

Formation of research competences of undergraduate studies with course of general physics

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A whole number of programmes, aimed to stimulate innovational activity of students, exist. Federal educational standard of higher professional education reinforces requirements towards training undergraduates for scientific-research activity. Fulfilling this task requires involvement of students into research work. One of requirements of educational programmes of training specialists in accordance with FSES is implementation of active and interactive forms of classes in combination with independent work of students within training process.

Regardless of urgency of the set goal, there are many other problems in this topic. One of them is a problem of forming research competences among students of junior years. Course of general physics starts with the first semester. During this time a tutor, whose part is extremely important, must help students to “touch the science”, show them how and where one can undertake scientific researches. It is necessary that a tutor sees a perspective of solving this problem.

Physics department has been studying the problem of actualizing scientific-research activity of junior year students. We have a lot of methodical groundwork. Nowadays we are solving this problem deeper, considering urgency of this problem.

Problem: establishing and searching possibilities to form research competence among junior year students.

Research object: process of training bachelors in educational institution of higher professional education.

Research subject: content, means, and methods of forming research competence among junior year students.

Hypothesis: it is possible and reasonable to form research competence at junior years of education.

While teaching physics it is necessary to combine fundamental nature of education that allow one to form deep knowledge, put in programme, with introduction of innovative technologies into educational process. From the point of psychological didactics and active approach, fundamentality of education is defined by the following principles: scientific nature, systematicness, consistency – these are components of activity component of education during introducing students into research activity. Of course, interactive methods of training play the key part in it, and method of project is referred to them.

We have undertaken fundamental researches of interactive forms of training within educational process. The main attention was paid to the method of project. Organizational-pedagogic conditions of using interactive professionally-significant projects at junior years of IrSTU have been established [1, 2]. We have developed, approbated, and introduced a model of professionally-significant project on physics for undergraduates into work. The operation of this project solves the main problem – acquisition of new knowledge, skills to use the received information, collect and analyze data, make a decision, develop creativity – all these aspects provide for formation of the necessary competences including scientific-research competence. We have made a conclusion on necessity to introduce modern interactive forms of training starting with junior years when scientific potential is put and necessary competences are formed.

The department has developed and introduced into educational process a cycle of laboratory investigations with elements of scientific research that allows one to familiarize with

operating modern equipment, carrying out a real experiment, mastering skills of research work and formation of research competence.

One of basic methods of forming research competence is organization and carrying out scientific conferences and round tables. Thematic of scientific reports, made by students, is usually selected in regard with their future professional activity. Some works present analysis of a bibliographic review, others are a result of research activity. No doubt, all these aspects help students to master modern methods of searching, processing, and utilizing data and defend their opinion that will develop creative attitude towards work among them.

Conferences are usually held in a ceremonial atmosphere, in conference hall with participation of institute directors, deputy chancellor in educational or scientific work who open a conference, greet participants, and wish them success in their scientific searches. It is a visionary example of how students can familiarize with scientific activity. Questioning of conference participants took place (approx. 200 students), and it showed that all of them gave a positive answer to questions (do you wish to visit scientific seminars, take part in new scientific events, are you interested in visiting a conference and listening to reports). All these factors provide for attracting people to scientific work and forming research competence.

Thus, the undertaken study has proved our hypothesis of a possibility to form research competence at junior years of education. The following factors can be favourable to it: organization of laboratory studies with implementation of elements of scientific research along with traditional methods; computer modeling; widespread implementation of projection method within a lecture course; participation in scientific conferences, seminars, international exhibitions; professional competence of a tutor.

We have developed and approbated organizational-pedagogic methods of forming research competence among students of junior years during the process of mastering general physics. Pedagogic conditions of formation have been defined.

The mentioned facts define the formation of research competence among students of junior years, train them to work at senior years and thus form research competence of a graduate.

Bibliographic list

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