



ENGINEERING FACULTY PROFESSIONAL DEVELOPMENT (TRAINING OF TRAINERS) AT RUSSIAN UNIVERSITIES

Julia Ziyatdinova,

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**German S. Dyakonov, Youri Pokholkov, Vasiliy G. Ivanov, Vladimir V.
Kondratiev, Julia N. Ziyatdinova**

A peculiar feature of Russian engineering education is that the majority of faculty who teach engineering disciplines do not have any pedagogical background; their education comprises the following stages: Bachelor Degree Program – Master Degree Program – Post-graduate Program, then they proceed to work as an instructor, an assistant professor, and an associate professor in the corresponding departments of the University.

Faculty can participate in special professional development programs of psycho-pedagogical training in the system of the so-called Additional Professional Education (hereinafter APE) at special university units such as Department (or Faculty) of Professional Development (hereinafter FPD) and Centers for Training and Professional Development (hereinafter CTPD) established at the leading engineering universities.

Three mainstreams of professional development programs funded by the Ministry of Education and Science of the Russian Federation were implemented during the last years in CTPD and FPD: 1) professional development programs at home universities (72 hours, the participants balancing work and study); 2) professional development programs at other universities (72 hours, the participants leaving their home university for around 2 weeks); 3) professional development programs at home universities (over 500 hours, the participants balancing work and study).

All the three types of programs are run at Kazan National Research Technological University (KNRTU). Moreover, several all-Russian events have been hosted by KNRTU in the last years, including:

- Meeting of Coordination Council on additional professional education of the Russian Federation (2002);
- All-Russian meeting on problems of modernization and development of additional professional education (2004);
- The 7th All-Russian conference on additional professional education "Challenges of Additional Professional Education Development Under Education Reforms" (2006);
- The 9th All-Russian conference on additional professional education and All-Russian forum "Social Partnership in System of Continuing Education" (2008).

In 2011, with participation of International Society for Engineering Education (IGIP) and Russian National Training Foundation, KNRTU hosted International scientific school "Higher Technical Education as an Instrument of Innovative Development" [1].

Three days of the conference saw two master-classes, a training, three workshops, a round table, two meetings (the meeting of the Russian Monitoring Committee IGIP and the meeting of Association for Engineering Education of Russia), 20 reports from the leading international scholars. Over 300 participants from education, industry, ministries and authorities, including 150 KNRTU faculty members were involved in the event.

In 2012, under the aegis of International Society for Engineering Education (IGIP), Russian National Training Foundation and Ministry of Education and Science of the Russian Federation, KNRTU hosted another International scientific school "New Challenges of Engineering Education for Gas and Petrochemical Complex in the Context of Russia's Accession to the World Trade Organization (WTO)" [6].

Five days of this conference witnessed an expert seminar, ten workshops, four round tables, over 20 reports from the leading international scholars. The event gathered around 420 participants from different countries (USA, Germany, UAE, Austria, Israel, Ukraine) and different cities of Russia (Moscow, St.Petersburg, Tomsk, Arkhangelsk, Novosibirsk, Yakutsk, Smara, Sratov, Nizhny Novgorod, Chelyabinsk, Ivanovo, and etc.).

On September 25-27, 2013, under the aegis of Russian National Training Foundation, International Society for Engineering Education (IGIP) and its Russian Monitoring Committee (RMC IGIP), Carinthia Technical Institute (CTI), KNRTU hosted the 42nd IGIP International Conference on Engineering Pedagogy "The Global Challenges in Engineering Education" and the 16th International Conference on Interactive Collaborative Learning [2, 4, 7].

The event gathered over 500 participants from 44 countries, including scholars and scientists, leaders of international organizations, representatives of authorities, leaders of industrial enterprises and non-governmental organizations.

The international conference aimed at discussing the trends of education and research development in technical universities, exchanging practical experience in engineering education, and introducing pilot projects.

The conference included four plenary sessions, annual IGIP meeting, IGIP award sessions, young scientist award session, and 51 full paper and poster sessions with 210 reports.

The same dates, September 23-28, 2013 were given to International Scientific School "Engineering Education for New Industrial Development" [4, 5]. Six days of the school included four plenary sessions with 14 reports, 6 teaching workshops, 12 topical workshops, 7 round tables, one of them with participation of the President of the Tatarstan Republic, Rustam Minnikhanov, and 2 expert seminar.

In the last few years, another interesting trend in KNRTU is a series of workshops chaired by Academician of Tatarstan Academy of Sciences, Sergey Dyakonov, including:

- Challenges of Higher Professional Education (2008-2009) [3];
- Higher Professional Education for Innovative Development (2010-2011);
- New Tasks of Engineering Education for Gas and Petrochemical Complex (2012) [6];
- Engineering Education for New Industrial Development; Challenges and Opportunities (2013) [5].

The first series of workshops included the following meetings: 'International Trends and Models of Higher Professional Education', 'Social Consequences of Higher Education Development in the World', 'Strategies and Models of Higher Professional Education Development in the Russian Federation', 'Competence-based Engineer Training', 'Modern Educational Technologies in Technical University', 'Designing Academic Disciplines as Information Models for Distance Learning', 'Application of Computer Technologies in Teaching Physics', 'Designing Academic Disciplines for Competence-based Engineer Training', 'Quantum Chemistry Techniques for Chemical Engineering Students', 'Russian Higher professional Education in the Context of Global Development Trends', 'Training Engineers in Real Virtual Environment' [3].

The second series of workshops included the following meetings: 'Contents of Higher Professional Education for Innovative Development', 'Methodology of Innovative Engineering', 'Engineering Solutions for Chemical Technology', 'Education Contents as an Instrument for Developing Professional Potential of an Engineer', 'Concept of Chemical Engineering Education', 'Training High Technology Managers', 'professional Development Programs at Bauman Moscow State Technical University'.

The third series of workshops included the following meetings: 'Training Engineers and Scientists in Korea Universities', 'Challenges of Project Based Learning in Chemistry, Petroleum Chemistry and Petroleum Refinery', 'Problems of Science Philosophy'.

The fourth series of workshops included the following meetings: 'Developing Engineering Competencies in New Professional Virtual Learning Environment', 'Professional and Public Accreditation of Educational Programs in Engineering and Technology', 'History and Prospects of Process System Engineering', 'Problems and Prospects of US Chemical Engineering Education'.

In total, over 650 faculty members participate in professional development programs at KNRTU annually. In addition to professional development programs, all-Russian and international scale events, series of workshops, KNRTU also runs PhD and Postdoctoral Programs in Education, including 'Theory and methods in teaching' chemistry' and 'Theory and methods of professional education'. In the last 20 years, over 200 PhD thesis in education were defended in KNRTU.

Engineering pedagogy has always been among the priorities of KNRTU. In 1994, KNRTU founded one of the first Russian Centers of Engineering pedagogy. This is the largest Russian Center, the flagman of engineering pedagogy, accredited by International Society for Engineering Education (IGIP) as number 2 of 14 Russian centers with a license to run

'International Engineering Educator ING-PAED' program. The founder of this center was Academician of Russian Academy of Education Anatoly Kirsanov.

Thus, Russian engineering universities run a wide range of professional development programs for engineering faculty. The mandatory requirement for the faculty members is to participate in at least one program in every three years. In fact, the opportunities provide much more chances, and the majority of faculty use them regularly.

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