

Organization of Research Work of Students in Russia

V.V. Moiseev

Belgorod State Technological University named after V.G.
Shukhov
Belgorod, 308012, Russia
din_prof@mail.ru

I.V. Kirova

Moscow Automobile and Road State Technical
University (MADI), Moscow, Russia
kirovairina@yandex.ru

O. A. Komarova

Belgorod State Technological University named after V.G.
Shukhov
Belgorod, 308012, Russia
olga4544@yandex.ua

M.Yu. Karelina

Moscow Automobile and Road State Technical
University (MADI), Moscow, Russia
karelinamu@mail.ru

Abstract—One of the most effective ways to improve the competence of graduates in the conditions of scientific and technological progress and the transition to knowledge economy is the organization of research work of students.

The article deals with topical issues of the organization of such work at a technical university, it identifies the main directions for the development of their creative and scientific activity, motivation and competence in the field of their future profession. The article defines factors that have great influence on the motivation of a student's research work and its effectiveness not only in consolidating professional competencies, but also in obtaining managerial skills necessary for a modern specialist. The role of research work in shaping the qualities necessary for a modern leader of any level is noted: responsible citizenship and high intellectual culture.

Examples of methods and means for formation of these important managerial qualities in the process of research work are given.

The authors have classified the criteria for assessing the effectiveness of the research activities of students, analyzed the current requirements for high school teachers in organizing this work at a technical university. At the same time, researchers note the role of university management in providing this process with the necessary material and intellectual resources.

Key words—*student research work, engineering education; technical university; competence; motivation; management skills; professional.*

I. INTRODUCTION

Currently, the search for improving the efficiency of the educational process in higher education is of particular relevance. Rapid development of industry, digitalization of economic sectors are setting the task of training specialists with a high level of competence in the professional sphere. The readiness of a future engineer for immediate and high-quality implementation of labor functions, also for challenges of modern economic development of Russia and for competitive interaction with representatives of business and scientific structures of foreign countries - this is not yet a complete list of requirements for a graduate of a technical

university. In this regard, the search for ways to improve the efficiency of the educational process and operational implementation of the most promising areas, allowing achieving effectiveness in the near future, are the basis for the transformation of interaction between teachers and students.

II. PURPOSE AND QUESTIONS OF RESEARCH

The purpose of this study is to focus on key tasks of organizing effective research work of students, as one of the main areas of training competitive specialists and formation of qualified managers. Another aim is setting the main tasks for the high-quality organization of students' research work.

The main research questions are:

1. Analysis of professional and personal qualities emerging from students in the process of performing research work.
2. Necessary conditions for the organization of effective research work of students.
3. Classification of criteria for assessing the effectiveness of student research.

A student's research work is one of the ways to form professional competencies of a future specialist. It allows not only to actualize knowledge in the subjects studied, but also to form the ability to work with various sources of information, to expand the boundaries and methods of self-education and intellectual activity and to develop independence and self-control. Effective organization of student research work allows us to expand the scope of the studied disciplines, taking into account the peculiarities of professional orientation.

A student, taking part in research work, learns to see problems, set tasks and implement solutions in reality. By collecting the necessary information, carrying out the necessary calculations and graphical constructions, analyzing the available data, synthesizing it, evaluating and preparing the final report, the student becomes competent in the questions that he or she studies.

Let us give some examples of these important qualities that are formed in the process of research work.

1. Ideas about the scientific approach and a research way of thinking, the ability to analyze technical and socially significant problems and processes, also the ability to calculate the consequences of management decisions and actions taken from the standpoint of social responsibility.

2. Ability to analyze and evaluate both one's actions and occurring and predictable processes, taking into account their logical sequence.

3. Ability of perception, synthesis and analysis of information.

4. Ability to set research goals correctly and choose proper methods to achieve them.

5. The ability to build written and oral speech properly, to think logically, to defend their case in a reasoned and understandable way, etc. [2; 4].

Effective research, as a type of intellectual activity, is based on giving students an opportunity to reflect, compare different points of view, formulate and defend their point of view, based on knowledge of facts, laws, including laws of science, their own observations and other people's experience. As a result, students learn to manage their time and themselves to achieve their goals; they develop the skill of participating in scientific discussions, they also know how to prepare and conduct public speeches; finally, they defend their opinion competently, reasonably and fruitfully.

The main tasks that are to be solved in order to organize a well-organized research work of students are:

- a more efficient use of time devoted to independent work of students;

- a qualitative change in the level of mastering competencies in the subjects leading to the main professional educational program;

- expanding the range of professional competencies;

- formation of competences in related professional fields;

- increased motivation and performance;

- formation of the basis for implementation of a student's final qualifying work at a high level: a work of an applied nature or having a scientific component;

- exclusion from the professional trajectory of graduates during the adaptation period.

The research work of students enrolled in the areas of undergraduate and specialist training is part of the independent work. Like any other type of independent work, it requires carefully thought-out organization and control [1].

The goal of organizing a student's research work is to teach students how to work intelligently and independently, first with educational materials, then with scientific information, to lay the foundations of self-organization and self-education in order to instill the ability to further improve their skills, develop managerial and organizational skills for effective collective management work [2].

Student research work is one of the ways to form professional competencies of a future specialist. This allows not only actualizing knowledge in the studied subjects, but also to form the ability to work with various sources of information, expand the boundaries and methods of self-education and intellectual activity, as well as develop

independence and self-control. Effective organization of student research work allows to expand the scope of subjects studied, taking into account the peculiarities of professional orientation [2].

It should be noted that the level of results achieved by students during research is influenced by a number of factors.

Among them is the level of competence of the teacher carrying out scientific management. Here we are talking not only about competence in the field of scientific research, but also about pedagogical skills, inclination for scientific leadership and mentoring. [14].

Effective organization of research work of students requires creation of certain conditions:

- motivating students to gain knowledge through the mechanism of scientific research;

- readiness of students for independent work;

- sufficient provision of the university with necessary teaching and reference materials;

- providing students with access to electronic databases of relevant scientific information;

- advisory assistance of a teacher;

- presence of a system of regular quality control of the independent scientific research performed by a student.

In our opinion, in the modernization of vocational education, and therefore, modernization of its results, organization of students' research work occupies a central place, being a point of growth and development of professional competencies and qualities necessary for both highly qualified specialists and modern managers of any level [3].

Particular attention is paid to the role of the teacher as an organizer of the research work of students. At the same time an attempt has been made to analyze the typical shortcomings in this area.

Unfortunately, the organization of advanced training for the faculty of universities and institutes does not pay due attention to the methods of organizing and conducting research work with students. And teachers often lack correct methodology in this area, which allows the interaction with a student to be transferred from the level of control to the level of a joint scientific search. [15]. The organization of special training of teachers, advanced training in the field of technology implementation of scientific leadership will significantly improve the effectiveness of student research and the effectiveness of the educational process as a whole [16].

The factors contributing to a better quality of research work of students, surely, include implementation of the university educational program in the form of a network [17]. This will allow a student to get consulted not only by his or her supervisor in the framework of scientific research, but also to carry out work and to get acquainted with the experience of the university as a partner. As a rule, when organizing a network form of program implementation, the possibility of conducting studies and research on unique equipment available in universities is taken into account. The possibility of a deeper study of scientific problems is also presented by

academic mobility, organized by a university together with foreign partners [18].

III. RESEARCH METHODS

In this study, the following methods were used.

1. The analytical method was used both for analyzing published works on the subject, and for analyzing the effectiveness a student's research work.

2. The authors used the comparative method to compare the level and quality of a student's research work in the Russian Federation with education in developed countries to determine the true state with the training of highly qualified professional personnel and the competitiveness.

3. The institutional approach applied in the study allowed the authors, firstly, to reveal the role of the government, the Ministry of Higher Education and Science, other public authorities and management in the implementation a student's research work.

4. The system method was necessary for the team of authors in order for the study to become complex, integral, united by a common idea and not fragmentary.

5. The problem approach is used by authors to identify topical issues a student's research work and the development of the knowledge economy.

IV. CONCLUSION

The conducted study allows the authors to draw the following conclusions.

1. Qualitatively organized research work of students is the most effective tool of the educational process, which allows to significantly increasing the level of qualification and competence of graduates and the way they develop their professional management skills.

2. The key role in the organization of effective independent research work of students belongs to:

- a teacher who can professionally work with a particular personality of a student, with his strengths and weaknesses, individual abilities and inclinations;

- the management of a university, which is able to provide material, scientific and informational bases for conducting student research, and professional development of teachers specifically in the field of technology implementation of scientific supervision of research work.

3. The implementation of an educational program in the form of a network by a university contributes to more effective research activities of students, which in turn has a beneficial effect on the results of the educational process as a whole.

Thus, the organization of effective research work of students is a powerful factor in the formation of a competitive specialist. The multi-criteria of this function testify to considerable efforts and resources that should be laid by a university. With the desire of the university to develop both educational and business space properly, research work of

students should become an integral part of the activities of the educational organization.

REFERENCES

- [1] N.Yu. Bugakova, E.A. Karelina, I.V. Kirova. Independent work of a student: forms and evolution // News of the Baltic State Academy of the Fishing Fleet, 2018, vol. 4 (46), pp. 7 - 11.
- [2] I.V. Kirova, T.L. Popova. University teacher: requirements and performance assessment. In the collection: Engineering Pedagogy. Moscow, 2015, pp.126 - 141.
- [3] L.P. Barylkina, L.D. Obukhova, V.M. Grebennikova, N.I. Nikitina, L.D. Kamalova, M.Yu. Karelina, N.V. Atamanenko, T.Yu. Cherepnina, O.A. Lodde, E.V. Komarova, T.D. Posyagina, A.A. Pulina. Professional education: modernization aspects // Collective monograph in 9 volumes / under the scientific editorship of O.P. Chigisheva. Rostov-on-Don, 2014, vol. 5, 205 p.
- [4] I.V. Kirova, T.L. Popova. Realization of the worldview function of education on the example of the disciplines taught // Automobile. Road. Infrastructure, 2015, vol. 4 (6), pp. 25.
- [5] N.Yu. Bugakova, E.A. Karelina, I.V. Kirova "Clip thinking" as a challenge to the educational system // News of the Baltic State Academy of the Fishing Fleet, 2018, vol. 3 (45), pp. 7 - 11.
- [6] N.V. Atamanenko, M.Yu. Karelina. Some aspects of the formation of the substantive part of the discipline in the implementation of electronic educational resources in the educational process // In the collection: On some issues and problems of psychology and pedagogy. Collection of scientific papers on the results of the international scientific-practical conference. Innovation center for the development of education and science, 2014, pp. 94 - 97.
- [7] N.V. Atamanenko, M.Yu. Karelina, T.Yu. Cherepnina. Directions for improving the efficiency of the educational process in universities // In the collection: Methodology, theory and practice in modern pedagogy, psychology, sociology, philosophy. Proceedings of the IV International Scientific and Practical Conference, 2014, pp. 21 - 27.
- [8] M.Yu., Karelina, N.V. Atamanenko, T.Yu. Cherepnina. Formation of the content of the academic discipline as the main component of increasing the efficiency of the educational process // In the collection: New tasks of psychology and pedagogy and ways to solve them. Collection of articles of the International Scientific and Practical Conference. Science Center "Aeterna", 2014, pp. 23 - 27.
- [9] M.Yu., Karelina, N.V. Atamanenko, T.Yu. Cherepnina. Forecast-based formation of basic educational programs as a basic component of the strategic development of a technical university // In the book: Professional Education: Modernization Aspects. Barylkina L.P., Obukhova L.A., Grebennikova V.M., Nikitina N.I., Kamalova L.A., Karelina M.Yu., Atamanenko N.V., Cherepnina T.Y., Lodda O .A., Komarova E.V., Posyagina T.A., Pulina A.A. Collective monograph: in 9 volumes / Under the scientific editorship of OP Chigisheva, Rostov-on-Don, 2014, pp. 86 -105.
- [10] S.B. Benevolensky, M.Yu. Karelina, T.Yu. Cherepnina. Gestaltung des inhalts einer Lehrdisziplin als Hauptkomponente der Effektivitätserhöhung des Bildungsprozesses // Austrian Journal of Humanities and Social Sciences, 2014, vol. 9 - 10, pp. 75 - 78.
- [11] N.W. Atamanenko, S.B. Benevolensky, M.Yu. Karelina, V.M. Prikhodko. Von Prognosen begründete Formierung grundlegender Ausbildungsprogramme als Basiskomponent für strategische Entwicklung und Konkurrenzfähigkeit einer technischen Universität / In the collection: Achievements and Perspectives. Proceedings of the 5th International symposium. Koenig L., 2014, pp. 59 - 72.
- [12] M.Yu. Karelina, M.M. Revyakin, A.A. Zhosan, I.N. Kravchenko, A.V. Kolomeychenko, S.I. Golovin, E.V. Yakovleva. Graduation qualification work of a bachelor: a textbook for university students in the direction of training "Operation of transport and technological machines and complexes", Orel State Agrarian University named after N.V. Parahin, 2016, 328 p.
- [13] I.V. Klescheva. Evaluation of the effectiveness of the research activities of students, SPb: NRU ITMO, 2014, 91 p.

- [14] N.V. Atamanenko, M.Yu. Karelina. Some features of the improvement of the professional activities of a higher education teacher // Bulletin of the Federal State Educational Institution of Higher Professional Education Moscow State Agroengineering University. V.P. Goryachkina, 2014, vol. 1 (61), pp. 70 - 72.
- [15] N. W. Atamanenko, V. M. Prikhodko, M. Yu. Karelina. Einige Aspekte der Verbesserung beruflicher Tätigkeit des Lehrers an einer Hochschule // Austrian Journal of Humanities and Social Sciences, 2014, vol. 7-8, pp. 68 - 73.
- [16] M.Yu. Karelina, T.Yu. Cherepnina. The main trends in the formation of master's programs at a technical university // In the collection: Theoretical and applied problems of science and education. Collection of scientific papers on the materials of the International Scientific and Practical Conference: in 16 parts, 2015, pp. 87 - 92.
- [17] M.Yu. Karelina. The main trends in the formation of master's programs at the technical university in the transition to the network forms of the implementation of educational programs // In the collection: Engineering training, Moscow: MADI, 2015, pp. 68 - 74.
- [18] M.Yu. Karelina, T.Yu. Cherepnina Design and implementation of master's educational programs at a technical university in a network form as part of short-term mobility projects ERASMUS + // In the collection: Priority directions of science development: a collection of articles of the International Scientific and Practical Conference, 2015, pp. 109 - 111.