

Role of Technical University in Coordination of Education and Scientific Processes in Region

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Abstract: Modern situation requires permanent cooperation with leading industrial enterprises, both state and private, that is successfully realized in Zaporizhzhyye industrial region, where our State Technical University (ZSTU) serves as coordinator of technical higher education and scientific activity. Such interaction improved much with creation of faculty for economics and management in ZSTU in 1994.

Changes in Ukrainian economy due to market transformations influence greatly faculty structure of our technical University, with licensing of new specialties and specializations in engineering education. Thus, previously, when Zaporozhyye automobile plant produced more than 130000 Ukrainian microcars, engineers of automobile construction profile were thought in ZSTU. Now after joint venture "AutoZAZ-Daewoo" was organized, there disappeared the necessity of constructor engineers for this leading automobile enterprise, with accent shift technologist, materials science, engine specialists. So new transport faculty is being organized involving new specialties in "internal combustion engines", "organization and regulation of traffic", "organization of international transportation and custom regulation at transport".

If previously there existed the trend to very narrow specialization, now we support the idea of wide qualification, characterizing modern engineer as possessing:

- good special professional knowledge (know-how, basic technologies, materials and equipment etc.);
- wide scientifically underground (mathematics, physics, materials science etc.);
- sufficient management level (managerial projects, complex systems, economical analysis etc.);
- cultural and communication abilities (mother language and English language as leading one, programming, science history, ethic of engineering etc.)

In such determination of modern technical higher education we feel the necessity of new conditions to ensure both managerial part of it, and modern level economical education in general at technical university with very strict indication of required volume of computer knowledge.

As practical example of derived cooperation we can speak of University chairs activity with leading Ukrainian aviation enterprise "Motor-Sich", having results in organization of special aviation motors laboratory fully equipped by "Motor-Sich", direct participation of leading staff members in education, practical and methodical training, diploma projects fulfillment at the plant etc.

Keywords: technical high education, industrial enterprise, university.

1. Introduction

Modern situation requires permanent cooperation with leading industrial enterprises, both state and private, that is successfully realized in Zaporizhzhyye industrial region, where our State Technical University (ZSTU) serves as coordinator of technical higher education and scientific activity. Engineering education in technical university had occupied leading positions in new technologies development, creation of modern production means and technological processes` managing methods, thus ensuring production cost and quality, its place in world competition, and, finally, define countries place in world community. Very required interaction between technical higher education and scientific-technical activity of leading enterprises has much improved since creation of economics and management department in ZSTU in 1994.

All processes that proceed in relationship "Technical University – Industrial enterprise" depend much on general goal as achieving countries transition to open market economy. Thus the development of engineering education in Ukraine much depends also on solving the problem of high school humanization with final goal of new educational ideology formation on its humanistic – oriented grounds.

2. Pre–university training of future specialists

Since 1998 the specialists training started due to integrated teaching plans in 15 specialties. Since Ministry of Education has approved the status of Zaporozhye Regional Center of Politechnical Studies, the persons graduating from colleges and technical school can enter at relative courses with possibility of further rapid growth to 5th semester due to specialized (roped) basic engineering courses studies.

New possibilities of professional orientation and qualification abilities of school graduates appeared with organization of educational – scientific – industrial complex "Zaporozhye Regional Center of Politechnical Studies". Its creation was aimed at politechnical specialist training quality rise due to integral system of continuous learning, joint application of technical base and teaching staff of educational institutions.

The structure of above mentioned complex is shown at fig.1.

Thus a general agreement of Zaporozhye educational – scientific – industrial complex "Zaporozhye Regional Center of Politechnical Studies" was signed in 1998 together with 33 agreements of cooperation. All educational activities are carried out on the basis of center's status being searched out by our faculty of pre–graduate studies.

According to the abovementioned agreements Zaporozhye State Technical University ensures:

- the fulfillment of joint professionally – oriented work of schools aiming to find professional skills and abilities together with development of interest to technical disciplines. Thus different forms are being used as organization and caring out of scientific conferences, symposiums, excursions to university laboratories, application of ZSTU technical base etc.;
- choice of highly qualified teachers from professors and lecturers of ZSTU for teaching pupils in mathematics, physics, informatics, foreign languages;
- joint working–out and correction of teaching programs for deeper studies of the abovementioned subjects based on high school demands;
- development of pupil–to–student transformation conditions;
- development of materials (tests) for competitive choice of pupils;
- profile discipline's Olympiads caring out;
- acquaintance of entry procedure to different faculties;
- elaboration of methodical recommendations for separate courses and parts, caring out of methodical seminars and consultations for school teachers;
- attendance of lessons, exams etc. in schools and gymnasiums by university lecturers for getting information of pupil teaching.

3. Basic principles of cooperation between ZSTU and leading industrial enterprises

In modern difficult economical situation in Ukraine we have insufficient financial support from the government, that's why we strengthen direct ties with industrial enterprises irrespective to their state or private nature. So, in 1998 our university had signed multicomponent agreement with joint stock company "Motor Sich" that is widely known as manufacturer of highly-effective gas turbine engines for aeroplanes, helicopters and stationary power units. Leading specialists of "Motor Sich" company take part in educational process, special laboratories are equipped with engine models and computer technics from the plant, our students have their practical training at plant's shops and departments, and after graduating from the university they are employed as engineers at "Motor Sich". In 1998 multicomponent agreement between ZSTU and "Motor Sich" was signed, where all sides of cooperation were fixed, including organisation of special chair of "Technology of Aviation Engines" headed by Director-General of "Motor Sich" company V.Boguslaev. The same agreement is prepared with joint venture automobile company "AutoZAZ-DAEWOO". Such cooperation between industrial enterprises and technical university ensures further development of collaboration ties in engineering education.

As practical example of derived cooperation we can speak of University chairs activity with leading Ukrainian aviation enterprise "Motor-Sich":

- special laboratory of aviation motors equipped with modern samples was created due to "Motor-Sich" financing (it was attended by Ukrainian President L.Kuchma in October 1999);

- special discussions were carried out aiming the definition of major lines for engineers training employed at “Motor-Sich”;
- direct participation of leading specialists of “Motor-Sich” in education and methodical work, including director-general of “Motor-Sich” Dr.Sci, Prof. Boguslayev as University Council Member;
- organization of practical training and education for university students at “Motor-Sich”, including university branch at the plant;
- students participation in diploma projects fulfillment and scientific investigations at “Motor-Sich” request with their further employment there.

Recent activities in new engineering specialities opening brought into being those that appeared to be necessary for Zaporozhya industrial enterprises. E.g. such specialty as "internal combustion engines" is aimed to fulfill the requirements of Ukrainian – Italian joint venture "Motor-Sich IVECO" producing huge diesel engines, and is also interesting for joint venture "Avto-ZAZ–Daewoo" for renewing the engine production.

Another new specialty "special computer systems" is based on really huge potential of computer training in ZSTU and is able to satisfy the need of wide variety of enterprises.

The third specialty "marketing" is aimed to fulfill the goals of economical restructurization proceeding since 1991.

4. Development of new information-based technologies of specialist training

Modern high school progress is impossible without complex information of whole system, taking into consideration not only supply of TU with modern means of information and calculation techniques together with program equipment, but mostly solving the problem of computer nets creation for university and interuniversity communication together with new information technologies introduction to education and science.

As main lines in education informatization such trends can be expected: informatization of educational process and scientific investigations; creation of united information media of high school; informatization of high school management.

Thus the realization of the above-mentioned lines requires the implementation and development of such information technologies as computerized systems for studies and control; data bases and local nets; information expert systems; electronic libraries and multimedia technologies; technologies of far excess to data bases (through Internet) etc.

If in previous years (till 1996/97 year) the lack of centralized ideas in computerization of our TU resulted in purchasing of comparatively large number of electronic- calculating machines that weren't connected between each other, and frequently it was impossible to organize any net because all machines were of different classes (as cheap things are not really good ones) not combined to IBM-type computers.

For achievement of quick progress in informatization level in ZSTU during recent 2.5 years we have solved the problem of installation of highest modern level computers (more than 400 computers ensuring the rate of 13 students per 1 modern computer as recommended for TU level) and for every faculty specialized computer classes were made being integrated into local nets and joined to all-university net. All classes have entrance to Internet. Now majority of lecturers are engaged to development and introduction of new computerized educational programs, active means of computerized support of education such as electronic books, imitation and modeling programs, multimedia systems. E.g. such systems of computer modelling was installed at the special class for aviation gas turbines ensuring the possibility of graphic design of different engine systems together with strength analysis of engine elements.

The development of engineering education in any TU is based on natural-scientific, engineering-technical, social-economic and humanitarian grounds. It's clear that formation and development of Ukrainian state to a great extent depends on solution of problem of education humanitarization, having as final goal the formation of human world outlook based on humanistic valuables. That's why in ZSTU as in majority of Ukrainian high schools men work in the name of creation such conditions that help to develop high standards of thinking, mental and physical abilities, mastering the moral values and as a result - to restore mental potential of Ukraine. For this purpose we work in the following directions:

- creation of system of humanitarian disciplines teaching and studying that ensure mastering humanitarian whole-world valuables of world culture in combination with national culture;
- democratization of educational process;
- achievement of world level of humanitarian education;
- synthesis of humanitarian, natural (technical), fundamental and special sciences with special emphasis on ecologization of engineering education;

- strengthening of based on national pluralistic self-consciousness, i.e. respectful to all peoples and nations, tolerance to different trend of thoughts and different confessions etc.;
- changing of all organizations of educational process in way to development of individual peculiarities of person.

References

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Level of accreditation

Member of Center

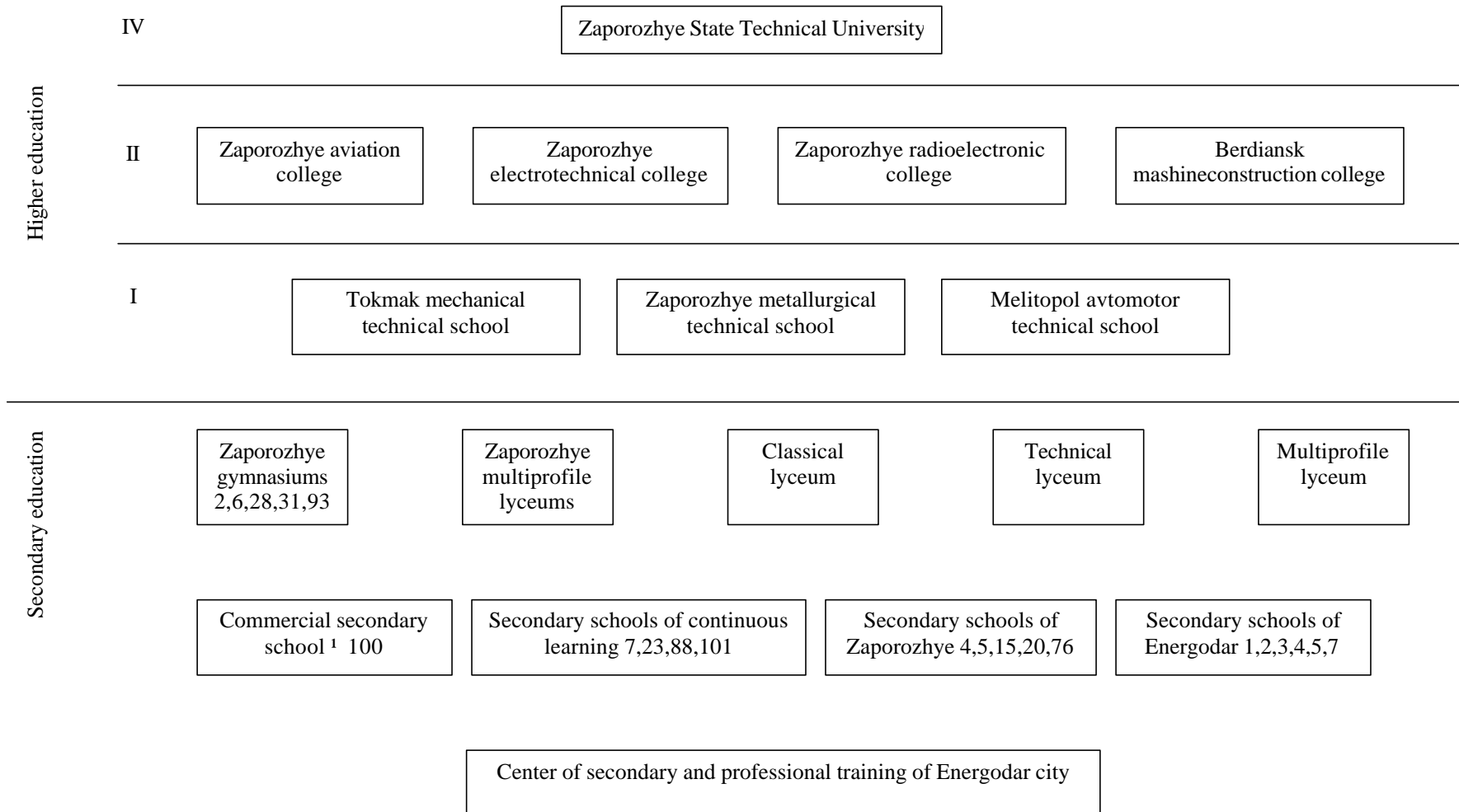


Fig.1. The structure of Zaporozhье Regional Center of Politechnical Studies