Summary

COMPETENCY DEVELOPMENT AND INNOVATIVE TRENDS IN ENGINEERING E-LEARNING

A.V. Putilov, I.A. Baranova
National Research Nuclear University "MEPhI"

The article examines the main issues related to the innovation implementation into the engineering e-leaning. It presents the examples of using information technologies: micro-knowledge, animations, simulation, and chatbots.

MOTIVATIONAL TYPES OF PROFESSIONAL RETRAINING PROGRAMME ATTENDEES

S.M. Kazantseva
Tyumen State University

Demand for education is consistently high in Russian society. Apart from basic higher education, various retraining programmes account for a large share in service sector. The main goal of the retraining programme on Managerial Personnel Training for National Economy (the President programs) is to teach people having primarily engineering education how to manage a modern company. The article examines basic motivational types of retraining programme attendees. Knowledge of motivational types and ways of defining them are required for education programme design, however, this problem is currently neglected, which results in poor education quality.

POPULARITY OF ENGINEERING PROFESSIONS: RESULTS OF SOCIOLOGICAL SURVEY

I.A. Kaplunov, E.V. Klyushnikova
Tver State University

The article discloses an analysis of the current state of school students' interest in scientific and engineering majors – a comparative analysis of the popularity of engineering professions and university majors among youth based on the results of sociological surveys and informational and analytical materials of higher educational institutions efficiency monitoring.

THE BALANCED SCORECARD AS A TOOL TO DEVELOP BUSINESS EDUCATION AT LEADING UNIVERSITY

A.A. Kozlova, A.V. Putilov
National Research Nuclear University "MEPhI"

The article deals with the relevant issues concerning innovative development of education system. It describes the role of business education in development of innovative economy. The role of the Balanced scorecard in enhancing business education is defined. The Balanced scorecard performance indicators for a leading university are evaluated.

"YOUR FUTURE STARTS TODAY": FIRST-YEAR STUDENTS' INSIGHTS IN ENGINEERING PROFESSIONS

E.V. Kondrashova
National Research University "Higher School of Economics"

The article considers the connection of professions of the future with engineering, what first-year students think of their future engineering job and what demands are made by future engineers today to do their job successfully in future. The article reveals the future specialists' principle requirements as well as establishes the key factors of profession selection.

INTELLECTUAL GUIDELINES (REFERENCES) OF ENGINEERS IN RENOVATING MODERN PRODUCTION

V.V. Likholetov
South Ural State University (National Research University)

Engineers lack sound guidelines to identify the level of changes in construc-tions and technologies. It leads to problems in planning and managing the renovation of modern production. The article discusses guidelines for gradu-al identification of level of changes in technologies and constructions based on interconversion of object and process systems.

PECULIARITIES OF ENGINEERING EDUCATION WITHIN THE INNOVATION-BASED ECONOMY

O.A. Moiseeva, Yu.P. Firstov, I.S. Timofeev
National Research Nuclear University "MEPhI"

In today's fast-changing market, the link between the decisions made in different fields is of significant importance. This peculiarity should be reflected in engineering education. The theory of technological modes serves as a methodological basis for the current research. It has been revealed that engineering-economic environment is shaped as a combination of technological modes, within which the problems of harmonized development of technologies are solved. The models to shape engineering knowledge under modern conditions are proposed.

DEVELOPMENT OF ENGINEERING CREATIVITY IN THE SYSTEM OF SPECIALISTS' TRAINING

M.K. Romanchenko
Novosibirsk Industrial-Power-Engineering College

The article discloses the issue of developing engineering creativity as an element of the qualified specialists' training. The researched forms and methods of organizing engineering creativity in Russia are analyzed in comparison with these activities in foreign countries. The author shares his experience in organization of classes aimed at development of creative abilities of students and provides the achieved results. The proposed conclusions underline an opportunity for transferring best practices to the practical activity of other educational institutions.

THE PROBLEM OF VALUE-BASED GUIDELINE FORMATION FOR FUTURE PROFESSIONAL ACTIVITY

T.A. Fugelova
Tyumen State University

Contemporary education is aimed at training engineers capable of transforming the environment.
Formation of value-based and responsible attitude of future engineers to the environment as a basis of accession into culture taking into account personal qualities and specific living conditions, involvement in innovative activity is a condition and prerequisite for their professional mobility.

IMPLEMENTING WORLDWIDE CDIO INITIATIVE AT SIBERIAN FEDERAL UNIVERSITY: HEAT POWER ENGINEERING PROGRAMME

E.A. Boiko, P.V. Shishmarev, D.I. Karabarin, A.A. Pikalova
Siberian Federal University

The paper describes the experience and results of implementing the Standards of the CDIO Initiative into the Bachelor's degree programme in heat power engineering provided by Siberian Federal University.

IMPLEMENTING CDIO INITIATIVE IN RUSSIAN UNIVERSITIES: INTERIM RESULTS AND PROSPECTS

R.A. Dolzhenko
Non-state Higher Educational Establishment "UMMC Technical University"

The paper describes interim results of implementing the CDIO initiative into education programmes of national universities. The author has indicated the trends in publishing academic papers on the topic. The factors hindering CDIO implementation into national education have been identified. The author gives recommendations and suggests the algorithm for implementing CDIO into the education programme of the Russian university.

ENGINEERING EDUCATION
22'2017

ON THE INFLUENCE OF THE BOLOGNA PROCESS ON DEVELOPMENT OF HIGHER EDUCATION IN RUSSIA

I.N. Kim
Far Eastern State Technical Fisheries University

Among the educational community there is a common opinion of the negative impact of the Bologna process on the national higher education. In the context of FESTFU we can say that the transition to the two-tiered system of education has substantially changed educational and scientific activities of universities. Regulatory framework was developed for ensuring educational and research activities in the terms of the Bologna process. It includes updating teachers' activity, developing their educational and teaching culture, preparing them to effectively use the modern technologies in training and allowing them to bring educational process to a new level.

ENGINEERING EDUCATIONAL PRACTICES TO TRAIN FUTURE ENGINEERS IN THE USA

I.A. Monakhov
Tver State University

Based on the analysis of engineering educational practices in the USA as well as the governmental support of education programs, the article reveals strengths and weaknesses of stimulating the youth to choose engineering education and engineering professions.

IMPLEMENTATION FEATURES OF INTERDISCIPLINARY RELATIONSHIPS IN THE SYSTEM OF UNIVERSITY TRAINING OF SPECIALISTS IN THE FIELD OF MECHANICAL ENGINEERING, 15.04.01, AND THE ENHANCEMENT OF THE ROLE OF TECHNICAL SPECIALISTS IN CONTEMPORARY SOCIETY

I.N. Romanova, A.Yu. Krasnopevtsev
Togliatti State University

The paper considers major requirements for development of interdisciplinary relationships model during specialists training in Mechanical Engineering, in order to enhance their role in contemporary society.

WAYS OF IMPLEMENTING PROFESSIONAL SPECIALIST TRAINING FOR DEFENCE INDUSTRY COMPLEX

T.Yu. Dorokhova
Tambov State Technical University

The paper introduces the description of learning environment, which accumulates the resources of scientific, educational and production structures and allows ensuring the participation of students and master students in learning, scientific and research activities. Creation of practical-oriented environment within the integrated scientific, educational and production structures allows implementing the educational technologies for practical-oriented learning based on the activity approach and expanding the use of problem- and project-based learning for creating the innovative ideas.

DEVELOPING MANAGERIAL COMPETENCIES OF MASTER'S CIVIL ENGINEERING STUDENTS BY INTODUCING MODERN TEACHING TECHNIQUES

M.S. Gusarova
Tyumen Industrial University

The article proposes the design of a unique course "Design HR engineering" for master's civil engineering students, which is aimed at shaping managerial competencies. The course is intended to develop managerial competencies by means of active teaching techniques: business games, project teams, case-studies, workshops. These teaching techniques contribute to developing leadership skills within the formats that are familiar to future engineers (engineering and project-based approach).

SIMULATION IN PROFESSIONAL EDUCATION

O.V. Yezhova
Kirovohrad Volodymyr Vynnychenko State Pedagogical University

The article is devoted to the issues of simulation as means of research in professional education. A classification of pedagogical models is developed according to their most essential features: application area, form, structure, subject of research, development in time, level of reflection of system's core features, level of specification, problem broadness. A brief explication is provided for each class of models. Definitions of the terms "model of a specialist" and "model of specialist's training" are proposed.

PROJECT-BASED LEARNING AND RESEARCH AT UNIVERSITY

S.S. Kugaevskiy
Ural Federal University

The article analyzes the changes in practice-oriented training of stu-dents. It describes the example of making arrangements for enhancing stu-dents' motivation to conduct research and development activities while im-plementing the project within the framework of the Resolution No. 218 of the Government of the Russian Federation.

ANALYSIS OF FSES TEXTS OF THE LAST GENERATIONS OF ENGINEERING PROFILES (SPECIALITY "NUCLEAR PHYSICS AND TECHNOLOGIES", BACHELOR DEGREE) IN FOREIGN LANGUAGE SUBJECT

S.I. Prokopieva
North-Eastern Federal University in Yakutsk

The article analyzes the Federal State Educational Standards (FSES) of the latest generation by the example of speciality "Nuclear Physics and Technologies", Bachelor degree programme, Foreign language course. The principle changes in the components of the FSES 3 and FSES 3+ standards are considered in the higher education system.

PEDAGOGICAL CONDITIONS FOR RESEARCH-TECHNICAL CREATIVE ACTIVITY IN TECHNOLOGY TRAINING

M.K. Romanchenko
Novosibirsk Industrial-Power-Engineering College

The article is concerned with the study in the issue of development teachers' creative potentials engaged in students' technology training.
Having analyzed the practice of research-technical creative work, the author shows the dynamics of students' achievements from the fifth to the eleventh form, observes the changes in general awareness of process technology and understanding the essence of these processes and their perspective improvement.
The work defines pedagogical conditions for research-technical creative activity in technology training consisting in the idea of students' special attitude towards labour, development of profile skills and features, such as: civil liability, patriotism, and need for labour activity. The principle aim of this development is to involve students in labour activity based on their in-born individual abilities, to teach them to apply modern scientific achievements.
Studying the dynamics of transforming a student's cognitive interest and the results of research in the sphere of pedagogy, the author justifies a number of concepts stated in the article to provide efficient technology training.

EXPERIENCE IN DESIGN AND IMPLEMENTATION OF EDUCATIONAL SOFTWARE WITHIN STRENGTH OF MATERIALS AND STRUCTURAL MECHANICS DISCIPLINES, TSUAB

B.A. Tukhfatullin, L.E. Puteeva
Tomsk State University of Architecture and Building
F.A. Krasina
Tomsk State University of Control System and Radioelectronics

The article presents the results of software implementation into education process provided by the department of "Structural Mechanics", TSUAB. These software packages are intended to solve problems in the disciplines "Strength of Materials" and "Structural mechanics". They allow checking the correctness of manual calculations, rapidly finding and eliminating the mis-takes being made, avoiding a great number of typical calculations. The de-veloped software packages are characterized by advanced interface; the ini-tial data are presented in a way that is familiar for students; the software packages are free.

ENGLISH FOR SPECIFIC PURPOSE FOR FUTURE ENGINEERS: SOFTWARE APPLICATION

S.E. Tsvetkova
Nizhny Novgorod State Technical University n.a. R.E. Alekseev (NNSTU)
I.A. Malinina
National Research University "Higher School of Economics"

The paper studies pedagogical reasons to apply training software and suggests software technology for learning ESP in technical higher schools. The main part of the article is devoted to the particularities of multimedia training course introduced at the first stage of foreign language training, as well as software to test students' ESP skills during further training.

STUDENTS' TRAINING IN DOING LABORATORY WORKS ON PHYSICS

E.V. Politsinsky
Yurga Institute of Technology, National Research Tomsk Polytechnic University

Based on the analysis of advantages and disadvantages of laboratory training methods on physics, personal practical experience, the article describes and justifies intensification of students' training at engineering university in physics laboratory in terms of problem-based approach. The feasibility of specially selected and developed tasks and problems is shown at the specified stages, interactive models, which improves the learning outcomes.

ANALYZING EMPLOYMENT OF HEI GRADUATES ACCORDING TO THE ENLARGED GROUPS OF SPECIALTIES

D.Yu. Baskakova, O.Yu. Belyash
Saint Petersburg State Electrotechnical University "LETI"

The article analyses indicators of Saint Petersburg HEIs graduates' employment according to the enlarged groups of specialties. The research allows determining groups of specialties with highest graduates' employment rate, as well as to allocate HEIs according to their graduates' employment rate within each enlarged group of specialties.

DIDACTIC CONDITIONS OF INDUSTRIALIZATION RISK MITIGATION IN ENGINEERING EDUCATION

M.A. Dubik
Tyumen Industrial University

The article deals with the issue of engineering education industrialization. The risks of engineering education industrialization are identified. The didactic conditions of their mitigation are grounded: arrangement and management of a student's autonomous work with possessed information (textbook) and raw information (research engineering data).

THE 50TH ANNIVERSARY OF VAZ: HIGHER EDUCATION IN TOGLIATTI AS AN INDICATOR OF INNOVATIVE DEVELOPMENT FOR PJSC "AVTOVAZ"

V.V. Eltsov, E.M. Chertakova
Togliatti State University

The Volga Automobile Factory and Togliatti State University (TSU) were simultaneously founded. The development of both institutions was conditioned by mutual interaction in a number of aspects including scientific and research ones. The university contributed to the technical, technological and innovative solutions applied at the factory. It is also TSU that provided engineering staff for the factory. The modern condition of higher education in TSU reflects the same situation in PJSC "AVTOVAZ", that is system cri-ses in science and production. Both institutions have the same objective and subjective problems: the lack of funding for research, the cut of engineering structures (departments) at the factory, the decrease in university science ac-tivity, staff shortage, and subjective decisions made by top managers.

TRAINING STUDENTS TO MONITOR PRODUCT QUALITY IN CAD FOR CAR INDUSTRY

E.N. Pochekuev, V.V. Eltsov,
A.V. Skripachev
Togliatti State University

Training of skilled specialists capable of designing qualitative products within the car industry could be hardly secured without the introduction of modern automated design systems into education programmes. Within the degree programme in "Mechanical Engineering", 15.03.01 offered by Togliatti State University Siemens PLM Software NX is applied. The proposed programme is comprehensive and aimed at product quality enhancement at the stage of product design. A great attention is also paid to evaluating the quality of the products subject to pressure shaping via CAE program Autoform, Deform and LS-DYNA.

MODERNIZATION OF PERSONNEL TRAINING FOR ECONOMIC DEVELOPMENT

V.P. Soloviev, T.A. Pereskokova
Starooskolsky Institute of Technology (branch of National Research Technological University "MISIS")

This article considers the need to modernize the national system of training personnel with a university degree to ensure the growth of industrial output and the significant increase in the production of innovative products. The task of universities is to improve pedagogical skills of teachers so that they could efficiently use modern teaching technologies. Universities must generate students' fundamental competence, which is the commitment to quality. It is proposed to discuss new principal approaches to the system of education and upbringing. The article expresses the view that relatively soon the training of graduates with a Bachelor's degree in technical fields may hamper the development of modern innovative economy.

THE MISSION OF COMPETENCIES IN QUALITY MANAGEMENT DISCIPLINE AS A PART OF MASTER'S PROGRAMME "CIVIL CONSTRUCTION"

N.N. Aleksandrova
Tyumen Industrial University

The article describes the role of competencies in mastering quality management discipline as a part of the master's degree programme "Civil Construction". The competencies are analyzed in accordance with the Federal State Education Standard 3+. In addition, the article presents the methodological bases of "Quality Management" discipline.

HUMANITARIAN MEANINGS OF ENGINEERING ACTIVITY AND THEIR ACTUALIZATION AMONG STUDENTS DURING UNIVERSITY EDUCATION PROCESS

E.G. Belyakova
Tyumen State University
A.A. Melikhova
Tyumen Industrial University

In modern education, the issue related to acquisition of axiological basis of engineering activity is still solved in compliance with knowledge approach. The authors substantiate the potential of integrating humanitarian and technical components of education content through activation of psychological and pedagogical mechanisms of meaning-making. This makes it possible to establish a meaningful axiological attitude among students - future engineers, to lay humanitarian meanings and values at the basis of their professional activity.

INTERACTIVE UNIFIED STATE EXAM TRAINING COMPLEXES

I.B. Docenko, V.V. Bur'kov, D.V. Bur'kov
South Federal University

The article presents the experience in implementing modern interactive tools, precisely unified state exam (USE) training complex, into school education. It describes the structure of the training complex and specific features of its integrated elements. The use of USE training complex for studying History of Russia is examined.

DEVELOPMENT OF CREATIVE GRAPHIC SKILLS

R.R. Kopyrin
North-Eastern Federal University in Yakutsk

The article considers the current problems of teaching descriptive geometry for engineering students at the Russian universities. The key objectives of descriptive geometry course are shown. Modern conditions of teaching the course are described in terms of Russia's accession to the Bologna process.

MANAGEMENT THE WRITING OF BACHELOR'S GRADUATE QUALIFICATION WORK IN CONSTRUCTION BASED ON TECHNOLOGY OF END-TO-END COURSE PROJECT

L.A. Kulgina, L.V. Peretolchina
Bratsk State University
A.N. Rostovtsev
Novokuznetsk Institute (branch) "Kemerovo State University"

To resolve the issue of high-quality training of graduates in the field of Construction, in order to perform complex engineering activities, it is required to adopt new educational technologies and organizational forms of training. This article presents the implementation model of Bachelor's Graduate Qualification Work in Construction, as per IDEF0 methodology. The model is based on the technology of end-to-end course project work. The article demonstrates positive results of the model implementation in the learning process.

FOREIGN LANGUAGE TEACHING WITHIN "AIRCRAFT ENGINEERING" PROGRAMME

O.N. Martynova
Samara University

The article discusses the issue of enhancing the quality of foreign language teaching at engineering university. Within the education programme "Aircraft Engineering", this issue is of particular importance due to the current situation in this economy sector. The article examines the problems of foreign language teaching, describes and postulates the language teaching system developed at Samara University.

STUDENTS' GRAPHICAL CULTURE DEVELOPMENT IN THE UNIVERSITY VIRTUAL LEARNING SPACE

M.V. Samardak, T.A. Rubantsova
Siberian Transport University

The article analyzes the problems related to the development of students' graphical culture in modern virtual environment of an engineering university. Graphical culture is defined as a matureness of productive professional competencies shaped within the virtual learning space of a university. They include broad-based graphical knowledge and graphic design thesaurus.

CONTINUOUS MASTERING OF COMPUTER TECHNOLOGIES AS A MANDATORY CONDITION FOR HIGHLY QUALIFIED SPECIALISTS' EDUCATION IN THE SPHERE OF OPTICAL ENGINEERING AND ELECTROOPTIC INSTRUMENT ENGINEERING

I.P. Torshina, Yu.G. Yakushenkov
Moscow State University of Geodesy and Cartography (MIIGAiK)

Specialists' training in the sphere of optical engineering and electrooptic instrument engineering can be divided into three stages from the standpoint of using information and computer technologies: 1. Study of general principles of information and computer technologies; 2. Mastering these technologies in design of typed blocks of optic and electrooptic systems; 3. Instruction in computer modelling based on systematic approach to designing electrooptic complexes as a whole.

Professional and Public Accreditation of Educational Programmes (Results)

Over the past 20 years, Association for Engineering Education of Russia (AEER) has been developing the system of professional and public accreditation of engineering and technology programmes in Russia.

AEER is a member of the most authoritative international organizations involved in engineering programme accreditation: International Engineering Alliance, Washington Accord, European Network for Accreditation of Engineering Education (ENAEE). AEER is the only national organization entitled to assign the international certification label (EUR -ACE label) for accredited programmes.

The system of professional and public accreditation of engineering programmes developed and implemented by AEER is now international and accepted in the majority of developed countries.

By December 21, 2017, AEER has accredited 511 educational programmes (first and second cycles) provided by 75 leading universities of Russia, Kazakhstan, Kirgizstan, Tajikistan, and Uzbekistan. The European certification label EUR-ACE has been awarded to 429 programmes. Also, 5 secondary vocational education programmes provided by Russian vocational training colleges have been accredited. The lists of educational programmes accredited by AEER are regularly submitted to Federal Education and Science Supervision Service and reported to the signatories of Washington Accord and ENAEE.

International accreditation of the educational programmes improves the image of Russian education on the global market, and makes national universities more attractive both for Russian and foreign students. It intensifies academic mobility and development of international cooperative education programmes. Graduating from an accredited institution allows young professionals to be recognized by APEC and FEANI engineer registers.

The following Register shows the educational programmes accredited by AEER.

ENGINEERING EDUCATION
22'2017