Advances in Economics, Business and Management Research, volume 128
International Scientific Conference "Far East Con" (ISCFEC 2020)

Contents and Outline of the Informational Educational Environment

V P Gulyaev[1], T F Gavrilyev[1]

[1]Northeast Federal University named after M.K. Ammosova

E-mail: fareastcon2019@gmail.com

Abstract. The issues of employment after the graduation and acquiring respective qualificationы are studied. The analysis of the Federal Educational Standard for various degrees and professional standards has allowed to identify the list of the main requirements of the labour market for a young professional. The need for a unified employment policy for educational institutions, employers, the society and a Russian graduate have been indicated.

1. Introduction

Today when informational technologies are used everywhere, and the first generation of "children with a tablet" has been born, the most pertinent problem of the educational process is the synthesis of traditional education and remote education (online education). For example, along with the traditional classroom-based courses there are also lectures, seminars, workshops, lab practicals; new educational formats are introduced, in particular webinars, conference calls, online education (for example, via skype, etc.), various video resources are used, e.g. YouTube and distance learning tools (for example, moodle, etc.).

2. Main part

2.1. Identification of the problem

Postindustrial economy has fundamentally changed the relations between individuals and the society, new forms of competition between people, organizations and companies have emerged and become more acute in the dynamically developing social and economic environment. The present situation and trends in the development of higher education in the Russian Federation is characterised by Russian experts and scientists as a movement towards harmonization of professional training targets and growing needs of the dynamically developing society [1, 2, 3, etc.]. Tackling the existing higher education deep-rooted contractions that are determined by the transition of the economy producing means of production to the economy that produces services is associated with the development and introduction of qualification assessment professional standard system and the improvement of state educational standards.

Present day challenges to national education institutions boost high-quality training of competitive graduates with master's, specialist's and bachelor's degrees. The society accepts and approves organizational education quality assessment mechanisms, in particular accreditation and certification of educational activities. The controlled education quality management space includes the main functions of educational institutions: educational programmes, scientific research, human resources, and other pa-

rameters. Teaching students to efficiently achieve their professional goals, to enhance effectiveness that is based on the motivation and readiness for self-actualization is the central strategic educational area. State higher education standards involve key social, personal, economic, administrative and management, general scientific and professional competencies for every degree [2, 4].

At the same time, leading academic staff, scientists, experts, organizers and practitioners in the higher vocational training indicate the need for the development of modern academic, scientific and methodological materials that help to develop professional special competencies of students [4]. The research of the national higher education shows specific and not fully justified for the quickly changing labour markets aspects of the reform of specialist, master and bachelor degrees in engineering, technical areas. The publications [4, etc.] underscore that higher qualification training, including technical engineering degrees, ensures the solution to the two main problems: it determines the life quality of the society and fulfilling the real needs of the society.

Retrospective analysis of the technical engineering education in Russia conducted by the Center for social forecasting and marketing [8] and other researchers [6 and others] shows that 90 years ago the initial needs of the state controlled economy were fully met by 26 technical higher education institutions in Moscow, Leningrad, Kiev and Kharkov. Successful industrialization was ensured and supported by the creation of a system of technical engineering education. More 900 thousand engineers graduated from 150 higher education institutions during the industrialization. The requirements of the society and time determined a close link between education institutions and production, new textbooks, study guides, other incentives that ensured active involvement of graduates with technical degrees into manufacturing processes [1].

The statistics on the average age of machines and equipment in the Russian Federation in all industries from 2008 to 2016 is 11.1…11.2 years. Machines and equipment is used in production and power, gas and water distribution for quite a long time, 14.2 … 15.4 years, for 11.9 … 12.2 in processing industries, 7.6 … 8.3 years in mining, and 6.8 … 8.8 years in services [8]. Depreciation of fixed assets is quite high, and in some economic sectors in 2016 it reaches 50% and more: transport and communication – 56.9%, public services – 56.9%, construction – 51.8%, mining – 56.1%, processing industries – 49.5% [8].

The number of cutting edge technologies used in all industries is growing, and at the same time the number of technologies that are 6 and more years old is also increasing, which calls for essential qualified operation maintenance, service, and performance diagnostic.

According to the Russian National Classifier of Types of Economic Activity, the biggest number of modern production technologies is used today in processing industries that include machine and equipment building sector and other 23 sectors from food production to manufacturing of furniture, car and equipment repair and maintenance [8]. These factors show the real status and need in specific economic activities for qualified engineers, and, clearly, the need for adapting the technical engineering education to the current social and economic situation.

2.2. Practice-oriented lessons on the basis of activity approach

Reforming the higher engineering education is aimed at the development of high-quality human capital in educational institutions with various degrees. The focus of academic community is aimed at the development of the best possible norms and regulations in the educational process under new social and economic conditions [7 and others]. The new generation of the Federal Educational Standards (ФГОС ВО, ФГОС 3, ФГОС 3++) implement modern educational models for training professional, qualified experts that are interested in self-improvement and self-actualization and meet the requirements of the labour market.

The new generation of the Federal Educational Standards indicate specific areas of professional activities of graduates. For example, Degree 15.05.01 Design of technological machines and complexes (specialist's degree) defines the professional area of the graduate as "... the creation of competitive products in machine building...". The graduate with the degree in Specialization No.21 "Design of technological automatic machines and automated complexes" must be ready to solve design problems

associated with such machines and complexes, their information support, management and production organization of technological automated machines and complexes.

The necessary professional and specialized competences under Specialty 24.05.07 Aircraft and Helicopter building are defined quite fully and clearly. The graduate with a degree in "Aircraft building" must be ready to find solutions to challenges connected to airplane design, aerodynamics, flight dynamics, durability and economics, production technology for aircraft parts, joints and equipment, etc.

We must say that for the majority of graduates with specialist and bachelor degrees, the state standards define the area of their future professional activities as engineering production support, in particular machine, complex and technical system operation. For example, the standard for the engineering support expert in human mining activities (Mining machines and equipment degree) lists tasks associated with the development of support documentation and standards for the production, operation, technical and service maintenance of mining machines and equipment with different functions. The most important tasks are associated with the sustainable operation of mining machines and equipment under different climate, mining, technical and geological conditions; selection of methods and means of monitoring the technical status of mining machines and equipment, etc. [3r2 Federal Educational Standard].

The Federal Educational Standard for Higher Education, Degree in Agricultural Engineering 35.03.06, illustrates best the specific aspects of the necessary harmonization of the labour market needs and competences of higher technical engineering institutions' students [1-3]. Educational institutions offer relevant bachelor courses in engineering for regions with various climate conditions. This is why the standards establish considerable independence of educational institutions in training students that have all the necessary skills, first of all, of using, servicing and maintaining machines and equipment in agricultural industry, agriculture, forestry, fisheries, and with regards to scientific research and development of technical means for updating industrial production.

However, today academic support for the training of technical engineering specialists and bachelors in natural sciences, math and general professional training is still to a certain degree based on the paradigm associated with the creation and development of industrial economy. Academic contradictions between studying materials and future professional life that graduates from ordinary and not elitist technical educational institutions will face, are clearly seen by students and significantly reduce their motivation for active educational engagement.

The need for enhancing students' motivation for engaging the educational process, and their preparation for real-life professional norms, regulations and requirements has determined the development of unique educational technologies based on CAE system machines and equipment that are widespread in machine building. Active introduction of widespread CAE machine building systems is also caused by limited targeted educational programmes that imitate processes of engineering and technical support of production technologies in production, electric power industry, construction and other critical industries in post industrial economy.

2.3. Practical usage

Over the years introduction of practice-oriented courses on the basis of the activity approach under Specialist and Bachelor Degrees 21.05.04., Mining, 23.03.03 Operation of transport and technological machines and complexes, 36.03.06 Agricultural engineering with CAE Win Machine shows a significant increase in the motivation and interest of students in studying "Machine parts" and "Machine parts and construction basics" courses.

It is clear that the practical value of the "Machine parts" and "Machine parts and construction basics" courses in curricula for engineers and bachelors that cover the operation of machines and other technical systems is associated with the development of relevant professional competencies. Objectives of enhancing operational productivity of machines and equipment are a side issue, which is, however, very common in practice and calls for engineering solutions.

A professional engineering solution to such problems is developed with regards to many conditions and factors. For example, the capacity of machines and technical systems is significantly affected by climate conditions, and as a result real-life operating load is higher than the estimates that are provided for by terms of reference. The practice of exceeding the full weight of wheeled vehicles is very common (excess of weighting capacity). Engineering changes and machine and technical system modernization are possible and feasible.

The analysis and solutions to the established objective involves the development of academic course elements, for example, tasks for term papers that reflect the proposed concept, and relevant methodological guidelines.

Modernization of SUVs like УАЗ aimed at enlarging the clearance by installing tires with bigger diameter is common in many regions. These and other under-explored performance factors must determine most professional competencies of students in technical departments. Calculation and graphic solutions for such tasks with the help of an automated engineer workplace module "Trans" in the Win Machine system, a software programme simulating a changing machine operation environment, draws increased interest among students and by itself develops necessary professional skills.

3. Conclusion

Besides the traditional monitoring of knowledge quality and skills acquired during the course "Machine parts", in order to test new tasks under the term project, it is essential to develop the system for assessing student papers taking into account the information and educational corporate environment.

References

[1] Dorofeev A A 2018 Engineering scientific and educational schools and the modernization of national higher education *Alma mater Bulletin of higher education* **1** 5–8
[2] Pilipenko S A, Zhidkov A A, Karavaeva E V, Serova A V 2016 Interfacing FSES and professional standards: identified problems, possible approaches, recommendations for updating *Higher education in Russia* **6(202)** 5–15
[3] Popova N V 2017 Key topics of relevant educational policy and practice *Higher education in Russia* **10(216)** 26–38
[4] Rakitov A I, Anisimova A E 2015 Higher education and society: Russia and other countries Higher education in Russia **5** 128–135
[5] Safiullin M R, Abdukaeva A A, Yelshin L A 2018 Organization of university space in the regional space system: analysis methodology and assessment of the effectiveness of the Volga Federal District *Alma mater Bulletin of the higher school* **11** 5–11
[6] Skachkova N I 2018 Determinants of the development of modern professional education *Alma mater Bulletin of higher education* **6** 5–11
[7] Shkarubo S N 2017 Modern education and the problem of training engineering personnel for high-tech production *Economics and management in mechanical engineering* **6** 49-51
[8] Rosstat-M 2017 Russia in numbers http://www.gks.ru/free_doc/doc_2017/rusfig/rus17.pdf