

XV International Conference "Linguistic and Cultural Studies: Traditions and Innovations", LKTI
2015, 9-11 November 2015, Tomsk, Russia

Implementation of Federal Research Projects as a Tool to Enhance the Training Quality of Master's Program

Kirill Larionov*, Sergey Lavrinenko, Vladimir Gubin, Artem Kitaev

National Research Tomsk Polytechnic University, 30 Lenin Avenue, Tomsk, 634050, Russia

Abstract

Analytical study of the impact of Federal target programs (FTP) implementation with involvement of master's program students for the purpose of obtaining practical skills, identifying and developing organizational skills, increasing motivation to the educational process and competitiveness in the labor market. The result of a parallel implementation of the Federal program and training of students in the master's program has significantly improved the performance of students. The average point increased from 4.23 in 2014 to 4.55 in 2015. The publication activity increased by 64 %, the number of conferences with participation of students in the master's program increased by 75%. The growth of these criteria is caused by a large number of experiments carried out, analytical review, the practical relevance of the studied material and level of motivation due to payments to students from the Federal program funds.

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Peer-review under responsibility of the Scientific Committee of LKTI 2015.

Keywords: Effectiveness; learning efficiency; increase of motivation level; involvement in research activities.

1. Introduction

In 1992, the higher education in Russia has been translated into a multilevel system, which is divided into three levels: incomplete higher education, complete higher education, confirmed by awarding the Bachelor's degree, higher education, confirmed by the Master's degree or a traditional qualification of specialist.

Russia's joining to the Bologna process in 2003 had a significant impact on the objectives and content of the Russian educational, economic and social reforms, which deeply affect the social, political and economic structures,

* Corresponding author.

E-mail address: laryk070@gmail.com (K. Larionov).

affect the interests of communities and the state (Lavrinenko & Kitaev, 2015; Sokolova, 2011). The main objectives of Russia's participation in the Bologna process is to increase the Russian economy competitiveness due to its steady growth, transfer of the economic and social spheres to market relations, bringing up a new generation of promising and competent human resources who will be able to solve problems of different difficulty and develop key sectors of the country (Beresneva & Goreva 2013; Sokolova & Gil, 2014). This should also contribute to a favorable development of relations with foreign partners and promote exchange of experience between research teams (Achcaoucaou, et al., 2015).

According to the Order of November 21, 2014, Tomsk Polytechnic University adopted the Federal state educational standard (FSSES). It is a set of requirements that are mandatory in the implementation of the basic professional educational programs for higher education, one of which is to train masters in the field 13.04.01 Heat and Power Engineering (Federal state educational standard of higher education. The direction of training 13.04.01 Heat power Engineering and heat engineering).

The scope of professional activity of graduates who have completed the master's program in this field, includes a set of technical means, ways and methods of human activity on application, control of flow and conversion of other energy types into heat (Lavrinenko, et al., 2015).

Upon graduation the graduates should master the following types of professional activity: calculation and design, process and production, research, administrative and teaching activity (Galloway, 2008).

The implemented two-tier system of training is relatively new and still not fully realized by the students and employers. For students who received a bachelor's degree, the question arises whether it is reasonable to continue training in the master's program, when they have diploma certifying higher education. Master's program implies the second final qualification work, which is more complicated and research-intensive. It should be noted that after awarding the Master's degree, the graduates are employed in the same positions as the bachelors, thus wasting two years of professional experience. On the other hand, employers are unsure of the level of bachelors' professional competences and consider masters more research-oriented.

Perhaps, if training in the master's program with less classroom hours was carried out in parallel with a partial employment at the core enterprises, students would develop more practical skills.

Since this approach has not found an application yet, for successful training of future graduates, it is necessary to organize the learning process so that they can get theoretical knowledge and practical skills at the University. This will make it easier to perceive the information and visualize the studied processes.

The aim of this research is to examine the impact of large-scale Federal level projects on the basis of higher educational institutions on the level of competence and improving skills of master's program students.

2. Research methodology

In September 2014, the National research Tomsk Polytechnic University within the framework of the Federal target program has begun to implement the applied researches and experimental developments on the subject "Conducting applied research and experimental development aimed at development of solid fuels gasification plants for energy and industrial sectors".

The purpose of these works is the adoption of a final design and technological solutions for the building a new generation of gas-producing installations of in-line vortex and hearth gasification of solid fuels that enhance the resource efficiency of existing and upgraded energy facilities and reduce their anthropogenic impact on the environment.

This project calls for a large number of studies of various properties of coal that affect the processes of gasification. Students of the first year of the master's program were involved.

Types of professional activity, which students are being trained for in the program, agree with the main stages of the Federal program quite well (Table 1).

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