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The Specialist's Professional Mobility as a Trend in Developing Higher Engineering Education in the Conditions of Globalization

Topicality. Socio-economic changes in Ukrainian society which are connected with the globalization of all the spheres of human activity have significant influence on the state of the labor market and the requirements that are set up for professional and personal characteristics of a future specialist. The experts assure that a young specialist who will work on a modern enterprise of the 4th or even 5th type of technological organization has to be a specialist of a new kind who is a poly-professional of a high level technological culture and is also capable to adapt to quickly changing conditions of modem manufacturing as well as to competitive relationships on the labor market. Taking it all into account the problem of developing the professional mobility of a future specialist, in particular, a specialist of Engineering and Technology becomes topical. It should be noted that the problem of professional mobility is relatively new for pedagogical

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studies, that's why it is thoroughly being studied by a number of native and foreign researchers (S. Zeyer, B. Ygoshev, L. Merkulova, R. Pruma, L. Sushentsova and others). Within the field, there exist several tasks that are important in the conditions of modernization in the system of education, in particular, the research into professional mobility in the context of the processes of globalization in the system of education, and this accounts for the topicality of the article. It should be noted that the problem of mobility is closely connected with a number of contradictions where the contradiction between the tendencies of fast developing modern society and the readiness of modern specialists to work in the market conditions is of paramount importance.

The investigations analysis and publications testifies to the fact that the research into adaptation strategies of educational modernization as a social institution on which the process of development of intellectual potential in Ukrainian society definitely depends is quite a difficult problem. That's why this solution is the only possible one to the integrative efforts of researchers of different branches. V. Astakhova, K. Astakhova, M. Zgyrovskiy, V. Kremen', V. Andruschenko, V. Bakirov and others define the potential of modern education and those directions of its development which are topical in the conditions of globalization. Philosophical problems of the dynamics of educational processes in the conditions of globalization are dealt with in researches of such philosophers as P. Bourdieu, F. Matarasso, V. I. Baydenko, M. S. Konokh and others. Essential contribution to the solution of the problem has been made by the works of native and foreign researchers as L. Horyunova, R. Pryma, T. Sushentsova where the issues of training professional mobile experts in the conditions of globalization and integration processes are directly examined. However, as some representatives of management structures state, in modern conditions educational establishments "react as slowly as they did before to social changes that have occurred and they are as poorly adapted to new realities and tasks as they were before" [3].

The objective of the paper is to specify the factors that predetermine the requirements for training a modern competitive expert in Engineering and Technology.

The body of the article. The genesis of modern society that has acquired the name of information society is accompanied by a number of interrelated globalization, integration and information processes that cause essential changes in organizing public institutions functioning, in particular the system of education, and predetermine new requirements to

professional and personal qualities of a modern specialist.

The British scientist M. Waters defines globalization as a social process in which the constraints of geography on social and cultural arrangements recede and in which people become increasingly aware that they are receding [8]. This characteristic feature of globalization indicates the emergence of new social relations, new concepts of interaction and a new system of interdependence in the global social space.

The British sociologist A. Giddens recommends to view globalization as the intensification of worldwide social relations which link distant localities in such a way that what happens locally is shaped by events occurring many miles away and vice versa [9]. In this interpretation globalization promotes a new type of society based on knowledge and a new system of social relationships that produce and support it. In the mid-80s of XXth century a famous American sociologist and one of the authors of "Information Age" A. Toffler emphasized that tendency of society development. The scientist pointed out that most 'the third wave' companies are no more increasing their profits by 'squeezing the sweat' out of their employees but by acquiring the value of information and creativity [6]. Accelerating of the knowledge transformation into a direct productive force in economic and social development especially in the second half of XX century marked the formation of a coherent system of scientific views that gained the name "knowledge economy". The Russian economist and mathematician Academician V. Makarov suggests interpreting the economy based on knowledge as a new type of economy for which the knowledge sector plays a significant role, and the production of knowledge becomes the source of economic growth [4]. According to Doctor of Economics L. Fedulova, the Professor of Economics and Forecast Institute of the Ukrainian National Academy of Sciences "… now the concept of knowledge has become the main theoretical basis of development policy, it reveals a new role and a place of human intelligence in society". Also, the scientist points out to the fact that there are some fundamental changes in social and economic sectors of different countries due to a synergistic effect of globalization and the technological revolution; such changes as the decrease of a part of the manufacturing sector and the growth of the service sector, deconcentration of industrial production, changes in its industrial structure etc. testify to that. The above-mentioned changes lead to the changes in the structure and nature of employment, significantly affect the Labor Market, and form new tendencies of its development [7]. Both native and foreign scientists believe that in the conditions of globalization and technological revolution

the problem of reduction of unskilled employees is becoming more urgent. For instance, high-tech mass production requires the increase of the share of engineering work compared to the proportion of the worker's labor in manufacturing products. "According to economic surveys that have recently taken place in some countries, the level of unemployment among the least skilled people is significantly higher than among more educated people" [2].

In general, the systematization of modem scientist researches shows that to understand the process of globalization one must distinguish 3 basic vectors which are important in interpreting its transformational impact on the educational systems and the requirements for future specialists.

First, globalization is accompanied by some 'erosion' of economic, cultural and other borders, which promotes the active exchange of human resources within the international community. The development of international labor market contributes to the significant changes in labor relationship. A new type of international employee is being formed, the one who is quite flexible and able to adapt quickly to the increasing demands of modern production, is easy to migrate, is flexible in communicating with other groups of workers, can work in a team and communicate effectively. It is this new type of workers that constitute the army of employed in the internationally-oriented production, which has been developing continuously under the influence of a number of economic and political factors. Therefore in the conditions of globalization the migration is increasing significantly and it leads us to the problem of workers' mobility.

The next feature of globalization that is of a particular interest within our research work is the appearance of new social relationships, new principles of interaction and a new system of interdependence in global social space. A. Belyayev and V. Livshits admit that "... organizations of XXI century will not have a strict hierarchy. They will consist of mobile units that form the conglomerates of temporary nature. These structures can be rebuilt if necessary, and this trend is called "adhocracy" (in Latin ad hoc means for 'this purpose')" [l]. A. Toffler also concluded that "in post-industrial society the bureaucracy will be slowly replaced by adhocracy that is a type of holding structure which coordinates the work of many temporary working groups that appear and cease their activity in accordance with the rate of environmental changes that surround the organization". The future adhocracy will require the workers who possess completely new qualities. New people who are able to reeducate quickly and who have good imagination will be needed. A coworker of a future

corporation will act not like "a book says" while solving problems which are completely new or unique. He should be able to judge and make evaluative decisions but not mechanically follow the given instructions, be able to freely navigate among the multiple tasks and organizational situations as well as to learn to cooperate with constantly changing groups of coworkers. Under such circumstances, the ability of an individual to adapt to temporary cooperation is of special importance [6].

The global economy also determines the tendency to the new forms of employment, to virtualization and intellectualization of labor, ownership, manufacturing that demands creativity, flexibility, and adaptability from a future professional. We emphasize the fact that the use of the INTERNET has provided some specific features to the production functioning. Therefore the professional mobility of a future specialist can be of not only physical nature but also virtual, so called "telecommuting", when the worker's location does not matter any longer.

Another characteristic of globalization is its all-embracing and system-forming role in the process of developing "knowledge economy" with its "cascade" increase of the amount of information and the fast "aging" of knowledge typical for "intellectual society". That is why staff qualification, professionalism and creative activity are of prior importance. These processes demand the ability to life-long learning and skills upgrading, and the ability to be ready to retrain in those cases when the production methods or products get outdated. According to the statistical data, a special feature of information civilization is doubling the information every 3 years as well as making up a 50% new list of professions every 7 years. Hence, to become successful an average person has to change the place of work 3-5 times during their professional career. It should be pointed out that scientists have developed a system of indicators that characterize the "knowledge economy". One of these indicators is the increased scientists and experts' mobility, especially of those of high qualification, as well as students' mobility.

The increase in the educational potential of employees required by any branch of human activity in Information society is called "technologization" in scientific publications; it is directly accompanied with the "technocratization" of the society that creates special requirements for employees with engineering education. First of all, it is connected with the development of professional functions of engineering activities. Even nowadays the professional activity of engineers combines many functions such as: to create projects, to study the market, to negotiate, to find the

market for products, to buy raw materials, components and equipment, to manage the production and people, etc. The share of professional competence has increased dramatically: the functions of designers and technologists are often performed by the same person, the menial worker is often absent in the production chain, because, as a rule, production processes with automatic equipment is performed by the engineer or a technician who have performed in advance the full range of design and technological preparatory work for new products production. The integration of elements of physical and mental labor took place in the activity of a synthetic professional worker long ago, and the proportion of mental and creative work has been constantly growing. In our opinion, this fact certifies to the necessity to train engineers capable of mobility within the framework of their professional sphere. This conclusion is confirmed by V. A. Dtsov who writes about the "professional polyphony" or the mixture of a number of jobs in one general area. The professional polyphony is characterized by blurring an area of knowledge by a variety of specialties. As the scientist thinks, it all leads to the fact that in Information society one should talk not about a profession but about a job, an activity, or a vocation.

The "poly-professionalism" of engineering activity that replaced the "mono-professionalism" has greatly influenced specialists' behavior in social and professional space. In their social life a person usually performs several social parts which constitute, in R. Merton's words, "a repertoire". In his research V.A. Yadov notes that objective social and economic patterns determine certain changes in people's behavior, i.e. the change of roles. The ex-minister of Education of Ukraine D. Tabachnyk says, "The production that is changing rapidly leads to the fact that every member of the society is to be able and ready not only to perform a specific set of social functions and role responsibilities in the system of social relationships but is to be able to have the proper level of qualification and proper specialization that gives them an opportunity to increase the level of their professionalism according to the production requirements of the future" [5]. We completely support this thought and consider that engineering activity being multifunctional contributes to the extension of the professional's social "repertoire", and we believe that this process can be considered as a separate type of engineer's professional mobility.

Hence, it is required today that a professional should possess not only thorough knowledge and appropriate skills but also be ready and be able to navigate the information flows, to master new technologies, to self-educate, to search and apply the missing knowledge or other resources, i.e. to be

professionally mobile, thus professional mobility must be a part of the 'ideology' of professionalism, especially that of a future engineer.

The conducted theoretical analysis allows us to distinguish certain factors that determine the need for training professionally mobile specialists in Engineering and Technology. As we know, it is factors as reasons or driving forces of any process that determine its character and its properties.

Empirical research data suggest that the factors of individual mobility in the social space are being formed within the existing institutional differences of a particular society and they can be conventionally divided into objective and subjective factors (A. A. Heras'kova).

Among the external objective factors the following ones should be distinguished:

- the formation of information society and the 'knowledge economy';
- the formation of the global labor market and liberalization of social relations;
- the emergence of new principles of professional cooperation and the system of interdependence in global social and professional space;
- the emergence of new forms of employment, virtualization and intellectualization of labor;
- the development of production dominated by the V-th level of technological organization and transition to realizing some scientific trends of the VI-th level aimed at developing and applying biotechnologies, nanotechnologies, genetic engineering, membrane and quant technologies, photonics, micromechanics, nuclear energy and other scientific advances.

Objective factors of individual character include demography indices (gender, age, physical abilities), educational level, professional qualifications (the status of a profession, job experience).

On the subjective level (micro-level) mobility depends on a person's attitude to mobility formed by their needs, interests, and values.

Taking into consideration all the groups of factors that predetermine the necessity of training professionally mobile future engineers, we believe it possible to differentiate its main types. First, it is professional mobility within one profession – that of an engineer. Modern educational and qualification requirements to an engineer include their ability to perform project and design functions, organizational and management functions, technological and productive functions, and research functions. Another type of professional mobility includes mobility in the sphere of engineering activity. In information society engineering activities expand

due to such new directions as system engineering and sociological and technological projects. Moreover, the development of modern systems of telecommunication determines the appearance of a completely new type of mobility – virtual mobility. These essential changes in the engineer's activity lead us to distinguishing the third type of mobility – professional mobility in upgrading professional skills (continuous upgrading of one's knowledge and skills, the ability to retrain and master new technologies).

Thus the conducted theoretical analysis allows us to claim that a future engineer must be ready for life and activities in distant future when professional development is self-guided, i.e. a person is to be ready to change. In this case the task of education is to create the conditions that will let a student to develop this readiness to change which will serve as the basis for their professional mobility.

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Abstracts

СВІТЛАНА ДАНЬШЕВА, ДИМИТРІЙ ЧЕРЕДНІК. **Професійна мобільність фахівців як тренд розвитку вищої інженерної освіти в умовах глобалізації.** *У статті розкрито актуальність дослідження феномена професійної мобільності як невід'ємної складової професіоналізму фахівця XXI століття. Обґрунтовано перспективність підготовки професійно мобільного майбутнього інженера в умовах глобалізації різних сфер життєдіяльності людини. Проаналізовано вплив процесів глобалізації на розвиток системи освіти. Визначено зовнішні фактори, які впливають на професійну мобільність. Доведено необхідність проведення досліджень особливостей цього процесу в умовах технічного університету. Виділено закономірності теоретичної основи створення педагогічної системи формування готовності до професійної мобільності у студентів в освітньому процесі технічного університету.*
Ключові слова: *глобалізація, формують чинники, професійна мобільність, технічний університет.*

SWITŁANA DAŃSZEWA, DYMYTRIJ CZEREDNIK. **Mobilność zawodowa specjalistów jako trend rozwoju edukacji inżynierskiej w kontekście globalizacji.** *W artykule opisano fenomen mobilności zawodowej jako integralnego składnika profesjonalizmu specjalisty XXI wieku. Uzasadniono*

perspektywiczność przygotowania inżyniera, gotowego do mobilności zawodowej szczególnie w warunkach globalizacji. Przeanalizowano wpływ globalizacji na rozwój systemu edukacji oraz określono czynniki, wpływające na mobilność zawodową. Pokazana konieczność tworzenia w procesie kształcenia na wyższej uczelni technicznej systemu profesjonalnej gotowości studentów do mobilności zawodowej.
Słowa kluczowe: *globalizacja, mobilność zawodowa, czynniki mobilności, wyższa uczelnia techniczna.*

СВЕТЛАНА ДАНЬШЕВА, ДМИТРИЙ ЧЕРЕДНИК. **Профессиональная мобильность специалистов как тренд развития высшего инженерного образования в условиях глобализации.** *В статье раскрыта актуальность исследования феномена профессиональной мобильности как неотъемлемой составляющей профессионализма специалиста XXI века. Обоснована перспективность подготовки профессионально мобильного будущего инженера в условиях глобализации различных сфер жизнедеятельности человека. Проанализировано влияние процессов глобализации на развитие системы образования. Определены внешние факторы, которые оказывают влияние на профессиональную мобильность. Доказана необходимость проведения исследований особенностей этого процесса в условиях технического университета. Выделены закономерности теоретической основы создания педагогической системы формирования готовности к профессиональной мобильности у студентов в образовательном процессе технического университета.*
Ключевые слова: *глобализация, формирующие факторы, профессиональная мобильность, технический университет.*

SVITLANA DAN'SHEVA, DYMYTRII CHEREDNYK. **The specialist's professional mobility as a trend in developing higher engineering education in the conditions of globalization.** *The article deals with the relevance of the study of the phenomenon of professional mobility as an integral part of the professionalism of the XXI century. Perspectivity of professional mobility of the future engineer training in the conditions of globalization of various spheres of human activity is grounded. The influence of globalization on the development of the education system is analyzed. External factors that have an impact on professional mobility are determined. The necessity of carrying out of studies of this process in a technical university is proved. Regularities theoretical basis for the creation of pedagogical system of readiness formation of students to professional mobility in the educational process of technical university are obtained.*
Key words: *globalization, forming factors, occupational mobility, Technical University.*