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PROFESSIONAL ACTIVITY OF TECHNOLOGY ENGINEERS IN TERMS OF INNOVATIVE DEVELOPMENT IN FOOD INDUSTRY

Стаття розглядає професійну підготовку інженерів-технологів харчової галузі за нових соціально-економічних умов, аналізує філософські, психологічні погляди на творчу професійну діяльність інженера-технолога харчової галузі, конкретизує місце професійної діяльності інженера-технолога у виробничому процесі, визначає елементи організаційної та психологічної підсистеми професійної діяльності інженерів-технологів харчової галузі, а також описує технологічну, організаційно-управлінську, експлуатаційну, проектну, науково-дослідну функції творчої професійної діяльності інженера-технолога харчової галузі.

Ключові слова: *професійна підготовка, професійна діяльність, інженери-технологи харчової галузі, інноваційний розвиток.*

Статья рассматривает профессиональную подготовку инженеров-технологов пищевой отрасли в новых социально-экономических условиях, анализирует философские, психологические взгляды на творческую профессиональную деятельность инженера-технолога пищевой отрасли, конкретизирует место профессиональной деятельности инженера-технолога в производственном процессе, определяет элементы организационной и психологической подсистемы профессиональной деятельности инженеров-технологов пищевой отрасли, а также описывает технологическую, организационно-управленческую, эксплуатационную, проектную, научно-исследовательскую функции творческой профессиональной деятельности инженера-технолога пищевой отрасли.

Ключевые слова: *профессиональная подготовка, профессиональная деятельность, инженеры-технологи пищевой отрасли, инновационное развитие.*

The article considers future food industry technology engineers professional training under new social and economic conditions, analyzes philosophical, psychological points of view on food industry technology engineer creative professional activity, defines the place of food industry technology engineer professional activity in the manufacturing process, shows the elements of the organizational and psychological subsystems of food

industry technology engineer professional activity and describes the technological, organizational, managerial, operational, project, scientific research functions of food industry technology engineer creative professional activity. The technological function means the work according to the technological standard of traditional and innovative food goods production. According to the organizational and managerial functions rhythmical goods production corresponding the necessary assortment and high quality as well as the organization of punctual supply, storage, preservation and rational usage of goods and materials are realized.

Key words: *Professional training, professional activity, technology engineer of food industry, innovative development.*

Modern stage of the social and economic development of Ukraine, membership in the world Trade Organization and Association with the European Union open new approaches of market relationships with other countries in the world and that enables the appearance of new sources of raw materials supplying, transfer to innovation goods manufacturing, the use of world labor division. Under such conditions the activity of food industry businesses is connected with introduction into the manufacturing new types of food goods, the broadening of their assortment, creation of innovative food technologies and equipment corresponding modern requirements to preservation of resources, energy, safety and quality. That explains the necessity of the training of competent technology engineers, able to perform creatively, to develop and improve professionally.

Strategic tasks of such specialists training according to the paradigm of competences in professional education are defined in the National strategy of education development in Ukraine for the period till the year 2021 (in 2013), in the Law of Ukraine «About Higher Education» (2014), the Order of the President of Ukraine «About strategy of constant development «Ukraine – 2020» (2015) and also in the main points of the Copenhagen declaration (2002) and in the Bruges communiqué (2010) [12].

In this aspect food industry technology engineers training is focused on their mastering of the whole system of professional knowledge, skills, experience of creative professional activity, and the formation of willingness to solve creative tasks in the manufacture using intellectual, moral, creative strengths. Such high standards for the level of creative professional activity of a modern specialist in food industry predetermine the necessity of their reflection in the system of higher professional education.

Analysis of the newest researches and publications where the solving of this problem was started.

The research and development of scientific approaches of the future specialist preparation for the creative professional activity is given appropriate attention, particularly in such directions:

– the philosophical aspects of creative activity reasoning (P. Alexeyev,

N. Al-Ani, M. Berdyayev, V. Vernadsky, V. Gorokhov, John Dewey, P. Enhelmeyer V. Lesevych, B. Matyushko, V. Melnyk, I. Oreshnikov, V. Petrushenko, E. Semenyuk, M. Tarasenko, H. Chelpanov, O. Chizhevsky, V. Yakovlev and others) [4; 5; 6];

– creativity psychology research (A. Adler, D. Bogoyavlenska, L. Vygotsky, J. Guilford, E. Ilyin, B. Kedrov, A. Klepikov, V. Klimenko, H. Kostiuk, I. Kucheryavy, S. Maximova, O. Matyushkin, S. Mednik, V. Molyako, G. Olport, K. Platonov, Y. Ponomarev, N. Postalyuk, N. Rogers, V. Romenets, S. Rubinstein, R. Sternberg, B. Teplov, O. Tikhomirov, E. Torrance and other) [9];

– the research of psycological processes of creative activity (K. Abulkhanova-Slavska, B. Ananiev, A. Brushlynsky, L. Vygotsky, G. Zarakovsky, O. Leontiev, F. Levinson-Lessing, D. Oshanin, V. Ponomarenko, V. Rybalka, O. Savenkov, T. Tardif, B. Teplov, G. Shadrikov, P. Jacobson and others) [9];

– the points of system approach reasoning (S. Archangelsky, Yu. Babanskii, V. Bespalko, V. Hershunsky, V. Zahvyazynsky, T. Ilyina, M. Kahan, V. Krayevski, A. Kuznetsova, V. Kuzmin, N. Kuzmina, V. Mizintsev, M. Prokofiev, A. Subbeto, Yu. Shreider, E. Yudin and others) [7; 8];

– the points of activity approach reasoning (V. Belikov, A. Brushlynsky, P. Halperin, V. Zinchenko, O. Leontiev, S. Rubinstein, N. Talyzina, A. Khutorskyi, V. Shadrikov, V. Shvyrov and others) [1];

– the reasoning of person oriented approach in the studying process (S. Bondarenko, R. Vaynola, I. Garanina, V. Zahvyazynsky, O. Dubasenyuk, I. Zyazyun, V. Ilchenko, O. Ionova, O. Koshuk, M. Levkivsky, O. Pyehota, V. Rybalka, O. Savchenko, S. Sysoyeva, V. Serikov, I. Yakymanska, S. Yatsenko and others) [2; 13];

– the reasoning of the points of competence approach (N. Brukhanova, A. Verbitsky, I. Zymnya, E. Zeyer, N. Kredenets, V. Lozovetska, P. Luzan, O. Ovcharuk, V. Radkevich, V. Slastonin, A. Khutorskyi, V. Yagupov and others) [2];

– the research of innovative activity, heuristic and logical methods of creative tasks solving (H. Altshuler, V. Andreev, A. Antonova, H. Bush, I. Havrish, R. Hareev, L. Hurova, O. Dvoryankin, V. Zayonchyk, T. Zybina, M. Zinovkina, Yu. Zuyev, I. Ilyasov, I. Kaloshyna, Ya. Kepsha, N. Kupriyanycheva, M. Makhmutov, V. Molyako, S. Muhallimova, O. Polovynkin, V. Popova, V. Rybalka, O. Skafa, A. Khutorskyi, M. Tsykanova, L. Stefan and others) [10];

– the reasoning of methodical systems of future specialist preparation for creative activity (A. Belyaeva, O. Huzalova, O. Didenko, O. Dyomin, L. Yeryomina, M. Ivanov, M. Kabanets, O. Koshuk, N. Kupriyanycheva, V. Nagaev, A. Nizovtsev, O. Popova, I. Rogov, M. Skyruta, O. Shandyba) [1–3].

The formulation of the article aim and objective.

The aim of the article is to theoretically justify the future technology engineers of food industry training to the creative professional activity.

According to the aim of the article the following objective was defined – to analyze the system of engineers' professional activity in terms of innovative

development in food industry and determine its structure and content.

The main material presentation with full justification of scientific results.

Innovative transformations in food industry predetermine the establishment of new relations in the system «specialist – the object of activity – professional activity». Among food industry specialists the key role and responsibility for technological process belongs to a technology engineer, whose objects of activity are raw materials, semi-prepared goods, food goods, technology and equipment. Professional activity of technology engineers in the terms of innovative development is aimed on the search of new ideas, creative transformation, untypical tasks solving during goods production. The definition of innovative content of food industry technology engineers' professional activity creates the conditions for its successful mastering in the process of future specialist professional training [7; 8; 10].

Further we will analyze food industry technology engineers' activity with the aim of its reflection in the professional training system. Much influence on the research of professional activity was made by the works of T. Gabay, E. Zeyer, O. Ivanova, V. Kozakova, B. Kossov, O. Leontyev, B. Lomov, V. Shadrikov etc. Systematic generalization was done in the theoretical model suggested by B. Lomov and V. Shadrikov that consists of organizational (outer) and psychological (inside) subsystems [2; 4].

To the parts of organizational subsystem of professional activity belong: subject, object, process, means, conditions, the result (product) of professional activity.

To the parts of psychological subsystem of professional activity belong: motives, aims, informational basic of professional activity, the program of professional activity, the unit of decisions making, the results of professional activity, professionally important features [6; 9; 10].

Let us consider manufacturing process as one of the components of organizational subsystem. Food industry manufacturing process is characterized as a complex system of connected actions of the specialists and equipment in which raw materials, semi – finished products, goods are transformed under technology observation into finished goods in the necessary amount, quality and in the determined time.

The set of the specialist actions and responsibilities according to the job description and qualification characteristics determines its production function.

Food industry engineer performs the following manufacturing functions: technological, organizational, managerial, operational, project, research.

Now we will study the technological function of a food industry technology engineer.

It is in the necessity to work according to the technological standard of traditional and innovative food goods production, perform urgent control of the preserving of goods production technologies and the level of its quality, analyze and develop technological production regimes for traditional and innovative goods, consider the suggestions about goods assortment broadening and the

introduction of innovative goods production technologies, calculate the norms of materials usage (technical norms of raw materials, semi – finished goods, equipment, fuel, energy usage) for traditional and innovative production technologies, economic effectiveness of traditional and innovative technological processes, make changes in technical documentation because of correction and improvement of recipes, technologies and regimes of production, rationally use raw materials, semi-finished goods, equipment, analyze the reasons of defects and the manufacturing of goods of low quality and low sorts, take part in the development of measures of its avoiding and liquidation and consider complaints about manufactured goods [3].

The usage of new raw materials types, innovative technologies and equipment in the production process require from a technology engineer the sharp attention and the ability to react untypically onto the possible production problems. Such situation can appear while transferring the developed production technology from the lab into the production. A technology engineer must be able under many factors and features to define the possibility of getting finished goods of high quality and to influence on time the manufacturing process if there are some interactions. Very often the decisions made by a technology engineer have creative character and are made having much knowledge, skills and experience of creative activity.

We will also analyze the organizational and managerial functions of a technology engineer.

We can track them in the team setting on rhythmical goods production according to the necessary assortment and of high quality; organization of punctual supply, storage, preservation and rational usage of raw materials, semi – finished goods, technical goods; organization and management of the process of development and applying of innovative technologies of food goods production; ensuring the proper organization of workers' activity at the workplaces; scheduling the timetables for employees, their division into shifts and workplaces considering sustainable forms of work organization and time saving; the introduction of the measures aiming to increase the work effectiveness; making compromise decisions if conflict situations appear in the team; providing the matching involvement of the workers; organization of effective cooperation of all departments and subdivisions of the plant while manufacturing both traditional and innovative goods; agreeing of the documentation with managers, specialists from other departments in particular while producing innovative food goods; the selection of qualified personnel with the purpose of innovations developing and implementing into production; active participation in training, retraining and advanced training of workers according to market requirements. Today the important feature of the professional activity of a technology engineer are knowledge and skills to organize and manage the process of development and implementation of creative activity results in production in order to improve the effectiveness of a company and to achieve a leading position in the market. Therefore, willingness of an engineer to organize

creative activity, to manage the implementation of innovative solutions, the ability to predict future development of the industry and innovative work are a part of the general existence of a successful food business [6; 8].

Let us also consider the operational function of a technology engineer that is fulfilled while monitoring technological discipline and the proper operation of process equipment, in the organization of maintenance and repairing of equipment. Under modern conditions of food production there are situations of launching into operation the innovative equipment, selection of optimal parameters and operating conditions of the equipment as well as its repairing. Such situations require from a technology engineer creative thinking and the ability to make untypical decisions.

We will also analyze the implementation of the project function of a food industry technology engineer. A technology engineer offers solutions of the goods range expanding, about introduction of new materials and innovative equipment; develops and approves new recipes and technologies of food production; develops documents for the new goods (technical instructions, technical conditions, branch standards, official standards for the goods etc.), defines the norms of waste and expanses in the process of innovative goods production; develops using automation means the projects and apply the progressive technological processes, equipment, means of automation and mechanization, optimal regimes of goods production. To the tasks of a technology engineer while performing project function belong the actions connected with development of the plans of equipment optimal setting, technical supply of workplaces, defining production possibilities and equipment charging, defining technically considered time norms of production, making line and chain timetables of goods construction analyzing their adaptability. A technology engineer develops technological norms, instructions, the schemes of setting, route maps, technical level and quality maps for traditional and innovative goods and other technological documents, creates technical tasks for recipes projects, technologies, equipment, special tools; develops technical control and testing methods, participates in the development of operational software (for digital equipment), in processing of already developed software, its correction during processing, writing instructions for the work with the software [1; 2; 4; 6; 13].

Such professional activity of a technology engineer demands constant creative research, setting of new goals, innovative development of plans and projects, systematic work on the definite scientific, technical idea or project, creative usage of standardized elements, norms of scientific and technical activity, bringing ideas to the application into the production.

Here we will define how the scientific research function of a technology engineer is realized.

In the modern conditions of tough completion in the market the performance of scientific research work with the goal of food goods range broadening, technologies and equipment improvement takes one of the leading positions in the technology engineer activity. Scientific research activity is

realized in the research process of domestic and foreign experience of production technologies, factors influencing the successful development of food business; the research of goods production, equipment and tendencies in the market; the conditions of production effectiveness increasing with the aim of raw materials expanses shortening, decreasing of labor costs during the goods production, work effectiveness increasing [3].

When fulfilling scientific research activity a technology engineer considers the suggestions concerning recipes, technologies, equipment improvement, prepares conclusions about the necessity of their usage under the conditions of this particular plant. He performs pattern researches and calculates the measurements of technical level of the objects from the sphere of technics and technology being developed. He participates in experiments performing aiming to implement new food goods, technological processes, improved equipment into the manufacturing, development of pattern and license passports and filling the application for inventions and industrial supplies as wells as development of implementation into production programs for innovative products and controls their fulfilling. Typical traits of such activity of a technology engineer is the interest to the new objects, facts, knowledge, the ability to definitely describe the notions, laws, logical connections, to find untypical solutions, to analyze and concretize the results what is typical for a creative person [4–8; 13].

Conclusions and further research perspectives.

The analysis of an engineer activity indicates a significant level of creative components in the production function.

The components of organizational subsystem of professional activity of a food industry technology engineer are defined: subject, object, means and conditions.

The components of psychological subsystem are defined: motives, aims, informational basis of professional activity, the program of professional activity, the unit of decisions making, professional activity results, and important traits for a profession.

The content of organizational and psychological subsystems components of professional activity should be taken into consideration while developing the methodical system of future food industry technology engineers' professional training to the creative professional activity.

Further research perspectives are in the development of the methods system for future food industry technology engineers training for creative professional activity. The aims, content, methods, means and studying forms for future food industry technology engineers must be defined, developed and the possibilities of their applying tested [11].

REFERENCES:

1. Интерактивные технические средства обучения : практ. руководство / сост.: А. Г. Суковатый, К. Н. Захарьин, А. В. Казанцев, А. В. Сарафанов. – Красноярск : ИПК СФУ, 2009. – 84 с.

2. Кругликов Г. И. Методика профессионального обучения с практикумом : учеб. пособие для студентов высш. учеб. заведений / Г. И. Кругликов. – М. : Издат. центр «Академия», 2005. – 288 с.
3. Кукушин В. С. Теория и методика обучения / В. С. Кукушин. – Ростов н/Д. : Феникс, 2005. – 474 с.
4. Методика профессионального обучения: метод. указания по самостоятельной работе / сост. : А. С. Степанова-Быкова, Е. Е. Савченко, А. С. Карманова, О. В. Константинова. – Красноярск : ИПК СФУ, 2009. –(Методика профессионального обучения : УМКД № 1513/1115-2008 / рук. творч. коллектива Т. Г. Дулинец).
5. Методика профессионального обучения: учеб. программа дисциплины / сост. : Т. Г. Дулинец, С. И. Почекутов, Т. В. Сильченко, А. С. Степанова-Быкова. – Красноярск : ИПК СФУ, 2009. – 48 с. (Методика профессионального обучения : УМКД № 1513/1115-2008 / рук. творч. коллектива Т. Г. Дулинец).
6. Методика профессионального обучения: практикум / А. С. Степанова-Быкова, Е. Е. Савченко, А. С. Карманова, О. В. Константинова. – Красноярск : ИПК СФУ, 2009. – 99 с. (Методика профессионального обучения : УМКД № 1513/1115-2008 / рук. творч. коллектива Т. Г. Дулинец).
7. Методологічні засади професійної освіти : навч. посібник для студ.інж.-пед. спец. / О. Е. Коваленко [та інші]; Укр. інж.-пед. академія. – Х.: Б. в., 2008. – 178 с.
8. Методологічні засади професійної освіти : навч. посібник для вищих навч. закладів інж.-пед. спец./ О. Е. Коваленко [та інші]; Укр. інж.-пед. академія. – Х. : Контраст, 2008. – 120 с.
9. Педагогика : учеб. пособие для студентов пед. вузов и пед. колледжей / под ред. П. И. Пидкасистого. – М. : Пед. о-во России, 2006. – 608 с.
10. Сборник учебных планов и программ для подготовки квалифицированных рабочих в технических и профессионально-технических училищах. – М. : ВНМЦ ПТО (для различных профессий), 2007.
11. СТО 4.2-07–2008. Система менеджмента качества. Общие требования к построению, изложению и оформлению документов учебной и научной деятельности / разраб. Т. В. Сильченко, Л. В. Белошапко, В. К. Младенцева, М. И. Губанова. – Введ. впервые 09.12.2008. – Красноярск : ИПК СФУ, 2008. – 47 с.
12. Теоретичні засади професійної педагогічної підготовки майбутніх інженерів-педагогів в контексті приєднання України до Болонського процесу : монографія / О. Е. Коваленко, Н. О. Брюханова, О. Мельниченко; Укр. інж.-пед. академія. – Х.: 2007, Б.в., – 162 с.
13. Эрганова Н. Е. Методика профессионального обучения : учеб. пособие для студентов высш. учеб. заведений / Н. Е. Эрганова. – М. : Издат. центр «Академия», 2007. – 160 с.