

## Summary

### FORMING COMPETENCES FOR GENERATING NEW IDEAS – BASIS OF COMPLEX ENGINEERING EDUCATION

S.A. Podlesnyi, A.V. Kozlov  
Siberian Federal University

The paper examines the structure of modern knowledge, abilities and skills required for generating new ideas. Based on up-to-date approaches, didactic and information technologies have been proposed.

### “FORMULA-STUDENT” PROJECT AS A PLATFORM FOR PRACTICE-ORIENTED TRAINING OF ENGINEERING GRADUATES

V.V. Yeltsov, A.V. Skripachev  
Togliatti State University

Practice-oriented training, an innovative teaching technology, is one of the conditions for quality assurance in Higher Education. Such innovative international “Formula-Student” project, combining education, science and sport, is being implemented at Togliatti State University.

### PRACTICAL COMPETENCES AS LEARNING OUTCOMES USING CES EDUPACK

T. Vakhitova, C. Fredriksson  
Granta Design Limited, Cambridge, UK

The quality of modern engineering education is measured in terms of learning outcomes. This holds true for, e.g., the ABET accreditation system and the CDIO Syllabus. This paper demonstrates how a computer-based teaching resource, CES EduPack, could be used by Universities towards learning outcomes necessary for accreditation of engineering programmes.

### “RISK-MANAGEMENT” AND “RISK OF MANAGEMENT” AS PHENOMENON OF CONTINUING PROFESSIONAL EDUCATION

N.V. Samsonova, E.S. Minkova  
Immanuel Kant Baltic Federal University

The paper examines the concept «challenging professional environment» as an obligatory component of continuing professional education, analyzes the risks inherent in workplace-related and person-related sub-systems as a special group of risks in professional micro environment, and outlines the concepts “risk-management” and “risk of management” which constitute the conceptual basis of continuing professional education programs.

### TOOLS AND INDICATORS FOR A DYNAMICAL, INNOVATIVE AND OPTIMIZED EDUCATION PROGRAM

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ENSICAEN, Grande Ecole, Caen, France

Table and indicators which allow a rapid analysis and comparison of education programs are presented. Among them, the matrix of competences is very useful to check that targeted skills are really fulfilled by the education program. In addition to the analysis of the curriculum, benefits, limits and opportunities provided by innovative learning process like Project Oriented Learning, Reverse Engineering Learning and Online courses are discussed.

### INTELLIGENT DATA ANALYSIS IN QUALITY MANAGEMENT PROBLEMS OF EDUCATION PROCESS

G.J. Soltan, S.S. Smailova, I.M. Uvalieva  
D. Serikbayev East Kazakhstan State Technical University  
A.K. Tomilin  
National Research Tomsk Polytechnic University

The article describes the Intelligent Data Analysis (IDA) system model applied to the University education process, the

possibilities of IDA in consideration of the characteristic education aspects and its application.

#### ORGANISING EDUCATIONAL AND TRAINING PROCESS IN COOPERATION WITH EMPLOYERS

N.I. Senin, M.N. Popova  
National Research Moscow State University of Civil Engineering

Best practices of university interaction with employers within the educational process are presented. The paper describes an example of cooperation between the Institute of Civil Engineering and Architecture (MGSU) and employers – the construction enterprises in Moscow and Moscow region. Some forms of joint projects that improve the quality of students' training are given.

#### ABILITY TOWORK IN PROFESSIONAL COMMUNITY AS UNIVERSAL COMPETENCE OF A MODERN ENGINEER

I.G. Kartushina  
Immanuel Kant Baltic Federal University

The author analyzes the meaning of "competence for collective work" as engineers ability to work in professional community. She reveals the content and structure of the competence, discovers its influence on whole pedagogical process in higher education.

#### TECHNICAL MECHANICS WITHIN THE TECHNOLOGY TEACHER TRAINING SYSTEM

V. Luzhetsky, Yu. Pavlovsky  
Drohobych Ivan Franko State Pedagogical University, Ukraine

Based on the theoretical analysis and practical experience in grounded circuit integration, the course Technical Mechanics has eliminated the possible duplication of technical disciplines within the technology teacher training system.

#### LEARNING MOTIVATION OF ENGINEERING UNIVERSITY STUDENTS BY MEANS OF PEDAGOGICAL SUPPORT OF EDUCATION

U.V. Podpovetnaya  
South Ural State University

Pedagogical support of student's training is a key factor influencing the process of learning student's motivation in an engineering university. This process is focused on formation of educated people meeting socially valuable requirements of the society. The given article reveals the conditions of educational environment in an engineering university focused on student's learning motivation, presents the characteristic of pedagogical support in engineering university student's training, analyzes the human resource of a subject in pedagogical support of student's training.

#### IMPLEMENTATION OF ORGANIZATIONAL AND PEDAGOGICAL CONDITIONS FOR END-TO-END COURSE PROJECT TECHNOLOGY

L.A. Kulgina  
Bratsk State University

To meet the FSES requirements on competence development in the frame of Bachelor's Degree programs in civil construction it is necessary to technologize a training process and use an integrative approach to course project. The solution could be an end-to-end course project (EECP) technology including the following tools: the structural-logic scheme of the EECP content; EECP procedure; graphical description of the process; the diagnostic tools; the mathematical model of learning activity correction, etc.

#### EDUCATIONAL PROCESS AT THE

### FEDERAL UNIVERSITY AS A BASIS TO IMPLEMENT INNOVATIVE PRACTICE-ORIENTED EDUCATIONAL TECHNOLOGIES

N.S. Buryanina, A.A. Pshennikov  
North East Federal University  
I.S. Lysenkov  
CJSC "Optogan"  
E.V. Lesnykh  
Siberian Transport University

The article sets a principle goal – to change the traditional system of engineering education by implementation of flexible practice-oriented and project-based educational technologies by the example of North-Eastern Federal University n.a. Ammosov.

### APPROACHES AND METHODS FOR MOTIVATION DEVELOPMENT AT UNIVERSITY

L.M. Semenova  
South Ural State University

The article deals with pedagogical technologies, innovative approaches and methods of work with students, motivating them to be engaged more in the training process.

### ACTIVITIES-BASED TEACHING TO BUILD ENVIRONMENTAL COMPETENCE OF STUDENTS

L.S. Nasrutdinova  
Tyumen State Oil and Gas University

The article presents the analysis of various definitions of the concept "environmental competence", which were suggested by different authors. The author of the paper suggests a new definition of the concept "environmental competence". The matter of activities-based approach has been revealed. The basic methods to apply activities-based approach to build environmental competence of students have been described.

### QUALITY MANAGEMENT OF PROJECT DEVELOPMENT PROCESS

E.A. Shepeleva,  
I.A. Kuznetsova, E.A. Shepelev  
Northern (Arctic) Federal University n.a.  
M. Lomonosov

Based on performed analysis concerning the notion "project development", quality determination criteria of design products, classification of projects designed in universities and possible quality management tools applied in the project development process, application requirements are proposed for specific sub-processes with further operations manuals.

### SUSTAINABLE TECHNOLOGICAL FACILITIES IN ESPC EDUCATIONAL INSTITUTIONS AS A FACTOR OF EFFICIENCY AND QUALITY IMPROVEMENT OF ENGINEERING EDUCATION

M.A. Tarasova  
State University – Education-Science-Production Complex

The article presents and proves scientific concept of sustainable technological facilities development in integrated scientific-educational institutions aimed at improving quality and efficiency of engineering education.

### ADVANCED DEVELOPMENT OF ENGINEERING EDUCATION IN RUSSIA

L.B. Khoroshavin  
Academy of Technological Sciences  
T.A. Badyina  
Ural State Mining University

The article deals with modern conditions of the education in Russia including engineering education and its development perspectives. The design of the best in the World Russian education completely free at all levels with restoration of a Teacher's status has been suggested for improving the unity and advanced development of Russia. The finite purpose is to increase the living quality of Russian people by modernization of the country.

### IMPROVING EDUCATIONAL ACTIVITY AT BELGOROD STATE NATIONAL RESEARCH UNIVERSITY BASED ON THE CONCEPT OF PRACTICE-ORIENTED LEARNING

A.V. Mamatov, A.N. Nemtsev,  
L.A. Kadutskaya  
Belgorod State National Research  
University

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.

### ENGINEERING EDUCATION 2.0: THE EINDHOVEN CASE

D.J.W.M. Mulders  
Tilburg University, Eindhoven University  
of Technology, Netherlands

In response to complaints from industry in the 1990-s that engineering graduates had been educated too theoretically, Eindhoven University of Technology first developed the concept of Design-Based Learning, which was successfully implemented from the year 2000. More recent developments, both globally and locally, necessitated a more fundamental reform of all TU/e education. In 2012 a totally new design of BSc education was put in place, with encouraging results thus far. More reforms, including graduate studies, are underway.

### EDUCATION AND METHODICS ASSOCIATIONS IN RUSSIAN XXI-ST – CENTURY UNIVERSITIES

A.E. Vorobiev  
Russian People's Friendship University

The article describes the development of Education – Methodics Associations (EMA) in the Russian Federation since 1987. There are three divisions of Education-Methodics Associations including humanities and Social Sciences, Sciences and Engineering. It is relevant to establish RF Education-Methodics Association for teaching foreign students.

### SCHOOL N.A. PROFESSOR N.S. NIKOLAEV

R.R. Kopyrin  
North-Eastern Federal University

This article is devoted to the 80th anniversary of Professor N.S. Nikolaev, founder of the Academic Olympic Movement in graphic drawing in Yakutia. It highlights the contemporary issues in technic drawing teaching in the schools of Sakha Republic (Yakutia) and describes the obtained 50-year experience in Academic technic drawing Olympic management. The author also suggests advanced development paths for effective teaching methods to improve the training quality of school technic drawing programs.