

# Improving Educational Activity at Belgorod State National Research University Based on the Concept of Practice-Oriented Learning

Belgorod State National Research University  
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The efficiency of university – employer cooperation could be evaluated by such indicators as the degree of compliance of graduates training quality with the employers' requirements, demand for graduates in the labour market and the efficient use of human resources. Creating conditions for successful implementation of practice-oriented learning in the system of vocational education, will enhance the competitiveness of graduates in the labour market and strengthen position of higher education institution in system of vocational education.

**Key words:** university – employer cooperation, concept of practice-oriented learning, Global initiative CDIO, applied baccalaureate.



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Current socio-economic development of the Russian Federation is characterized by the emergence of the labor force. Their efficient use is a compulsory condition for sustainable economic growth and well-being improvement. Therefore, this issue requires to be studied in a comprehensive way with evidence-based approach.

It is not enough for higher education institution just to prepare the graduate in the field of training, it is necessary to continuously monitor the labour market needs and focus on the demands of a particular employer.

Bring educational programs to real life, to link theory with practice - these are one of the main challenges that university faces today.

It is necessary to form a constant interaction between university and company where the employer acts as a customer from the labor market, defines learning outcomes as a set of graduates' competencies.

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Since September a pilot project of practice-oriented training based on the CDIO global initiative has been run at Belgorod State National Research University (BelSU).

CDIO global initiative is considered as one of the best international practices in convergent training of highly qualified personnel.

In accordance with the CDIO concept graduates should be prepared for the integrated activities throughout the product or service life cycle "Conceive – Design – Implement – Operate)" [1].

For the time being, 91 higher education institutions from 30 countries of the world have joined the project (North America and Latin America, Europe, Asia, Australia and New Zealand, South

Africa), including from Russia (Skolkovo Institute of Science and Technology (2011), Tomsk Polytechnic University (2011), Astrakhan State University (2012)), etc. [3].

BelSU is the first university in the region, which follows the CDIO concept in its activities, with the main focus on teaching practice. This principle is realized in the creation of training programs, their logistical support, recruitment and professional development of teachers. Although originally CDIO project was developed as a methodological framework for software engineering education, today it has become apparent that the CDIO standards ideology and approach apply to the training of specialists in every field.

The purpose of the CDIO initiative is to train students able to manage the processes of creation, operation and sustainable development of new products and systems. Graduates should apply innovative thinking skills in all tasks they have to deal with [2].

Practice-oriented training is largely aimed at independent team-work activities of students under the guidance of the teacher. Students have to complete practical tasks aimed at solving a particular problem.

Implementing CDIO Initiative requires the following steps to be done:

- Bridging the gap between universities and industry;
- Overcoming dissociation of disciplines and departments;
- Gaining real work experience within the training process at university;
- Acquisition of today's professional and personal competencies;
- Integration with the world leading universities;
- Training business and entrepreneurial skills and innovative thinking

In 2013 the pilot project in ctice-oriented 2014 academic year the following institutes and faculties of BelSU joined the CDIO pilot project implementation: Institute of Management, Faculty of Information Technology and Applied Mathematics, Biology and Chemistry

Faculty, Physics and Engineering Faculty and the Faculty of Mining and Nature Management

In framework of practice-oriented training several units of BelSU cooperate with companies and enterprises in the region.

For example, Faculty of Information Technology and Applied Mathematics together with Rostelecom designed an educational program to train specialists in the field of telecommunication technologies to meet the requirements of regional employers.

Department of information technology systems and technologies was founded on the basis of CJSC "Spetsradio" with technological development platform for design and production of electronic equipment.

In 2013 academic year Cisco network company started partnership with the Faculty of Information Technology and Applied Mathematics, which will deal with the implementation of joint educational programs for undergraduate and international specialists in networking for businesses in our region. At the Academy of the company professional retraining in this field will be organized.

To promote research and industry as well as to improve the quality of training at BelSU it was decided to establish a basic interdisciplinary department "Medical technology systems" the basis of CJSC "VladMiVa".

Since 2010 CJSC "VladMiVa" in collaboration with researchers from BelSU has started to develop new prospective research field - biocompatible materials for implantology, dental surgery and maxillofacial surgery.

In May 2012, the plant "Premiksov №1" together with BelSU Faculty of Biology launched a pilot experimental plant for the production of lysine. In fact, this is a prototype of the future enterprise in miniature. This plant represents a scientific laboratory for training future biotechnologists and training highly qualified specialists for microbiological industry.

Since 2011, the BelSU Institute of Management together with the admin-

istration of Rakitjansky Belgorod region has been working on the project "School of municipal employees".

"School of municipal employees" is focused on creating the conditions for training and professional development of municipal employees by solving real practical problems of municipal administration.

Together with the Belgorod Department of Education our university runs the project "BelsU School". The project aims at developing efficient tools and mechanism for the selection and training at the high quality level school graduates willing to apply BelsU educational programs in the field of mathematics and natural sciences. This helps to make the conditions for the creative development of students, providing high quality training and attracting talented young people to BelsU, as well as the conditions for training future teachers.

Today educational programs of technical secondary schools and colleges, aimed mainly at the development of practical skills, cannot ensure required high level of training. At the same time, university graduates who have acquired good academic knowledge base, often lack practical experience in the real industry conditions.

Therefore, it was necessary to design a practice-oriented applied Bachelor Program on the basis of higher education institution to improve a new qualitative level of education.

The basis of this level of educational programs of secondary vocational education focused on the acquisition of practical skills in the workplace, combined with higher education programs focused on getting fundamental theoretical training.

The volume of the practical part of the program, including laboratory and practical training, educational and industrial practice, is not less than half of the total time available for training.

In other words, the main objective of applied baccalaureate – prepare professionals with higher education degree diploma. Young people get the full set of knowledge and skills required to start

working immediately, without additional training needed.

In this case it does not matter that after graduating from applied bachelor program student could not continue further studies – if graduates wish they can apply for Master Degree programs afterwards.

In 2013 Belgorod State National Research University offered first practice-oriented programs of applied baccalaureate: 080500.62 Business Informatics; 034700.62 Documentation and Archive Studies.

From 2014 some more programs of applied baccalaureate could be introduced at the university in the following areas: 230400.62 Information Systems and Technology; 210700.62 Information and Communication Technologies and Communication Systems; 050100.62 Pedagogical Education; 230700.62 Applied Informatics, 050700.62 Special (Defectological) Education; 260800.62 Production Technology and Organization of Public Catering

The aim of introducing practice-oriented learning is to improve the research and educational activities of the university, aimed at training competitive, in-demand able to solve real specific problems.

The list of indicators describing the degree practice-oriented learning implementation should include:

1. Number of practice-oriented educational programs realized at HEI.
2. Particular forms of professional student's activities enabling them to solve real problems in practice.
3. Cooperation agreements between the university and industry enterprises and regional market.
4. Number of research, innovation and promotional structures, including industrial parks, business incubators, etc.
5. Total amount of R&D projects realized on the request of enterprises (organizations) with the involvement of students.
6. Total amount of research funding on targeted programs and grants with students involvement.

7. Amount of funding for initiative innovative projects in the educational, scientific fields involving students.
  8. Patents obtained on the research developments of the university with students' participation.
  9. Share of courseworks, projects and final works commissioned by the enterprise (organization).
  10. Number of students enrolled for practice-oriented programs of targeted training supported by special contract with enterprises (organizations).
  11. Percentage of students employed by target applications from enterprises (organizations).
  12. Share of students and graduates involved in the creation of start-ups or started their own business.
- Engage employers to career-oriented activities among school students, and among students at the university.
  - Develop mechanisms to encourage employees and students who have attained good results in implementing the concept of practice-oriented learning.
  - Create information environment using internet technologies for collaboration with employers, students, faculty and staff of BelSU within practice-oriented training and promote employment of graduates.
  - Interaction with employers to improve the system of social support of students and young professionals, the formation of an infrastructure to support students' entrepreneurship.

To achieve the above mentioned objectives it is important to complete the following tasks:

- Expand the range of training courses and professions, practice-oriented educational programs in accordance with the needs of employers.
- Strengthen the interaction between the structural units of the university and employers' organizations to conduct joint research and R&D projects, special targeted contract training and other activities.
- Improve the quality of graduate training in accordance with the future requirements of the labor market by engaging employers in the process of vocational training, as well as for current, interim and final control tests, etc.

To reach these goals Belgorod State National Research University developed algorithm presented in the form of a typical road map facilitating interaction of university departments with enterprises (organizations) – employers when implementing the concept of practice-oriented learning.

These measures will enhance the effectiveness of the system of vocational education and create conditions for successful implementation of practice-oriented learning, which ultimately will increase the competitiveness of graduates in the labor market and strengthen the position of the university in the vocational education system.

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