

Интернет-журнал «Мир науки» ISSN 2309-4265 <http://mir-nauki.com/>

2016, Том 4, номер 2 (март - апрель) <http://mir-nauki.com/vol4-2.html>

URL статьи: <http://mir-nauki.com/PDF/13PDangMN216.pdf>

Статья опубликована 12.04.2016

Ссылка для цитирования этой статьи:

Кулик С.С., Черкашина О.М., Юрченко Н.В., Климова Ю.А. Образовательные технологии в обучении физике, математике и инженерной графике иностранных студентов // Интернет-журнал «Мир науки» 2016, Том 4, номер 2 <http://mir-nauki.com/PDF/13PDangMN216.pdf> (доступ свободный). Загл. с экрана. Яз. рус., англ.

For citation:

Kulik S.S., Cherkashina O.M., Yurchenko N.V., Klimova Yu.A. [Some educational technologies used at the lessons of physics, mathematics, engineering graphics in teaching foreign students] On-line Journal «Mir nauki», 2016, Vol. 4, no. 2. Available at: <http://mir-nauki.com/PDF/13PDangMN216.pdf> (In Russ.)

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Some educational technologies used at the lessons of physics, mathematics, engineering graphics in teaching foreign students

Abstract. Article is devoted some educational technologies used at the lessons of physics, mathematics, engineering graphics in teaching foreign students.

Authors note that different educational technologies enable students to acquire skills in comparison, in the definition of speech situations for the use of the gained knowledge. The student learns to modify (transform) the knowledge gained. Student takes as its basis the primary product of knowledge and based on them receiving new knowledge. Authors emphasize that pre-university training of foreign students on technical disciplines has a number of special features one of which is inconsistency of the Russian and foreign techniques. The educational technology is a process system of joint activity of a student and a teacher in design (planning), organization, orientation and correcting of educational process for the purpose of achievement of concrete result. Technological effectiveness of educational process consists in making educational process completely operated. The authors describe some educational technologies used by teachers when training students - foreigners to physics, mathematics, engineering graphics. Among the variety of teaching techniques and methods used in the training best suited for use in a group of foreign students is multilevel training. To their opinion technology of tiered training aimed at full value formation and development of the language person of foreign students. Multilevel learning is based on scientific principles of general didactic principle of scientific character and availability, systematic and consistency, continuity of consciousness and activity, strength of mastery of knowledge and skills.

Keywords: educational technologies multilevel training; modular training; technology of carrying out educational discussions; method of projects

Pre-university training of foreign students on technical disciplines has a number of special features one of which is inconsistency of the Russian and foreign techniques. To replace the separate forms and methods of active training of foreign students making process of training broken off on parts come the complete educational technologies in general and technologies of training, in particular.

Modern educational technologies when training foreign students in physics, mathematics, engineering graphics have to provide: specification of the purposes and problems of training, selection and specification of the content of training, choice of optimum forms and methods of training.

The educational technology is a process system of joint activity of a student and a teacher in design (planning), organization, orientation and correcting of educational process for the purpose of achievement of concrete result.

The main objectives of training of foreign students at the international faculty are:

- mastering general scientific vocabulary and a terminology base of discipline, namely, mastering skills: a) of the semantic analysis of texts of the textbook, b) listening in the real mode of time, c) conducting discussion;
- elimination of gaps in knowledge of the foreigners connected with distinction of training programs in Russia and other countries.

For the solution of objectives on classes in physics, mathematics, engineering graphics at different grade levels the following educational technologies are used:

1. multilevel training;
2. modular training;
3. technology of carrying out educational discussions;
4. method of projects.

Technological effectiveness of educational process consists in making educational process completely operated. Let's consider some educational technologies used by teachers when training students - foreigners to physics, mathematics, engineering graphics.

Foreign students studying at a preparatory department, come from the different countries and have different levels of the mathematical preparation. The group is composed of individuals, every of which has its psychological and moral characteristics, interests and addiction.

The teacher receives a group non-uniform in every respect which should be trained in the Russian language mathematical and physical terminology, to liquidate gaps in development of some subjects, and also to study subjects which are not present in programs in mathematics in some countries. The university graduate, who comes to continue education in a magistracy or postgraduate study, demands from the teacher some other relation, than the graduate of a school.

Ensuring the development of each student in these conditions is the main task of educational process, which can be solved by individualization and differentiation of training.

Among the variety of teaching techniques and methods used in the training best suited for use in a group of foreign students is multilevel training.

Level differentiation is carried out not due to reduction of volume of the studied information, but provided with orientation of students - foreigners on various requirements to its assimilation.

Purpose of technology of level training is: to provide assimilation of the educational material by each student in a zone of his next development on basis features of his subjective experience.

Preparation of a training material provides allocation in the contents and in the planned results of training some levels, which choice is defined by structure of a group and requirements of state standard.

Thematic planning is carried out for the integrated units of assimilation and also provides preparation of the flow chart (in a look taxonomy of the purposes) for students in which on each unit are specified levels of its assimilation:

1. storing (remembered, reproduced, learned);
2. understanding (explained, illustrated, interpreted, translated from one language to another);
3. application (on a sample, in the similar or changed situation);
4. generalization, systematization (allocated parts from the whole, formed the new unit);
5. evaluation (determined the value and importance of the object of studying) . For each unit of content in the routing parameters laid down indexes of its condition presented in the form of text or control tasks.

Teacher prescribed to implement the following major steps:

- a) motivation and stimulation of cognitive activity of students;
- b) organization of independent work of foreign students at various levels - everything that they can learn on their own or with dosage help should be given to them;
- c) mixing the front or forms of work general to the whole class to sufficient minimum; preferred forms of organization of teaching cognitive process are paired, group and collective (work in pairs of interchangeable).

In the educational process is widely used test that is split-level character. Types of tests used at the preparatory faculty for foreign students:

- alternative questions (to be answered yes or no);
- issues with a clear choice in a closed form (required number one correct answer);
- questions with multiple choice (need to specify the numbers of all correct answers);
- informative questions on knowledge of facts (definitions, theorems, etc.);
- questions to meet (need to link questions and answers);
- questions a set of key words or patterns from which to construct the answer.

Multilevel and multi-pronged test can more fully assess the mathematical and scientific grounding and identify gaps. Testing is used throughout the study period.

Providing students with tasks of different difficulty levels allows to avoid cheating, improves the quality control of students' independent work.

Technology of tiered training aimed at full value formation and development of the language person of foreign students. Multilevel learning is based on scientific principles of general didactic

principle of scientific character and availability, systematic and consistency, continuity of consciousness and activity, strength of mastery of knowledge and skills.

Generalized features of approach to learning based on problem solving. We present this feature as a sequence of generalized steps for organizing a search of the educational process:

- 1) formulation of the problem, the search for its wording from different points of view;
- 2) search of the facts for a better understanding of the problem, possibility of its solution;
- 3) search for ideas simultaneously with the activation of the unconscious and the subconscious; evaluating of ideas postponed as long as they are not made and formulated by students;
- 4) search for a solution in which the expressed ideas are analyzed, evaluated; for implement, development the best of them are selected;
- 5) search for recognition of the solution found by the others.

The purpose of the technology of problem-based learning is to promote students' critical thinking, experience and tools of teaching and research activities, role-playing and simulation, capabilities creatively explore new experiences; search and definition of the students their own personal meanings and values relationships.

The initial ideas of problem-based learning:

- the development of the author's position in the student's educational process;
- non-judgmental nature of the reaction to the statements of the students in the course of problem-based learning;
- holistic inclusion of students in the educational process associated with rational knowledge and intuitive often unconscious emotional-personal sphere.

In this case, it is not just about connecting empirical observations, stock life experiences of students as an auxiliary material used by a teacher as illustrative addition. Student experience is the most important source of educational knowledge. Teacher (exactly as well as all complex of teaching resources he uses) carries out not a role of the «filter», passed through a training information, but the role of assistant in the work of the student. Ideally, the teacher becomes the organizer of an independent academic knowledge of students; their interaction with the training material, with each other and with the teacher constructed as educational and informative, in which the teacher acts as a source of information.

Technology allows us to develop independence, the desire for knowledge, interest in the subject.

At the initial stage elements of modular training are used. From the technology of modular training methods are used.

1. *Splitting of educational material on the modules.* Training material is presented in the form of separate fragments (modules) having a certain didactic integrity. Each fragment can be divided into three parts: an **informative**, **operational** and **secure**. Informative part is a presentation of a new semantic information, the introduction of new terms, concepts, linguistic units (words, phrases, designs, expressions). In the operative part of the fragment set forth above information is supplied in a modified form, in other examples. The third part of the fragment is a consolidation of the previously described information that at input stage is mainly carried out in the form of answers to questions.

2. *Using each module input, intermediate and final control of knowledge.* Entrance test in the languages of intermediaries allows you to get an objective assessment of the level of knowledge and skills that each student received at home. Intermediate and final control of knowledge provide an opportunity to discover gaps in the current and final preparation of students.

In the future, when students have a considerable degree of maturity and independence in the acquisition of knowledge and the formulation of the problems in the selection and accurate submission of their arguments in the preparation of the subject a technology of educational discussions is used.

Technology of educational debate involves the development of critical thinking of students, the formation of their communicative and discussion culture.

Training discussion is dialogic in essence and as a form of the organization of tutoring, and as mode of work with the maintenance of a training material. It is one of the most important form of educational activities that promotes student initiative, the development of reflective thinking.

The essential feature of the educational debate is dialogic position of the teacher, which is realized in the special organizational efforts made by him, sets the tone of the discussion and the observance of its rules by all participants.

At first uses of educational discussion efforts of the teacher are concentrated on the formation of discussion procedures. Subsequently, the focus of the teacher is not only the identification of different points of view, attitudes, modes of reasoning, their correlation and compilation of a larger and multidimensional vision of phenomena, but also a comparison of the interpretation of complex phenomena, going beyond just this situation, the search for personal meaning. The more students learn to think in terms of contrast comparisons the greater is their creativity.

When carrying out laboratory work the method of projects is used.

Project-based method involves the use of a wide range of problem exploration and research methods focused on practical results in laboratory studies, as well as solving common challenges of interdisciplinary. The decision of individual creative tasks, writing reports, participation in the preparation of layouts for laboratory practical works and demonstration experiments to develop creative activity and contributes to the acquisition of practical skills.

Different educational technologies enable students to acquire skills in comparison, in the definition of speech situations for the use of the gained knowledge. The student learns to modify (transform) the knowledge gained. Student takes as its basis the primary product of knowledge and based on them receiving new knowledge.

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УДК 51-7

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**Образовательные технологии в обучении физике,
математике и инженерной графике
иностраннх студентов**

Аннотация. Статья посвящена образовательным технологиям в обучении физики, математики и инженерной графики иностранных студентов. Авторы отмечают, что использование различных образовательных технологий на занятиях по математике, физике и инженерной графике позволит студентам приобрести навыки, необходимые для освоения данных дисциплин на практике. Авторы подчеркивают, что российская система образования имеет значительные отличия в методике обучения иностранных студентов по данным дисциплинам. Технологичность учебного процесса состоит в том, чтобы сделать учебный процесс полностью управляемым. В статье рассматриваются некоторые образовательные технологии, используемые преподавателями при обучении студентов-иностранцев предметам физике, математике, инженерной графике. Авторами отмечается, что иностранные студенты, обучающиеся на подготовительном отделении, приезжают из разных стран и имеют различный уровень математической подготовки. Среди разнообразных дидактических приемов и методов, применяемых в обучении, наиболее всего подходит к использованию в группах иностранных учащихся разноуровневое обучение. Технология разноуровневого обучения, по мнению авторов статьи, направлена на полноценное формирование и развития языковой личности иностранных студентов. Разноуровневое обучение, основывается на общедидактических принципах научности и доступности, систематичности и последовательности, преемственности, сознательности и активности, прочности овладения знаниями, умениями, навыками.

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Ключевые слова: образовательные технологии; разноуровневое обучение; модульное обучение; технология выполнения обучающих дискуссий; метод проектов

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