

Нової української школи.

Але з чого почати? Як навчити дітей розрізняти факти та суб'єктивні бачення, щоб не маніпулювати? Наша відповідь – використовувати на уроках методи розвитку критичного мислення. Критичне мислення є складним і багаторівневим явищем. Мислити критично означає вільно використовувати розумові стратегії та операції високого рівня для формулювання обґрунтованих висновків та оцінок, для прийняття рішень.

З педагогічної точки зору критичне мислення – це сукупність розумових операцій, що характеризуються здібностями людини: аналізувати, порівнювати, синтезувати, оцінювати інформацію з будь-якого джерела; бачити проблеми, задавати питання; висувати гіпотези та оцінювати альтернативи; робити свідомий вибір, приймати рішення та обґрунтовувати їх.

Ключові слова: освіта, компетентності, початкова школа, критичне мислення, цінності, європейський вимір освіти.

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PROFESSIONAL COMPETENCE OF PROSPECTIVE ENGINEERING PROFILE SPECIALISTS

The article investigates theoretical and methodological basis of formation professional competence of prospective engineering specialists in higher technical education institutions. On the basis of the analysis of modern concepts essence, purpose, and management of prospective engineers' training in higher technical educational establishments from the perspective of the competence approach realization are reconsidered. The aim of the article is to study the theoretical and methodological foundations of prospective engineers' professional competences formation as a basis for their professional training. Theoretical research methods were used during research, namely: study and analysis of psychological-pedagogical, normative and special literature on the research issue; analysis of state educational standards, programs, textbooks and teaching materials. stages of professional competence formation of prospective specialists of engineering profile are characterized: formation of professional intentions and orientation; specific professional knowledge and skills acquisition; professional development of a technical field specialist. The article focuses on personal value orientations of prospective engineering specialists in the process of their professional competence formation. The structural components of professional competence are defined: humanitarian, engineering-theoretical, technological, practical, managerial, research, informational, economical, economic-legal and ecological. The importance of professional orientation principle realization of prospective engineers training in the process of their professional competence formation is considered. The effectiveness of professional competences formation of prospective engineers is proved aiming at highly qualified technical specialists training.

Key words: competence, competence approach in education, professional competence, professional training, higher technical education institutions, engineering profile specialists.

(статтю подано мовою оригіналу)

The development of Ukrainian education is determined by the European integration which affects society in general and higher education in particular. The

reforming of the state education system aims at joining the European education sphere and modernizing education in the European requirements framework. The main goals of integration are to create conditions for the comprehensive development of a competitive, competent specialist capable of professional self-improvement throughout life. The competence of a higher education institution graduate indicates his readiness for professional activity and active role in public life.

The relevance of the study is determined by the current state of education as a social institution that ensures the professional success of young people and their competitiveness in labor market. Competence approach in education is defined today as one of the leading areas of improving the higher education system in Ukraine, which ensures the implementation of the concept of humanistic education and provides training of competent professionals who are fluent in the profession and related fields, ready for continuous professional growth, social and professional mobility.

Modern researchers of the issue of competence approach realization in education N. Bibik, O. Yeremenko, V. Lugoviy, O. Ovcharuk, O. Pometun, O. Savchenko, G. Selevko, V. Serikov, K. Khoruzhiy, A. Khutorskiy and others consider competence as a set skills of socially valuable activity of a prospective specialist; they characterize a competent specialist as the one ready to solve professional issues in terms of using innovative tools to achieve goals based on their own knowledge in a particular field.

Modern researchers of prospective engineers professional training in higher technical education institutions S. Artyukh, O. Baranets, N. Bryukhanova, E. Zeyer, O. Kovalenko, A. Nizovtsev, Y. Pazynich, N. Tymkiv and others state that the engineer is expected to set up and maintain technical devices as well as to be a researcher and a team organizer. The current state of engineering education in Ukraine is characterized by the actualization of the competence component of the prospective engineers training content on the basis of the person-centered approach implementation. Despite the fact that the issue of competence approach realization in education is actively studied by modern researchers, the problem of forming professional competence of prospective specialists in technical field was not the subject of a dedicated special research.

Aim of research – the formation of professional competences is a necessary condition for training qualified engineering specialists capable of competent and effective activity in the technical field at the level of European and world standards. The aim of the article is to study the theoretical and methodological basis of the professional competence formation of prospective engineering specialists in higher technical education institutions.

The modern perspective of the competence approach implies the ideas of general and personal development framed by psychological and pedagogical concepts of person-oriented education. The categorical basis of the competence approach interrelates with the notion of goal-setting in education and purposefulness of the process of education. Under such conditions, competences set a higher, generalized level of student's skills and abilities; the content of education is determined by a four-component model: knowledge, skills, creative

experience, and personal experience of general values [1; 2; 7; 9].

The ideas of effective knowledge and graduate's value attitude to the acquired knowledge as necessary for self-realization are considered the basis of a modern understanding of the competence approach in education. It is the competence approach that reflects the content of education, which is not reduced to a knowledge-oriented component, but involves the acquisition of comprehensive experience in solving life problems, fulfilling key functions, social roles, competence performance. Thus, the competence approach does not determine student's knowledge, but rather the development of skills to solve real-life problems.

In a wider perspective, competence can be defined as a fundamental knowledge of the subject or mastered skill; competence involves constant updating of knowledge, acquisition of new information for the successful solution of professional tasks and includes both semantic (knowledge) and procedural (skills) components. Competence approach is not equal to a psychologically oriented component, but it follows a holistic experience in solving life problems, performing professional functions, social roles and competences.

To reveal the essence of the competence approach in education, it is important to distinguish between such notions as "general competence" and "acquired competence". Derived from Latin, a word "competentia" means a range of familiar or experienced issues; professional competence is considered as the acquired relevant knowledge and skills that allow effective performance in a particular field, i.e. acquired competence is the product of general competence.

A. Khutorskiy and V. Kraevskiy define general competence as a set of interrelated personality traits (knowledge, abilities, skills, methods of activity) relevant to a certain range of subjects and processes and necessary for high-quality productive activity. Therefore, acquired competence is the possession of a person with the corresponding general competence, which implies his personal attitude to the subject of activity [6].

So, general competence is considered as a set requirement, the norm of educational training of the student, and acquired competence is student's developed personal qualities and experience. That is, if general competence is interpreted as a set norm, then acquired competence implies a formed quality, result of activity, student's personal trait.

The competence of a prospective specialist, according to I. Zyazyun, has a specific historical denotation and is defined as the ability to solve professional problems of a certain class, which requires knowledge, skills, and experience. Competence is manifested in the practice of professional activity as a systemic characteristic that has a certain structure [4].

Modern researchers N. Bordovska, L. Kovalenko, V. Petruk, V. Raevskiy, A. Rean, S. Sysoeva define professional competence of prospective specialists as a set of skills of a subject of pedagogical influence to structure scientific and practical knowledge in a way that helps to solve professional problems best [5; 10; 13]. Besides, V. Fedina notes that professional competence formation is a continuous process of professional development consisting of such main stages as the formation of professional intentions and orientation, professional training, and

professionalization. The stage of formation of professional intentions and orientation is conducted through psychological and professional adaptation of students to future activity; the stage of professional training means mastering general and special knowledge and skills; the stage of professional development is the acquisition of a professional mentality and high-quality professional performance [14].

The profession of an engineer is unique in its communicative-subject essence and the nature of actions in the industrial production field, as it combines interdisciplinary knowledge, innovative ideas and characteristics of the environment and its own ability to synthesize information to create a new subjective reality. For effective activity a professionally trained engineer must be able to design and construct, to use the means of production, to conduct management-practical, design-technological, and research activity. Engineers are the organizers of the production process, and therefore must be able to standardize and manage the work of production; to use normative, scientific-technical and production information to ensure the implementation of the achievements of science and technology in modern production. Some important professional skills of the engineer are the design of scientific and technical documentation, technical and technological projects, plans and regulations, solutions to improve production efficiency.

The peculiarity of training students of higher technical education institutions is prospective engineers' skills of self-organization and reflection. The student is expected to feel the need for educational material, to be aware of it, so the purpose of training is not the transfer of knowledge, but the development of activities of a prospective specialist in the technical field as a priority characteristic of a value-oriented personality.

Professional competence of prospective engineering specialists, according to our conclusions, means a set of personal qualities and knowledge that provides a high level of self-organization in professional activity. Professional competence is a complex multi-aspect formation that involves the unity of fundamental, subject, psychological-pedagogical and methodological competences.

Modern professional training of specialists in the technical field, as noted by N. Nychkalo, is a way of socialization as a harmonization of human-society relations; of professionalization as the acquisition of a specialist's professional competence, fundamental, applied knowledge acquisition, high culture of organization and implementation of professional activities; of self-realization as the development of human skills of productivity and self-improvement [8].

The professional competence of a prospective specialist in the technical field reflects the level of knowledge, skills and experience in order to efficiently perform work functions in the industrial production field, and therefore is an integrative characteristic of graduate's business and personal qualities. The competence of a technical specialist includes professional knowledge, ability to analyze and predict the results of work, use modern information in the relevant field of production, socio-communicative and individual abilities, and experience in the industry that ensures independence in professional activity. The professional competence of a prospective engineer includes: the ability to estimate professional situations; creative thinking; initiative in solving production problems; ability to organize the

team work; conscious understanding of personal responsibility for the work outcomes.

According to O. Romanovsky, the structure of professionalism of a modern technical specialist is determined by competence in the field (design and engineering, operational and technological, organizational and managerial, research); psychological and pedagogical, legal, economic and special managerial competence [12]. According to L. Tovazhnyansky, the formation of a systematic approach to the organization of professional training of prospective technical specialists is determined by the need to solve complex scientific and technical problems in professional activity that requires skills to predict economic, social and environmental consequences of decisions [11].

The formation of professional competence of a prospective engineer is based on a combination of scientific and theoretical training and experience in applying the acquired knowledge, which is revealed in solving both typical and problematic situations in professional activity in the industrial production field. Therefore, the structure of professional competence reflects: the system of knowledge and skills acquired by prospective engineers during scientific, theoretical and practical training to solve major production problems; personal experience of applying the acquired competences to solve typical and non-standard tasks in professional activity; system of value orientations and experience of emotional and value attitude of prospective engineers to the profession, to themselves, colleagues, and society.

The effectiveness of professional training of prospective technical specialists is ensured by fundamental engineering education, which combines abstract theoretical knowledge and specific tasks of industrial production, which also requires the formation of appropriate components of professional competence namely humanitarian, engineering, technological, practical, managerial, scientific, research, information, economic, legal and environmental components.

The humanitarian component of professional competence involves the study of personality, features of development, establishing the place in the national and world cultural environment. The main goal is to train an intelligent specialist in the technical field who respects the opinion, choice, rights and freedom of others. Mastering the engineering-theoretical component of the professional competence of a prospective specialist in the technical field is possible on the basis of knowledge of principles, patterns and models of the production industry.

The formation of the technological component of competence involves prospective engineering specialists' mastery of the technology of industrial process of materials and products. Thus, the practical skills of mastering the technological process of industrial production of competitive goods determine the practical component of professional competence.

The managerial component of professional competence of prospective engineering specialists involves the formation of culture and skills of labor collective management, formulation and solution of strategic, tactical engineering and technological tasks for their effective solution in the industrial production field, social organization of labor, adequate to market relations competition of ideas, goods and services.

Acquisition of the research component of professional competence occurs through the formation of scientific culture, involvement of students in basic field research, the formation of skills to implement innovative technologies of engineering science. The formation of the information component of professional competence is aimed at the study of modern information technology, computer technology, search, processing, storage and display of data.

The economic component of professional competence of a prospective engineering specialist is provided by the development of adaptive skills of professional activity in a market economy, the formation of economic culture of a prospective specialist, whose engineering decisions are justified by economic practicability. In the process of economic and legal component formation, the legal culture of a prospective engineer is developed on the basis of studying the system of state legal laws and rules. The necessary knowledge for a specialist in the system "man-machine-environment" is the knowledge of the impact of technical systems and production technologies on human health and environment, which provides the formation of the environmental component of professional competence.

The key principle of formation of the abovementioned professional competence components is the principle of professional orientation as one of the main components of the personality structure of a prospective specialist in the technical field, which affects personal work performance, creativity and responsibility. Ensuring the implementation of this principle in the process of training prospective specialists in the technical field involves the formation of focus on the future profession, professional values of the individual, and a set of motives for future professional activity.

We consider the professional orientation as a system of needs, motives, interests, inclinations of an individual to a positive attitude to future professional activity in the industrial production field. The characteristic features of professional orientation are: the integrity of professional, social and cognitive orientation; the connection of professional orientation with activity; awareness and psychological readiness for future professional activity; comprehensive sustainable interest in future profession on the basis of abilities and skills.

Conclusions and research perspectives. As a result, at the present stage of modernization of the state system of higher education an important strategic task is to ensure the training of prospective technical specialists at the level of international standards. The analysis of pedagogical experience and public expectations from the reforming process of the state education system revealed that its development should be based on competences as the competence approach becomes a socially significant phenomenon, a priority in education policy framework in Ukraine that is conceptual provisions, essence, and content of higher education, so the current strategy of public policy is the acquisition of relevant professional competences by students of engineering specialties.

The solution of this problem is possible in terms of formation of humanitarian, engineering-theoretical, technological, practical, managerial, research, information, economic, economic-legal and environmental components of professional

competence in the process of training prospective engineering specialists in higher technical education institutions. The effectiveness of formation of the abovementioned components of professional competence is ensured by the implementation of the principle of professional orientation of prospective engineering specialists training on the humanitarian basis. This, in turn, creates conditions for comprehensive consideration and facilitation of the development of prospective engineers' personal traits. As higher technical institution instructors follow basic humanitarian principles of education, they consider students' personal needs, requests, goals, experience, which provides conditions for personal and professional self-development of a highly qualified competent specialist in the technical field.

Further research can be aimed at the review of the results of approbation of the presented material in real conditions as well as the design of plans and programs for the development of professional competence training of prospective engineers in higher technical education institutions.

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РОМАНЧУК Н. О. Професійна компетентність майбутніх фахівців інженерного профілю.

У статті досліджуються теоретико-методологічні засади формування професійної компетентності майбутніх інженерних фахівців у вищих технічних закладах освіти. На основі

аналізу сучасних концепцій переосмислюються сутність, мета, зміст підготовки майбутніх фахівців інженерного профілю у вищих технічних закладах освіти з позиції реалізації компетентнісного підходу. Мета статті полягає в дослідженні теоретико-методологічних засад формування професійних компетентностей майбутніх фахівців інженерного профілю як основи їх підготовки. У роботі використовуються теоретичні методи дослідження: вивчення та аналіз психолого-педагогічної, нормативної та спеціальної літератури з проблеми дослідження; аналіз державних освітніх стандартів, програм, навчальних посібників і методичних матеріалів. Характеризуються етапи формування професійної компетентності майбутніх фахівців інженерного профілю: формування професійних намірів і спрямованості; оволодіння спеціальними професійними знаннями й уміннями; професійне становлення фахівця технічної сфери. Акцентується увага на ціннісних орієнтаціях особистості майбутнього інженерного фахівця в процесі формування його професійної компетентності. Обґрунтовуються структурні компоненти професійної компетентності: гуманітарний, інженерно-теоретичний, технологічний, практичний, управлінський, науково-дослідницький, інформаційний, економічний, господарсько-правовий та екологічний компоненти. Виділяється важливість реалізації принципу професійної спрямованості підготовки майбутніх інженерів у процесі формування їх професійної компетентності. Доводиться ефективність формування професійних компетентностей майбутніх інженерів з метою підготовки висококваліфікованих фахівців технічного профілю.

Ключові слова: компетенція, компетентність, компетентнісний підхід в освіті, професійна компетентність, професійна підготовка, вищі технічні заклади освіти, фахівці інженерного профілю.