

# ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ ИНЖЕНЕРНОГО ОБРАЗОВАНИЯ В РОССИИ И ЗА РУБЕЖОМ

*D.A. Kalashnikova*  
*Tomsk Polytechnic University*

## **Main problems of students' research work**

Effective development of modern education is not possible without the synthesis with science, interaction between scientific and educational institutions, as well as research papers ambitious and talented students and young professionals.

Research work of students is a system of events and collection of various forms of collaborative students, teachers and researchers of the University, oriented to break-in of techniques and skills of realization scientific research, the development of their intellectual culture abilities to scientific-technical and innovative creativity, increased professional independence, which contributes to the formation of a harmoniously developed personality. But the amount of students involved in research work is not great (for example, Tver State University, the number of students involved in research work is 42.5% of the total number of students [1]). The aim of this paper is to analyze problems students face while doing research work with a focus on our own experience. Main problems we faced are: 1 – classified information, 2 – funding.

Firstly, at the beginning of research work students usually look for and analyze appropriate information. And there is a problem – it is access to the literature on narrowly focused topic. For example, one of the directions of our research work is to flow injection analysis with using photometric detector. Flow injection analysis (FIA) is a simple, rapid, and versatile technique that is now firmly established, with widespread application in quantitative chemical analysis. This is apparent from the number of related papers that have appeared in the technical press since 1975, and since then the scope of the method has grown at an unprecedented rate. Over 10,000 papers devoted to FIA have been published in scientific journals up to now, with two papers being published each day. The literature on FIA doubles approximately every two years, whereas analytical literature as a whole doubles only every 14. And now look at the number of articles on this topic in Russian. On the site of the scientific electronic library eLIBRARY.ru on the theme “flow injection analysis” found in Russian (only) 780 papers, available in the full text of these 108 and only 3 of them touch upon FIA with using photometric detector. As can be seen from the statistics, papers on this topic are available in Russian, but, unfortunately, in a very limited quantity. There is a huge number of sources of information in English, but there is one problem – a free access for Russian students to most of them closed.

Secondly, the organization problem of students' research work is funding. Experience arranging funding of the U.S. universities may offer some important lessons for the Russian higher education system. The main source of funding for

American universities is the payment for education, which exists in almost all universities. State universities also receive direct appropriations from the state. Call attention to itself is also a significant proportion of university income that they receive from the federal government. Source of funding associated with the direct flow of funds in the form of grants for research work which distributed on a competitive basis. Unlike in the U.S.A, in most Russian universities, this share is insignificant yet and connected to, as a rule, arrival individual grants by the teachers. In the U.S.A, these grants are also obtained for specific projects of individual researchers from a variety of independent federal authorities. So, most part of the basic research funded by the federal government, and this item of income may also be about a quarter of all revenues to the treasury of the University. In Russia, it is also necessary to significantly increase this component in the funding of universities realizing research, using the mechanisms of orders from government agencies and institutional grants from the research funds which distributed on a competitive basis [2].

Problems students faced during the realization of research work have an effect on the quality of the scientific work. Proceeding from the position that on the one hand, the students don't have unlimited free access to scientific information in their narrow specialization and the other hand, they not always have the opportunity to exchange experiences at the international level, we cannot avoid the idea of decrease of the students' research work quality.

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*Linguistic adviser: A. G. Sondor, teacher of TPU*

*I.K. Erahtin, D.A. Konovalov  
Tomsk Polytechnic University*

### **Project work: designing a fish robot**

Project work is regarded to be one of the most interesting, challenging and creative components of English language learning and teaching. Many researches and