V. Poladova and others. They determine the mathematical competence of economics students as part of their professional competence, they also mention such important qualities as critical thinking, creativity, self-disciplined, self-control; as to the skills and abilities: empirical thinking, scientific thinking, logical thinking, algorithmic thinking, visual thinking for mathematical competence. They assume the role of mathematical competence in individual qualities, which show the readiness to

study mathematics, deep and solid knowledge of mathematics at the beginning and the ability to imply practically methods of mathematics in professional activity [1-2].

Professional competence is a basic characteristic of the activity of a specialist, which includes both the content (knowledge) and procedural (skills, skills, abilities) components and has the main essential features, namely: mobility of knowledge, flexibility of methods of professional activity and critical thinking. The professional competence of a future economist is an integrative complex characteristic, which is a system of knowledge, skills, skills, values and personal qualities of a specialist, guided by which he defines the goals of his activity and is able to perform professional and social duties [3-4]. Mathematical competence is an important component of the professional competence of a future economist.

The problem of mathematical competence development of students is reflected in following works: M.S. Anisimova, I.I. Bondarenko, O.A. Valikhanova, B.V. Hnedenko, G.I. Illarionova, D.A. Kartiozhnikova, L.D. Kudryavtseva, S.A. Sevastianova, S.A. Shunailova, T.I. Fedotova, N.G. Khodyrieva, and others. The authors show an opportunity for improving the quality of mathematical training by the implementation of professionally orientated studying mathematics. In their understanding, mathematical competence is the systemic property of the individual, which features his deep knowledge in the subject area of this knowledge, the personal experience, aimed at the career prospects, who is ready and willingly to accept new knowledge and is capable of achieving significant results and quality in mathematical activities.

S. Rakov [5] explains the definition of «mathematical competence» as a possibility to see how to implement mathematics in practice, understanding of matters and methods of mathematical modelling, understanding how to build a mathematical model, making a research with using methods of mathematics, interpreting the results, error analysis.

The analysis of different points of views provides us with a conclusion about dissimilarity of modern definitions of «mathematical competence» of economics students.

The task of the high school is to give competent economists a basic knowledge, which consequently will encourage professional mobility and develops skills of self-improvement and deepens the knowledge given. In connection with the above, the work of the economist in economic world assumes the increase of the level of mathematical training, that develops the skills of thinking and gives a possibility to use mathematical methods in performing basical and applied economic problems, as a result to form mathematical competence.

There are following classification of mathematical competencies:

Procedural competence – the skill of doing mathematical problems. The ways to get:

- use on practice the algorithms of solving typical problems;
- learn how to systematize typical problems by the similar criteria;
- learn how to find typical task or make it typical;
- learn how use different information sources to find the solution for typical problems (books, internet sources).

Logical competence – the skill of deductive method, proofs and proving:

- possess and use on practice key definitions of deductive theories (definition and meaning, theorems);
- express deductive proving of theorems and typical problems;
- make deductive explanation of the accuracy of the task solution and find logical problems in wrongful deductive thinking;
- use mathematical and logical symbols on practice.

Technological competence – the skill of using modern mathematical packages (character data, interactive geometry software, spreadsheet);

- Estimate approximate formulas;
- Build subject area computer models.

Researcher competence – the skill of methodical research of practical and applied mathematics applied problems by using mathematical methods.

The ways to get:

- Formulate mathematical problems;

- Build analytical models;
- Make and check conjecture by using common methods (induction, analogy, generalization) and form your own experience;
- Interpret the results, given by formal methods;
- Systemize the results, research the relations with the previous results, analogies with the other material, make analogies with other branches of mathematics.

Methodological competence – the skill of indicating the properness of using mathematical methods for solving practical and applied problems;

- Analyze the effectiveness of solving problems by mathematical methods;
- Reflex your own experience of solving problems and finding the right solution for frequent improvement of your own methodology of making a research.

The components of mathematical competence are:

- Motivation – self-motivation, interest;
- Conceptual – the complex of mathematical skills and knowledge;
- Acting – the skills of effective work (independence, self-esteem, self-control).

The nature of the competence might only be in the connection between beliefs of a person, which means the interest in the sphere of professional activity.

The formation of motivational component might be stimulated by:

- Guarantying the positive attention of a student to mathematical sphere of work;
- Training the cognitive interest;
- Forming cognitive self-determination, activeness.

Most students have low self-motivation, which depends on the situation. Thus, there is a need to use interesting logical problems, to solve situation problems, interesting facts from the life of famous people, different historical materials and games. Various forms of encouraging also are worthy, support and speaking also encourages positive motivation.

The development of students' interests and activeness might be encouraged in such ways: engaging them to searching and opening knowledge, solving problem problems; the need to think hard, but steady; the studying material must be connected with the earlier obtained knowledge; the problems must be practical, applied, also traditional; the usage of differential deductive materials, computer technologies, multimedia means of studying.

The formation of mathematical competence must be done on the basis of individually-differential approach.

The use of differential problems of various complexities makes possible to form such competencies: social (the skill of making a choice, to take responsibility for your choice), therefore it stimulates cognitive work, allows to form adequate self-esteem, stimulates the development of critical thinking about yourself.

The active component of students' mathematical competence might be created in the optimal conditions of continuing working: beginning under the lead of a professor and gradually going to individual working, by giving the possibility to find the solution by the student on his own.

Making professional relations between a professor and a student (a dialogue) will enforce to be free in solving problems, creative, to research more.

The formation of mathematical competence is indicated by such studying achievements:

- the formation of the subject level of the mathematical discipline;
- interdisciplinary level of formation within the mathematical, information, economy discipline;
- professional level in the framework of professional activity, practice [6, p.110].

Typical professional problems are delivered in the language of the subject area depending on the level of mathematical competence of economists. But there are some essential skills, which are needed for the formation of the mathematical competence:

- The skill of mathematical thinking;

- The skill of mathematical argumentation;
- The skill of mathematical modelling;
- The skill of solving mathematical problems;
- The skill of representing the data;
- The skill of operating with mathematical constructions;
- The skill of mathematical communication;
- The skill of working with mathematical instruments;
- These skills might be classified in the three groups of competencies:
  - I – reproduction, definition, possibility to reproduce mathematical constructions, to give the definition of mathematical objects,
  - II – structuration and integration to solve the problems;
  - III – mathematical thinking; generalization, insight.

The main principles for economist`s mathematical competence are:

- cognitive, which includes knowledge and understanding of the basics of mathematics, relying on the knowledge from school, possibility to find and interpret mathematical information to solve specific, professional problems, knowing the methodology of the scientific research, the skill of logical thinking, making explanation for the main statements, making logical relations between denotations;

- motivational, which gathers the students` interest in the mathematical training and awareness its necessity for their future career; understanding the essential usage of mathematical section for the effective functionalization in different types of situations; students` desire to make their level of mathematical training higher and to obtain new knowledge and skills for their professional career; interest in different types of problems on the seminars;

- emotional and willing criteria, which is connected with adequate self-marking of your skills and responsibility for the achievements in studying and future career, that foreseen self-, readiness to use mathematical knowledge and skills in the future work; certainty of students in the necessity of studying mathematics; understanding of the present and future needs in self-development; the joy of using additional

sources of information in the process of mathematical training; possibility to control the process of studying [7, p.32].

Nowadays the development of the higher education is under the problem, which is connected with the low level of economics students' mathematical training. This problem is triggered by the high amount of mathematical knowledge and limited possibilities of their comprehension by the students with a low level of mathematical competence; increased directions of employers referring to the level of mathematical training of economists and the level of mathematical competence of economics alumni; the modernization of professional education is also needed to be on the basis of interactive technologies of teaching and the lack of scientifically explained recommendations as to their realization in the process of formation and the development of mathematical competence of economics students.

The professional approach to the mathematical training of the future economists must be guaranteed by the increasing mathematical competence training of students, awareness of values of mathematics for the future professional career, therefore students have to know building mathematical models, analyze, solve mathematical problems for economists. So the basis of mathematical competence of economics students must be studying, including studying to obtain mathematical methodology as analogy for the future professional sphere.

The effectiveness of professional training of mathematical competence of economists might be increased by the training of solving mathematical problems, which contain theoretical and practical aspects of fundamental mathematical knowledge, which is a foundation of intellectual skills of a person and boost the formation of productive types of thinking and logical analysis.

«Fundamental knowledge – the most stable and universal theoretical knowledge, contents of which is described as generalized and arranged in a way, which unveils and determines internal and external relations with information» [8, p.134].

Furthermore, the presence of the informatively-methodical providing of the course «Higher and Applied Mathematics» is necessary for the formation of

mathematical competence of the future economists during the process of professional training and makes possible to show abstract characteristics of the real process, consequently making the better understanding of the material.

Positive motivation is also very important thing for the formation of mathematical competence of economists during the process of studying pure and applied mathematics, for the reason that stable motivation encourages the formation of cognitive and professional motives for the studying activity, emotional criteria makes the productivity of cognitive working higher and makes the given knowledge of mathematics the value.

Finally, the process of formation of mathematical competence might not be possible without the usage of pedagogical monitoring and control of studying of the future economists and their understanding of the mathematical knowledge in the process of professional training. The reason for that is the monitoring of the positive and negative tendencies of the formation of mathematical competency on the basis of analysis conducted proper adjustments to make the level of the development of mathematical competency according to the supreme results.

This allows the conclusion that «mathematical competence» of students – the future economists, is wide and nowadays it might be defined in many ways. Nevertheless, the development and formation of professional mathematical competencies of the future specialists in economic sphere will allow them to become the main figures and to guarantee the stable economic profit for the country.

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