

## ARTICLE

# SCIENTIFIC AND RESEARCH ACTIVITIES OF UNIVERSITY STUDENTS

N. G. Moskvin, A. G. Isavnin<sup>\*</sup>, S. K. Savitsky

Kazan (Volga Region) Federal University, Naberezhnye Chelny Institute of Russia, Candidate of Pedagogic Sciences, Naberezhnye Chelny, RUSSIA

## ABSTRACT

Modernization of higher education in Russia aims to train a competent, qualified graduate, who can work effectively, improve his professionalism, and be ready to compete in the labor market. To meet the requirements, which are imposed to specialists at the present stage, the student should have analytical, creative thinking, interest in cognition. Without these qualities, it is impossible to develop a harmonious personality. Undoubtedly, such a person should be physically developed. Being engaged in creative activity, mastering knowledge and skills, a person should be healthy to live a full life. In the process of self-perfection, a person will be able to maintain and even to improve his physical health. Chernyshevsky N.G. says that physical perfection is a consequence of purposeful formation, and not a gift of nature. At first glance, physical education is far from scientific research, from professional and production, economic relations. But in fact, it is organically involved in them, because only in such a way an individual can be improved, brought up and developed. In this article, the authors want to define what is the scientific research work of students (hereinafter SRWS).

## INTRODUCTION

Taking the courses of lectures in various disciplines, the student participates in seminars, prepares reviews and reports on the topics of disciplines. In order to do this, he studies various articles, materials and other literature. After the graduation, a former student comes to the workplace, where he must have research skills, and to achieve success in work and to improve his skills, he should have the necessary fundamental and special knowledge. Being in creative search and having some skills of creative solving practical problems, a graduate of the university will be able to adapt quickly to changing production conditions. [1]

There is no doubt that SRWS is one of the most important forms of the training process. As mentioned above, students carry out the simplest research when they prepare reports, term papers and projects. So, we can conclude, that all students are engaged in research work, in one form or another. Although, unfortunately, only a small part of the students are engaged in SRWS more deeply, going beyond the curriculum. But such students develop in themselves very important qualities: the ability to think creatively, to be responsible, to be able to defend their own point of view.

Many disciplines, studied by the students (especially in the junior courses), seem to them uninteresting, and therefore boring. In this case, it is necessary to meet such a teacher, who will support their endeavors and expectations.

Lomonosov writes in his works, that it is necessary to encourage those students, who want to perform their own research in study-free time.

Of course, now Russian science is experiencing not the best of times. Insufficient financing of educational establishments leads to the outflow of talented young people from higher educational institutions; there is the ageing of teaching staff, and people, who are not competent and incapable of teaching, are left in the staff of the university. And this, unfortunately, reduces the highest level of education, for which the Russian system has always been famous. Although, the investments in SRWS are not a big part of the budget expenses of the university. Basically, students need moral support. [2]

In particular, our institute has recently paid increasing attention to the organization of scientific research work of students.

The purpose of this article is to review briefly some forms of SRWS.

One of these forms is the scientific research work, which is included in the training process, in accordance with the curricula, and is conducted, respectively, during class time.

It should include lecture courses and lessons with the elements of scientific research. In the process of this activity, the student has to develop a detailed plan, containing description of the work stages, to select the necessary literature, to carry out the processing and analysis of the results, to prepare the report. Another form - is the scientific research work, which is performed by the student in his study-free time. Promising direction in this context is the need to create student scientific research laboratories (SSRL) in universities, where research activity will be conducted, and simultaneously the students' research and training work will be organized.

### KEY WORDS

specialist, student, research activities, development, implementation, achievements.

Received: 12 April 2018  
Accepted: 31 May 2018  
Published: 5 June 2018

### \*Corresponding Author

Email:  
isavnin@mail.ru

The main form of scientific work for students of junior courses is the preparation of reports and presentations, performance of tasks, which require an elementary scientific search, as well as participation in project groups with different directions, if there are any.

In the period of practical training, SRWS can be carried out in the form of individual tasks, on the topic of some bottlenecks in production. For example, this can be the execution of tasks, aimed at improvement of various technological processes, certain equipment, the organization of labor. The student can also collect the actual material and perform its primary processing, in order to use it in the course and diploma papers. During the execution of the course or diploma projects, SRWS requires of the student to develop special sections, including the elements of scientific inquiry and research, which should be performed in the process of solving the real tasks of certain enterprises. SRWS, conducted at an adequate level, used by the student in the graduation project, can result in its further implementation in the production, and to be a real research.[3]

At some departments of Naberezhnye Chelny Institute of Kazan (Volga Region) Federal University, the complex graduation works are implemented. These works are developed by several graduate students; each of them prepares some separate section. Such thesis works can be carried out at the request of the enterprise, where students completed graduate internship. The commission for the defense of thesis works, in addition to university teachers, includes the representatives of the enterprise. This commission evaluates each theme of the graduation work, and also makes a decision about the possibility of its using at the enterprise.

In an ideal scenario, universities should develop a list of bottlenecks in production together with enterprises, and then form the themes of course and diploma papers. Such an approach will provide an opportunity to more effectively use the scientific and creative potential of students, as well as to help them participate in solving specific tasks of production.

It was mentioned above, that in addition to academic research work students are engaged in scientific studies during extracurricular time. Such investigations can be carried out in the form of participation in planned state budget and business-contractual works, conducted at the department of the university, in the work of student bureaus or special student research laboratories. Students, who are the participants of such laboratories, can take part not only in solving various economic and engineering tasks, but also to give lessons, for example, in affiliated schools. [4]

There are various collective forms of creative work for students. These are the previously mentioned student research laboratories, design engineering departments, whose members the students are, as well as technological and economic bureaus, scientific and computer centers, etc.

The diagram, showing the forms of scientific activity of students, is presented in [Fig. 1].

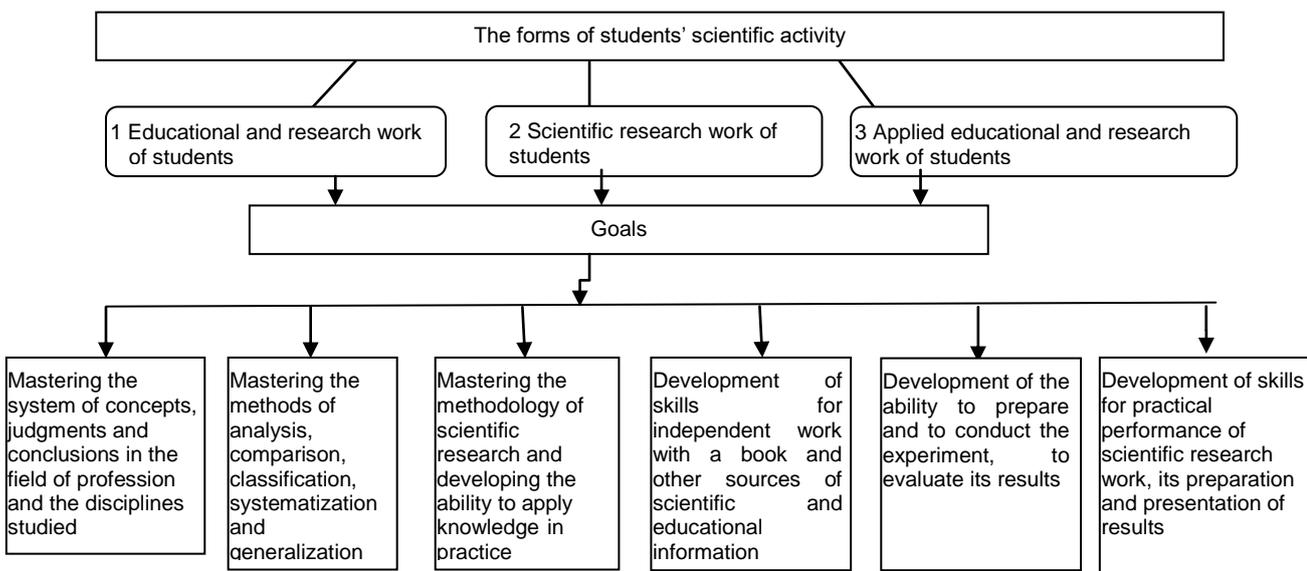


Fig. 1: The forms of scientific activity of students.

In the process of student's research, we can distinguish the following stages: the first stage is the emergence of ideas; further, the concepts and judgments must be formed; then hypotheses are put forward; after this it is necessary to generalize scientific facts and to give proofs of the correctness of hypotheses and judgments.

Most of the current scientific problems in the field of production can't be solved or corrected, using some universal methods. Therefore, cooperation of the teacher and the student in the process of scientific research work should be the factor, with the help of which the main aspects of the problem can be defined. The attention of the student should be directed to the certain sections of the information search and, thus, the teacher can help the student to solve the issues, arising in the process of research work, independently.

If we consider in more detail the issues of experimental research, we can conclude that technological investigations require control over a large number of those factors, which affect the output indicators of processes.

Any investigated production technological process, which is affected by a variety of factors, should be considered as a system. This system will be insufficiently organized, and the individual factors, influencing it, will be difficult to determine. The main method of studying these systems is statistical, and the method of carrying out the experiment is active or passive. Planning is used in case of active method of performing the experiments. Planning implies the possibility of choosing the way, using which you can actively interfere in the process and influence the system. The object of the research, on which an active experiment is carried out, is called a controlled object. If it is known in advance, that it is impossible to choose the way of influencing the state of the system, then the experiment is passive. [5]

Mathematical planning of the research experiment, choice of the factors variation, the final mathematical processing of the results obtained are carried out with the help of special techniques, the specific features of which are considered in specialized literature.

After the completion of the research (both theoretical and experimental), it is necessary to perform summarizing analysis of the results obtained. During this procedure, the hypotheses are compared with the results of the experiment. If such an analysis reveals discrepancies, then additional experiments are carried out. After the analysis is completed, scientific and production conclusions are formulated, and scientific-technical report is drawn up. [6]

## METHODS

All the characteristics of the study, including the level of complexity, form and period of the research, are determined by the teacher, taking into account the student's course and specific of tasks, put before him. The formation of scientific research activities of students, as a rule, includes several stages.

The first stage corresponds to the initial course, when the student has to:

1. Learn how to define the problem;
2. Be able to put forward hypotheses;
3. Formulate the necessary number of questions;
4. Find sources of information on a given topic;
5. Learn how to freely navigate in these sources, as well as in the reference literature.

Also at the first stage, the student should be able to create simple projects and to present them. More often in the first year of the university the research work is collective. Despite the fact that the topic, as mentioned above, is defined by the teacher, each of the students contributes to the overall work.

At the second stage, the students should include in SRWS the ability to create a research situation. Operation activities are extended and become more complex. It is a period, when the student must proceed to individual independent activity.

The third stage takes place in the senior courses of the university. At this stage, the projects and topics for the research are more complex, the judgments and conclusions should be more extended, i.e. the level of formation of universal actions should be increased.

## RESULTS

The main result of the research activity is an intellectual, creative achievement, through which the realness is established.

After carrying out the various stages, all the materials should be titled, rubricated, and linked in logical sequence. Then the student can start writing the final text of SRWS, in which special attention should be paid to formulations and definitions.

## DISCUSSION

In the process of scientific research work of students, the most difficult is to systematize the collected materials, to summarize and analyze them. Difficulties can arise when drawing up a plan of SRWS and, of course, when writing its text. The student should define the idea of the work structure already at the time

of intention formation. Therefore, it is necessary to teach the students to draw up a plan in several versions, applying different methods. For example, to use as a basic the chronology of the problem research in the structuring of sections. This will allow to reveal the advantages and disadvantages of each of the structural variants, or to define the issues, covering individual aspects of the problem, systematically reflecting its content. [7]

Academician D.S. Likhachev wrote about the scientific text:

1. The main feature of scientific language is its clarity.
2. Other advantages of scientific language are facility, brevity, ease of passage from sentence to sentence, simplicity.
3. Each written phrase should be checked by ear, reading it loudly.
4. The use of pronouns should be avoided.
5. Pay attention to the quality of words. Be careful with new words, especially borrowed from foreign languages.

## CONCLUSIONS

Based on the material, discussed in this article, we conclude that the scientific research work of students is one of the components of training work, which includes the motivational field for the student (its provision is assumed by the teacher), methods and various forms of scientific knowledge, which are necessary for a full-fledged scientific research process. The level of participation of students in scientific work at the current stage of education, its diverse forms and methods require the complex approach to its planning and organization. Comprehensive program of students' research work should provide a sequence of activities and forms of SRWS, in accordance with the logical chain of the training process. [8, 9]

In order to use the scientific potential of universities more fully in the training of modern highly qualified specialists, and to create a harmonious system, SRWS should be planned in a comprehensive manner.

### CONFLICT OF INTEREST

There is no conflict of interest.

### ACKNOWLEDGEMENTS

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

### FINANCIAL DISCLOSURE

None

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