

Improving Young Employees Training at Engineering, Repair and Installation Enterprises

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The article considers the implementation of network as a form of training in the higher school. It highlights the necessity of implementing this form of students training for engineering enterprises involved in repair and mounting of the equipment. The authors offer a model of interaction between engineering enterprises in the framework of network industry educational programs.

Key words: network for of training, engineering staff, professional competencies.

One of the main goals of higher education institutions involving engineering staff training is the modernization of the educational activity itself which, in its turn, is aimed at professional competence development. Such modernization is possible only by improving and reconstructing the higher education system in accordance with the global trends, labor market demands, employers' demands and students' educational needs, as well as the development and implementation of upgraded educational programs and specific educational modules focused on innovative activities, including joint education programs.

The basic mechanism to achieve the above-mentioned goal is network interaction. Network education program implementation as stated in the Federal Law on Education in Russian Federation, adopted on 29 December 2012 [2], allows:

- involving the resources of two or more education institutions, including foreign ones to improve the quality of training and unique professional competence development;
- introducing education programs in collaboration with foreign and Russian education and scientific organizations to further science-technical and intellectual potential development;

- upgrading students' and teachers' academic mobility level.
- Network education tasks are:
- training specialists with unique competences in accordance with priority labor market demands;
- improving education quality based on partner organizations resources integration in priority profiles of industrial, cross-sectoral and regional development in accordance with international standards;
- introducing best local and foreign experience into educational process for industrial and regional experimental research development.

The Federal Educational Standards also embrace the possibility of network educational program implementation. Prior to the Methodical Recommendations on Bachelor's degree network education program implementation, there was no idea about the mechanism of network interaction. The main objective of the network form is common training of specialists within the framework of several organizations. These organizations are divided into three types:

1. Basic education organization (here – Bashkir State University).
2. Education organizations (Autonomous Non-commercial Organization, Special Secondary Education Establishments, Higher Education Establishments and other



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establishments having educational license).
3. Resource organizations (manufactures, laboratories, industries, etc).

The functionality of innovative educational centers and departments including CPE (Continuing Professional Education), teaching councils, teacher training centers, regional competence centers, marketing and graduates' employment services expands during the implementation of network education programs. Network education programs could be:

- competence development – oriented to enhance highly qualified specialists for priority industrial and regional economy sectors;
- science-innovation – directed to applied research development for industrial and regional needs;
- industrial – directed to highly qualified specialists training for the priority branches of industrial, cross-sectoral and regional economy in accordance with international standards.

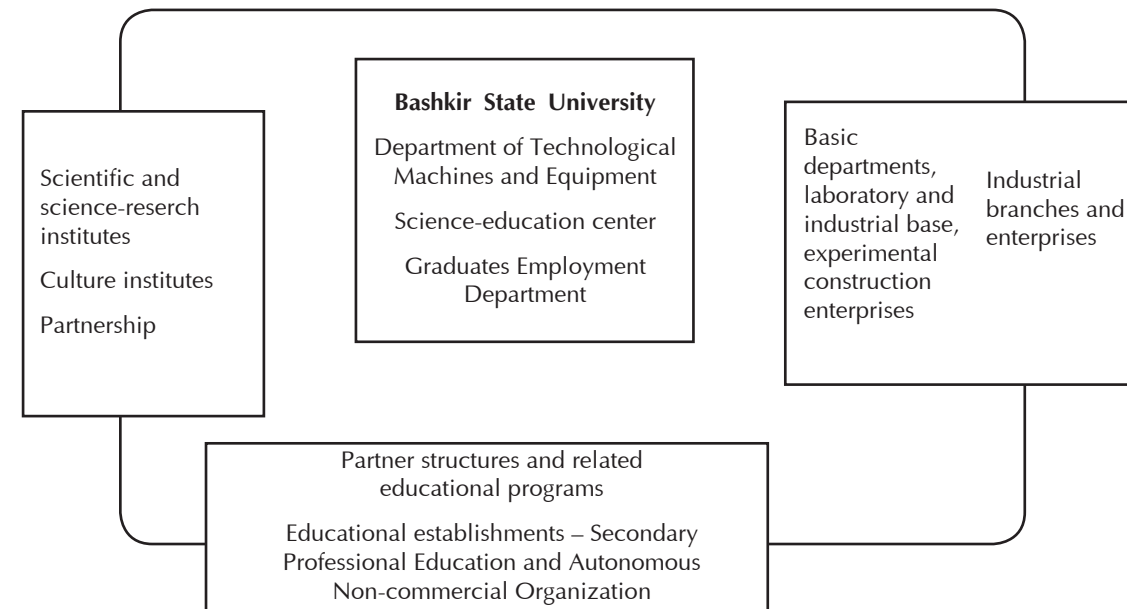
The realization of competence-oriented network education programs implies the development of pre-university tutorial centers, career centers and vocational classrooms for developing unique pre-professional competence.

Science-innovative network education program implementation includes the resources of education-research centers, research facilities centers, career centers and vocational training centers, which would develop science-education environment where the higher education institution is an inseparable member [1].

Our model of network education is industry-oriented and implies close interaction with real economy sector enterprises (Fig. 1).

The updated Law on Education introduced the term “structural unit of high education institution at basic enterprise of real economy sector”. This term means the interaction between high education institution and the enterprise during laboratory and practical work, on-site

Fig. 1. Model of enterprise interaction within network industrial education programs



training, research works and etc. The leading high education institutions like Moscow Institute of Physics and Technology use the term "basic department", but still there is no common law and methodological background for the development and activity of basic departments.

In 2011, Engineering Department of Bashkir State University established basic departments which are responsible for enrollment and engineering specialists training (full and part-time education). Here, the engineering enterprises are the customers for education service provision. Currently, there are 4 basic departments: BashSU-GMZ at LLC "Gribanovskiy mashinostroitel'nyy zavod" in Voronezhskaya oblast, BashSU-KP at Open joint-stock company "Krasniyproletariy" in the republic of Bashkortostan (Sterlitamak), BashSU-UTS-THM at LLC "Uraltekhnostroy-Tuymazykhimmash" in the republic of Bashkortostan (Tuimazy) and BashSU-BMZ at Bugulma mechanical plant PGSC "Tatneft" in the Republic of Tatarstan (Bugulma).

More attention should be paid to the autonomous non-commercial organizations having education training license on categories requiring additional education license.

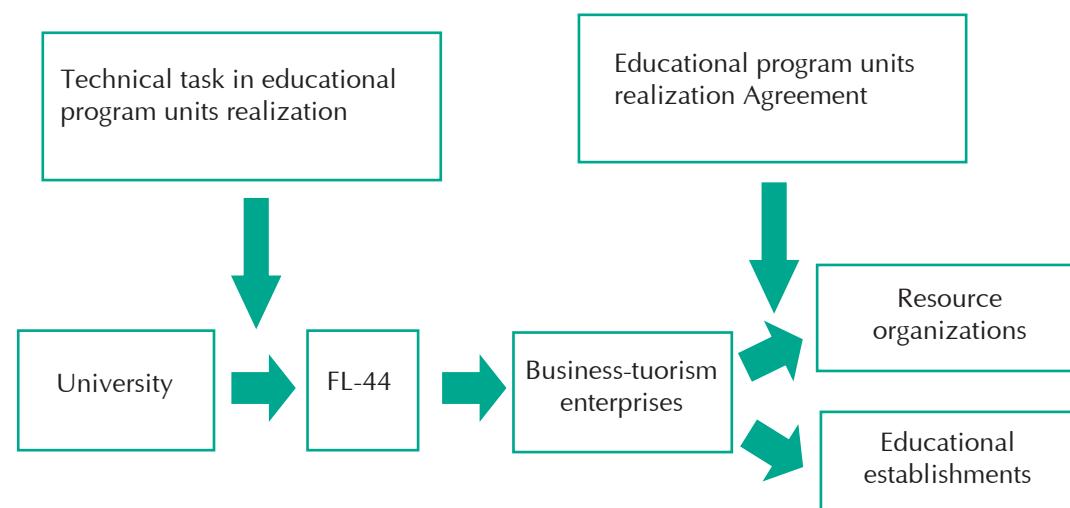
The existing laws, standards, and orders were studied in details, as well as the items on common business processes of all organizations and structural branches in order to develop the following provisions:

1. Bashkir State University:
Regulation on Science-Education Center.
Regulation on Network Interaction.
Regulation on Basic Departments.
2. Autonomous Non-Commercial Organization of Continuing Professional Education "Education Center"
Regulation on Network Interaction.
3. Engineering enterprises:
Regulation on Basic Departments.

The main issue of network interaction is the education institutions and resource organizations service payment for the implementation of education programs units. Currently, the network form is considered as indexes and according to the principle «we give you a student – you give us a student.» Thus, the network form is implemented between universities with the individual plan of a particular student training.

A mechanism of network interaction participants service payment based on the Federal Law № 44 (FL-44) (Fig. 2) is proposed.

Fig. 2. Mechanism of network interaction financial provision



This mechanism implies technical task development to achieve the didactic goals by the executives regarding the consumers – students. The units of education programs are noted in the technical task as credit units, as well as the specified competences related to them. Terms and cost of education programs implementation are also specified. These technical tasks are grouped in lots by the types of training activities and then are released to the public auction in order to find the service provider. The maximum cost of education program units is determined in proportion to the credit units spent on its implementation considering the announced admission quotas of the engineer training cost.

During the bidding process the service provider is defined for each lot among business and tourist enterprises. The task of a winning bidder is to organize business training, workshops, seminars, internships, and other types of activities similar to educational establishments. Thus, the following issues could be resolved:

1. Transfer of money from subsidy assignments into income-generating activity.
2. Receiving of compensation for external students' accommodation and admission.
3. Control of students' didactic goals achievement and competence development. This is performed by science-educational center, which is also responsible for technical task design. Such a center should possess permission for rendering service acceptance on behalf of Bashkir State University. This allows withholding the payments from business-tourist companies in case of their low-quality, incomplete or late service rendering. The basic share of students for network education is supposed to be the ones who live in the region of engineering companies' operation. This is defined by the fact that such companies are the members of network interaction and the major employers of Bashkir State University Engineering Department graduates.

After students' assignment at the engineering enterprise, the chief of the basic department helps them to choose the field of the study. Depending on the study field, a student gets the profession and starts working.

The methodological recommendation requirement analysis for the implementation of applied Bachelor degree in accordance with the Federal State Education Standards (FSSES) resulted in the following assumptions:

1. After the first-year study of the applied Bachelor degree (according to training-oriented program) a student should obtain the corresponding profession.
2. After the second-year study a student should defend his/her graduation thesis for secondary vocational education diploma (working qualifications).
3. After the third-year study a student should defend the graduation thesis of secondary professional education (mid-level professionals).
4. A fourth-year student should defend the graduation thesis of higher education (Bachelor degree).

After the completion of the applied Bachelor degree program a graduate is to have a Certificate on Working Profession (1st year), a Diploma of Primary Vocational Education (2nd year), a Diploma of Secondary Professional Education (3rd years), a Diploma of Higher Education (4th years). The list of such documents is necessary because, in accordance with FSSES, to implement the applied Bachelor degree program, the higher education system should correspond to the Secondary Vocational Education (SVE) program for mid-level professionals. Further SPE should correlate with the program for mid-level professionals, which should implement professional standards corresponding to the branches selected for applied Bachelor degree of higher education program. Correlation of different education requirements (higher education and secondary vocational education) and professional standards includes competences, professional activities and

disciplines correspondence. Also, in accordance with the Labor Code, a student who studies full-time is entitled only to part-time work and only if the employment corresponds the specialty.

To achieve the above-mentioned requirements, 50% (not less) of network education program should be implemented in collaboration with engineering enterprises. We have developed the mechanism of students' labor time management to study in terms of the network interaction. This mechanism implies spending the second half of the study day on practical and laboratory work at the enterprise. In this case, the student must be under the supervision of a professional.

The fundamental difference between students' training at the engineering enterprise under supervision and students' training at the university is in the individual training instead of mass classroom training. No company, even a large one could employ a group of graduates (28 engineers) every year. The logical solution to this problem is the application of the network form of training that allows splitting 28 students into subgroups at four basic departments. In this case, there are 7 students of one year in each enterprise. If 7 students are distributed to company's structural divisions, then

there are 1-2 students for each division. Considering the fact that each student will be entitled to independent work at the end of the first year, and, by the graduation, will become a professional employee with a four-year experience, as well as a specialist who can understand the difficulties of junior students (succession of generations), it is possible to establish a self-monitoring reserve personnel unit in the company.

Such features of the network education as part-time employment within practical and laboratory work are a kind of students' motivation to work and study, as the evaluation of students' performance by instructor or supervisor is considered at the credits and examinations. Failure in labor responsibilities fulfillment disables the student to study in accordance with the applied Bachelor degree program. This partially solves the problem of money return spent by the company on students' training.

Thus, the presented type of networking interaction is aimed at improving the quality of education, graduates' competitiveness, and students' mobility. Network education programs are a common practice in the world education system and have good prospects in the system of national higher education.

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Cross-cultural Interdisciplinary Study of Learning Motivation of Engineering Students in Russia and the USA

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The paper addresses cross-cultural analysis of the learning motivation of Russian and US students majoring in engineering. The study is carried out with the use of psychological and pedagogical methodology. Empiric analysis has not revealed significant differences between the Russian and US groups, however some peculiarities in the hierarchy and structure of motivational sphere were found and should be taken into consideration in organizing international mobility programmes.

Key words: interdisciplinary study, learning motivation, cross-cultural peculiarities, psychological-pedagogical analysis, engineering students.

Globalization, particularly in the sphere of professional communication, as well as knowledge economy, has provided researchers' and practician's unflinching interest in the issues of academic mobility and cross-cultural communication. The universities worldwide focus on the programmes of students' and teachers' mobility development, establishment of international working groups and projects. For example, Purdue University implemented a unique project of students' integration into the world community working at senior capstone project [1]. Kazan National Research Technological University has also great experience in international projects [2]. International teamwork allows future engineers to be integrated into international professional environment at the training stage.

Due to the increase in significance of cross-cultural communication in the professional engineering environment, it is of great interest for researchers as well. Cross-cultural communication is studied at the interdisciplinary level and is an object of culturology, psychology, pedagogy, linguistics, ethnology, anthropology,

sociology, and some other sciences. The given study implements interdisciplinary approach at the level of psychology-pedagogic relations to investigate cultural-related peculiarities of students' learning motivation in engineering universities of the USA and Russia.

Motivation, being one of the basic components of any activity and, to a great extent, defining its efficiency, is of interest for many humanitarian sciences. Interdisciplinary psychology-pedagogic approach to learning motivation considers a goal-oriented process of learning motivation development as a basis of learner's personal psychology. "Dynamics of personality development, – as V.G. Aseev puts it, – ...includes those steady regularities, study of which is a basic purpose of psychology. The most important among them are regularities of motivation development as a top form of psychological process regulation and moving force of human activity" [3, p. 334].

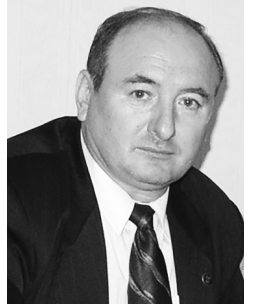
Besides, when considering learning motivation from the standpoint of mutual impact of personal, situational, and social factors, it is necessary to take



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