Mathematization of knowledge – the core of fundamentalization of proffessional training of the future economists

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Abstract. In the necessity of fundamentalization of professional training is grounded; aspects that are guaranteed by the fundamentalization are outlined; the main core of fundamentalization professional training of the future economists is highlighted – mathematization of knowledge through continuous mathematical training by integrating mathematical knowledge in professional disciplines; the essence of the proposed integrated approach is revealed.

Keywords: *fundamentalization, mathematization of knowledge, integration.*

The development of higher education is inseparably connected with the processes taking place in society. Scientists believe reform education, including higher education, is a major challenge today. Since it different educational institutions are the most important social institutions of society, providing its deep qualitative transformation.

Forming a highly creative individual is possible only on the basis of basic education. Need fundamentalization education is also due to the fact that the focus on the specialist narrow profile thing of the past. Today the labor market requires professionals capable of flexibly rebuild their content areas and activities, perform tasks creatively and self-education throughout life.

In modern conditions, globalization processes are becoming stronger in all spheres of human life. The world is becoming interdependent and interrelated, so there is a need in the development, establishment and formation of a comprehensively developed personality. The strategic goal of the modern educational process is a student of great erudition who has holistic view of the world.

Achievement of the goal is possible only through the fundamentalization of education. The training of future economists is no exception.

The questions of fundamentalization of higher school education have been studied by such scientists as A.A. Adannikov, S.I. Arkhanhelskii, O.V. Balakhonov, S.A. Baliaeva, A. Hladun, O. Holubieva, S.U. Honcharenko, H.Ya. Dutka, L. Zorina, L.S. Yolhina, S.Ya. Kazantsev, M. Karlov, V.H. Kineliev, V.V. Kondratiev, A. Kochniev, E. Kniazieva, V.V. Kraievskii, S.V. Nosiriev, A.B. Olnieva, Z. Rieshetova, V. Sadovnichii, O.V. Sierheiev, A.I. Subetto, A.D. Sukhanov, N.F. Talyzina, A. Khutorskoi, V.D. Shadrikov, M.O. Chitalin, O. Filatova, V. Filippov and others.

Fundamentalization of higher professional education today is one of the priorities of the state educational policy in Ukraine.

In the Memorandum of UNESCO International Symposium it is written that the fundamental holistic natural-science and humanitarian education must play a key role in the formation of the personality and ensuring sustainable development of the society, it should be regarded as a separate and important branch of intellectual activity: it is essential to attract the attention of the world scientific and cultural community to the problem of creating an intellectual foundation for the modern system of education, in the development of scientific research in logic, methodology, philosophy, history, sociology and psychology of science, as well as to the development of advanced technologies of training in the field of fundamental education; the interests formation of a single educational space within the global community can be achieved through the development of common approaches to international educational standards, requirements for fundamental education. According to the conclusion of UNESCO, fundamental education is evaluated worldwide as one of the major factors of national security, the sustainable development of the country, provision of its high status in the world community. Fundamental education implies focus of its content on methodological, invariant elements of knowledge that contribute to the initiation, development and implementation of intellectual and creative potential of students [4, p.5].

All authors who have examined the issue of fundamentalization, are unanimous in saying that it is aimed at improving the quality of the educational process and at obtaining a high result − a highly qualified specialist that meets modern requirements (of a personality, the society, the production sphere and economy on the whole). In other words, many scientists think that fundamentalization is the category of the level and quality of education.

As for the other aspects and characteristics of fundamentalization, researches of the issue differ in their judgments. The more objectively and in more detail the matter is considered, the more different opinions, claims, judgments are actualized. At the same time, the emergence of new ideas and approaches makes it possible to analyze them and further unify the whole variety into a coherent theory or methodology, as well as to determine the boundaries of their possible application, and only then put into practice at higher education institutions.

S.V. Honcharenko believes that fundamentalization of education on the modern basis should act as the leading imperative of educational reforms. He believes that fundamentalization of education currently should be considered as a didactic principle, and indeed fundamental, as the new paradigm of education shows, is the personal knowledge domain [1].

For the first time the concept of fundamental education was formulated by W. von Humboldt in the early XIX century [2]. In this concept it was emphasized that the object of such education should be the fundamental knowledge that is today opened by the fundamental science at its cutting edge. W. von Humboldt was one of the first to express the essential idea of higher education,

which has become particularly important today – first and foremost, education must be scientific and creative, and then it will generate in students a desire for constant creative search. Moreover, it was assumed that education must be directly integrated into the scientific research. It is this ideal of education that is realized in the best universities of the world for the last hundred years.

Higher school of the XIX century mostly followed the model of Humboldt. At the beginning of the XX century education in higher educational institutions was characterized by preparation of a single-discipline specialist. However, in the last decade the attention of scientists has returned to fundamentalization of professional training.

In the opinion of A.I.Subetto, fundamentalization in professional education guarantees:

– systemic level of cognition of reality, the ability to see and to explore the mechanisms of self-realization and self-development of phenomena and processes;

– the formation of the most significant, long-lasting knowledge underlying holistic perception of the modern world view;

– formation of a holistic encyclopedic view of the modern world and a man's place in it;

– mastery of the basics of a single human culture in its natural-science and humanitarian areas;

– creation of a database of professional culture and professional skill [4, p. 11].

In the process of training in a higher educational establishment, future specialists in the sphere of economy study a quite large list of disciplines. The expansion of opportunities and deepening of scientific knowledge, observed in the curriculum, is accompanied by increasing of fragmentation and weakening of connections between disciplines. This in its turn may reduce the effectiveness of the cognitive process and the quality of training of students, including the ones of economic specialties. At the same time the requirements for the level of training of future specialists, imposed by the state, rise.

American scientists have found a direct link between the level of mathematical training and quality of experts in the field of economy and finance.

Mathematical preparation becomes increasingly important for modern economists. Moreover, mathematics is not only basic (fundamental) for the study of special disciplines, but also the basis of scientific activity.

Therefore, we consider mathematization of knowledge the main core of fundamentalization of professional training of future economists.

Economic sector today involves a high degree of formalization both the macro and macro levels. Therefore, mastering the mathematical methods and their application in the economy is a natural and necessary skills to future economist.

We suggest conducting professional training of future economists on the basis of continuous mathematical training through the integration of mathematical knowledge in professional disciplines.

The essence of the proposed integrative approach is revealed in the following main provisions:

- implementation of intra- and inter-subject relationship;
- development of integrated courses;
- applied orientation;
- enlargement of didactic units;
- continuity in teaching mathematics;
- the systemic nature of knowledge in teaching mathematics.

One of the possible ways of integrating mathematics, information and communication technology and special subjects is described in detail in the article [5].

The principle of the integrative approach is focused on the formulation of goals and objectives of training, providing the formation of complex knowledge and skills and systemic thinking.

The integration creates conditions for convergence and interpenetration (association) of sciences, the creation of new industries and the emergence of new academic disciplines in higher educational institutions (e.g., econometrics, methods of managerial decision-making, optimization methods and models, etc.).

The integration is now becoming an integral part of the process of development of modern science, and therefore one of the fundamental ideas of modern methodology, pedagogy and psychology.

Integration allows avoiding discreteness in the acquisition of knowledge and skills, provides the possibility of developing conditions conducive to the formation of systemic, holistic scientific knowledge and practical skills.

The main objective of the integrative approach in the preparation of the future economists is the formation of readiness of an economic specialty graduates to the professional activity on the basis of unity and integrity of mathematical and professional knowledge.

The need to integrate mathematics and professional disciplines in the training of future economists is updated two related problems:

1. Prepare professionals able to solve life (practical, professional) problems in various ways, including using modern mathematical methods.

2. Strengthening the role of fundamental knowledge in the system of training specialists in economics.

3. Mobility future professionals.

Note that integration in teaching methodological problem causes the connection between science and other forms of social consciousness, philosophy, history, culture and more. Influenced by integrating each form of social consciousness developed as a complete sphere reflection of objective reality.

As a result of the integration of mathematics and specialized economic subjects students must:

- have a holistic view of the economic significance of the sector and mathematical methods in it,
- own mathematical methods of investigation of economic phenomena and processes
- be able to model economic phenomena and processes by means of mathematics,
- be prepared for self-mastery, update and improve their knowledge and skills on the basis of the fundamental knowledge.

Thus, fundamentalization of professional training of future economists suggest that the future expert in the field of economy in the process of training will receive the necessary fundamental basic knowledge (primarily the mathematical component), with the help of which a unified worldview scientific knowledge system will be formed.

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Анотація. У статті обґрунтовано необхідність фундаменталізації професійної освіти; зазначені аспекти, які гарантує фундаменталізація; виділено головне ядро фундаменталізації професійної підготовки майбутніх економістів – математизація знань через безперервну математичну підготовку шляхом інтеграції математичних знань у професійні дисципліни; розкрито сутність запропонованого інтегративного підходу.

Ключові слова: *фундаменталізація, математизація знань, інтеграція.*

Аннотация. В статье обоснована необходимость фундаментализации профессионального образования; указанные аспекты, которые гарантирует фундаментализация; выделено главное ядро фундаментализации профессиональной подготовки будущих экономистов – математизация знаний через непрерывную математическую подготовку путем интеграции математических знаний в профессиональные дисциплины; раскрыта сущность предложенного интегративного подхода.

Ключевые слова: *фундаментализация, математизация знаний, интеграция.*