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INTEGRATION OF UKRAINIAN POLYTECHNIC UNIVERSITIES AND INDUSTRY FOR CREATION OF A MODERN ENGINEER MODEL

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ОБ'ЄДНАННЯ УКРАЇНСЬКИХ ПОЛІТЕХНІЧНИХ УНІВЕРСИТЕТІВ І ПРОМИСЛОВОСТІ ДЛЯ СТВОРЕННЯ СУЧАСНОЇ МОДЕЛІ ІНЖЕНЕРА

The paper presents the experience of integration of Ukrainian technical universities and industry as well as its role in creation of a modern model of an engineer. In practice, it means cooperation between leading technical universities of the country and national and international businesses in the areas of innovative medium development, designing and realizing scientific, technological and educational projects.

The author analyzes prerequisites for crucial structural and economic changes in Ukraine resulting in the situation when employers will compete for highly qualified university graduates motivating them by grants and scholarships, new bases for practical training, providing innovative medium for realization of promising ideas. The demand of Ukrainian society brings about the necessity to develop an up to date educational system.

The mechanism of interaction between students, instructors and employers that creates favorable conditions for building a modern model of an engineer has been elaborated. It is emphasized that highly competent specialists and enhanced well-being of society are grounded on innovative methodological thinking of university graduates.

Education and science are becoming the vehicles of sustainable progressive development and the factors which provide for people's welfare in the global community. Education turns into the subject of social life that shapes the future of a country. Nowadays universities bear much more responsibility than before for the development of the world. That is why ensuring higher education quality is the key issue.

Ukraine concentrates its efforts on high technologies as strategic factors of the country's progress. The primary emphasis is placed on human resources whose mission is to support innovative development of the state through mutually beneficial interaction between higher education, science, business and administration.

The educational level and professional competencies of specialists determine the feasibility of social transformations and readiness of the country to conduct reforms. Before all, advances in technical education can really ensure a rapid, innovative and highly technological growth of the country.

There is an urgent need to create such structural and economic conditions in society when employers would compete for highly qualified university graduates by offering them grants and academic scholarships, by proposing state-of-the-art bases for practical training, by offering investment opportunities for realization of promising ideas. These measures will work well against draining the best brains out of Ukraine.

The modern system of education in Ukraine is to be based, in the first place, on growing social demand for advanced education whose quality is directly related to availability of well-rounded academic environment for specialist training.

Giving an applicant the opportunity to choose a personal road map of learning is one of the forms of societal control over the process. Such choice makes universities compete and bear responsibility for the decisions taken by the school leavers. This situation creates a challenge for the system of education management in Ukraine. De-centralization and university autonomy are the mechanisms whose mission is to answer this challenge.

Building creative thinking should become the methodological basis of learning. We know from life experience that progressive engineering education is based on new knowledge which students are supposed to get in well-equipped scientific university laboratories, as well as through communication with enthusiastic teachers and scholars, or with prospective employers who are interested in hiring qualified human resources.

The key strategic issue of every higher educational institution is self-organization of education system within the frames of general rules worked out by society.

The corporate culture, inherent to a vibrant university and formed in the context of its own strategy and its own unique realm of activity, comprises a distinctive system of values associated with this strategy. We mean, in the first

place, building a motivational environment for development, where teachers and students are in constant search for new knowledge and skills.

The research activity of modern polytechnic universities is based on interdisciplinary projects. Alongside with special tasks and in accordance with requirements of big business, they aim at solving the problems of economic efficiency, environmental security and social aspects of post-industrial activity.

The first and foremost task here is building adequate modern infrastructure, its primary purpose being consolidation of the university scientific potential, ensuring counseling, financial and judicial support for the innovative activity and successful accomplishment of projects, efficient training of engineers and researchers.

Such pattern of interaction between students, teachers, commissioners of scientific and research projects can be truly called ground-breaking. The modern model of an engineer incorporates the idea that the university graduate is distinguished by the unconventional methodology of thinking. It is topical to put this principle into practice since high technologies and scientifically grounded industries are of special significance for the development of the country's economy. Only in such case, we can achieve the adequate level of the personnel competence, technologically savvy range of commodities and services, which on the whole provides for the better well-being of society.

Nowadays, learning objectives and functions are directly related to the cutting-edge tasks: development of life-long learning skills, and building the motivation to master them, i.e. to be always on the winning side of the competition. Education is meant to develop the basis, or methodology of a person's life and activity. Hence knowledge becomes the foundation of human life.

It is critical to create a system of multi-channel financing for polytechnic universities, as they are the centers of integration between education, science and innovative business. This is vitally important for maintaining sophisticated educational and research equipment, for conducting complex scientific investigation and technological projects commissioned by business, as prescribed by the customized training of specialists.

In spite of the absence of the relevant legislation and insufficient interest of the Ukrainian business, the leading research universities of Ukraine – Kyiv, Lviv, Kharkiv and National Mining polytechnic universities – follow the line of integration with highly technological production. The results of their joined efforts are worth close attention. These universities aim to train high quality human resources with the help state-of-the-art scientific research, cooperation with business and powerful investors. Unlike most conventional institutions, they are rapidly developing within the triangle of knowledge, which harmoniously unites education, research and innovation. These universities boast of highly professional staff that focuses on the quality of research and innovation, as well as international publications. The faculty incorporates their own research together with renowned scientific and technological achievements into the process of teaching. Departments are engaged in original research, successfully implementing scientific and technological projects

commissioned by national and international companies. Every student studying in the bachelor or master program has an opportunity to do research and work in modern computer centers and state-of-the-art technical laboratories equipped by domestic and foreign companies and publish papers in reviewed academic journals.

Special attention to human resources in these universities allows accommodating the best scientific potential in every program of the interdisciplinary research. To achieve the best results of training students in the chosen field, teachers and scholars assist them in every way, through consultations and scientific reports. Owing to this approach, these universities are obtaining worldwide reputation of excellence, actively participating in international projects in order to ensure competitiveness of graduates on the modern labor market.

Educational communication in these universities is built on the motivation associated with three parts of the process: student-university-business. They comprise the most effective mechanism of training a highly qualified specialist who is in great demand with employers. Thus students acquire the most important skill a graduate should have: ability to find one's perspective place on the labor market.

Dynamic cooperation of the National Mining university (Dnipropetrovsk) with advanced national and international technological businesses (DTEK GROUP companies, Pavlograd Chemical Plant, Yuzhnoye Design Bureau, Interpipe Company – **Ukraine**; Solid Work – **USA**; Bosch, Danfoss Bauer, Auma, Schuler, Heldele, Festo – **Germany**; Central Mining Institute, KGHM – **Poland**) resulted in the enthusiastic involvement of employers in the customized training of specialists, through the development of curriculum, organization of bases for practical training, working out criteria for assessing graduates' competency, setting up specialized laboratories and departments. Institute of international, educational and scientific programs, centers of innovative culture and project management were set into motion at the University, which yielded unique experience of cooperation with foreign partner universities and businesses. It also promoted application of effective mechanisms for transfer of technologies developed by the university and accomplishment of important innovative projects for the economy of Ukraine with financial support of German and Polish companies. Thus a reasonable motivation for obtaining quality education and developing successful business has been formed.

Seven linguistic and cultural centers of the National Mining University are providing deepened knowledge in foreign languages and country study. Such approach helps form a civil position of a graduate, expands their academic mobility and allows for participation of students, scholars and teachers in international educational and scientific projects.

The unique experience accumulated by leading research universities of Ukraine in the domain of cooperation with business, has been taken into account while working out new educational legislation which creates favorable conditions for productive activity of universities. The recently adopted law "About Higher Education" has turned to be mould-breaking as it is based on the idea of university au-

tonomy and aims at bringing higher education to the level of European standards by ensuring competitiveness of educational institutions and science, by setting higher demands for knowledge and practical skills expected from prospective employers, and by developing scientific and innovational activity of universities. This is crucial for speeding up the development of engineer education at the moment.

If tax legislation is changed, the new law on higher education will provide for the development of an exceptionally important infrastructure between a research institute and production – startups. Supported by the European Union, Ukraine is putting all its effort to realizing the powerful potential of development concentrated in education and science and in innovations implementation.

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Наведено досвід інтеграції технічних університетів України та промисловості у формуванні сучасної моделі інженера. Врахована практика співпраці провідних технічних університетів держави з національним і міжнародним бізнесом у розвитку інноваційного середовища, створенні та реалізації науково-технологічних і освітніх проектів.

Розкрито умови, за яких в Україні буде здійснено необхідні структурні економічні зміни, коли за високо-

кваліфікованих випускників університету роботодавці будуть боротися шляхом надання грантів і підвищення стипендій, використання новітніх баз практики, забезпечення інноваційного середовища для реалізації перспективних ідей. Розвиток сучасної системи освіти в Україні може бути забезпечений за рахунок підвищення соціального попиту українського суспільства.

Розкрито механізми взаємодії студентів, викладачів і роботодавців, що створює умови формування сучасної моделі інженера. Підкреслено, що тільки інноваційне методологічне мислення випускників забезпечує високу компетентність кадрів, вищий рівень добробуту суспільства.

Приведен опыт интеграции технических университетов Украины и промышленности в формировании современной модели инженера. Учтена практика сотрудничества ведущих технических университетов государства с национальным и международным бизнесом в развитии инновационной среды, создании и реализации научно-технологических и образовательных проектов.

Раскрыты условия, при которых в Украине будут осуществлены необходимые структурные экономические изменения, когда за высококвалифицированных выпускников университета работодатели будут бороться путем предоставления грантов и повышения стипендий, использования новейших баз практики, обеспечения инновационной среды для реализации перспективных идей. Развитие современной системы образования в Украине может быть обеспечено за счет повышения социального спроса украинского общества.

Раскрыты механизмы взаимодействия студентов, преподавателей и работодателей, что создает условия формирования современной модели инженера. Подчеркнуто, что только инновационное методологическое мышление выпускников обеспечивает высокую компетентность кадров, более высокий уровень благосостояния общества.