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UDC 53:373

Z. DAUTOVA, A. MURATBEKOVA, G. ABYLKASSOVA

S. Amanzholov East Kazakhstan State University, Ust-Kamenogorsk, Kazakhstan

PECULIARITIES OF APPLICATION OF INNOVATIVE TECHNOLOGIES IN TEACHING CHEMISTRY

This article discusses the innovative learning technologies that develop thinking skills, research skills and competence of students at chemistry classes. The student must learn on their own, this is the only way to update his previous knowledge and apply their knowledge in life. The use of innovative methods in the educational process is a harmonious blend of man in the new era.

Keywords: interactive methods, information technology, problematic methods, presentations, discussions, case studies.

ХИМИЯНЫ ОҚЫТУДА ИННОВАЦИЯЛЫҚ ТЕХНОЛОГИЯНЫ ҚОЛДАНУ ЕРЕКШЕЛІКТЕРІ

Мақалада бүгінгі күні инновациялық әдістермен оқытудың ақпараттық технологияларын қолдану арқылы оқушының ойлау қабілетін арттырып, ақпараттық технологиялар негізінде ізденушілігін дамытып, құзыреттілігін қалыптастырады. Шәкірт өздігімен үйренуі керек, сонда ғана оның білімі толығыады, солай ғана ол білімді өз өмірінде қолдана алады. Инновациялық әдістерді оқу процесінде қолдану жаңа дәуір адамын тәрбиелеу, жеке тұлғаны үйлесімді ұштастыру баяндалады.

Түйін сөздер: интербелсенді әдістер, ақпараттық технология, проблемалық әдістері, презентациялар, пікірталастар, кейс-стадийлер.

ОСОБЕННОСТИ ПРИМЕНЕНИЯ ИННОВАЦИОННОЙ ТЕХНОЛОГИИ В ОБУЧЕНИИ ХИМИИ

В данной статье рассматриваются инновационные технологии обучения, которые развивают мыслительные способности, исследовательские навыки и компетентность

ученика на уроках химии. Ученик должен учиться самостоятельно, это единственный путь обновления его предыдущих знаний, применение своих знаний в жизни. Использование инновационных методов в учебном процессе представляет собой гармоничное сочетание человека в новой эре.

Ключевые слова: интерактивные методы, информационная технология, проблемные методы, презентации, дискуссии, кейс-стади.

The world in which a teenager lives is characterized by constant updating of information, it is dynamic and changeable. These conditions dictate the need for him to see his goals, show initiative, to design, to build social connections and engage in temporary teams, and modern educational technology.

To «enable» the cognitive activity of students and to guide it to the solution of the problem, it should be known, some initial data for reflection, for creative exploration should be set. It is important that the problem situation had a certain psychological element, which consists in the novelty and the brightness of facts in the unusual cognitive tasks, etc. that would excite students' interest and commitment to educational research.

To achieve educational goals teachers use educational technology. The concept of «educational technology» includes a skill system, providing design and implementation of the pedagogical process in a specific sequence of actions, procedures. Teacher build educational activities in which they understand the logic and structure of this activity, clearly see and configure all of its stages, possess the skills needed to organize each stage. It must be remembered that the choice of technology depends on group of factors:

- Priority aims of education;
- The specifics of the training content;
- Composition students and their quantities;
- The level of technical equipment of educational process, creation of a unified educational environment.

Development of training technology of teachers is a creative process, consisting in the analysis of goals, opportunities and the choice of forms, methods and means of teaching, ensuring the implementation of goals and opportunities. This choice is the choice of personal preference of the teacher, the practical is a constant search and creative mental activity that requires from the teacher an extra effort. For all types of teacher's activity (training, educational and communicational) technological chain of actions is as follows:

1. Diagnosis (study and analysis) of the pedagogical situation (learning, educating, situations of interpersonal and group interaction);
2. Goal setting – setting objectives and their concretization in the task system;
3. The selection of the appropriate content, forms and methods, creating the con-

ditions of pedagogical interaction;

4. Organization of pedagogical interaction (training, educating, developing);

5. Feedback, assessment of current results and their correction;

6. Final diagnosis, analysis and evaluation of the results of pedagogical interaction;

7. Setting new goals and objectives. The ability to build a pedagogical process presupposes the possession of pedagogical technique – ways of managing yourself and impact on others, aimed at the organization of pedagogical influence with the students.

Modern education process is inconceivable without the search for new and more efficient technologies to facilitate the development of creative abilities of students. We need to ensure that the student became an active participant in the learning process and the teacher, forgetting about the role of the informant, became the organizer of cognitive activity of the student. I offer some innovative technologies that can be used at chemistry lessons.

Case - technology

The case-technologies mean the study of the subject by examining a large number of situations and tasks in a certain combination, this technology contributes to the development of skills: to analyze situations; optimal solutions; evaluating alternative solutions to the tasks. The task of this method is the maximum activation of each student in independent work on the problem. The case technology means that each student receives a briefcase containing a package of textbooks, tasks in the selected theme, electronic materials. Technology of this group use computer networks and modern communications for consultations, correspondence and support, learners, educational and other information from electronic libraries, printed literature, databases and systems of electronic administration. An important advantage of this group of technologies is the possibility of more operational guidance to the trainees in the process of communication with the teacher and the group, which is a huge advantage in controversy with traditional forms of full-time study. The case examines more fully the topic within the subject, includes quotes from sources, contains the problem of the student. Training materials used in this group of technologies characterized by systematically organized set of materials. Their advantages include:

– Accessibility as the ability of organization of independent work in the digital library and at home;

– Visibility, i.e., colorful illustrations, videos, multimedia components, circuits;

– The presence of interactive tasks;

In form and content, cases can be classified:

– Integrated (modular) case contains 20 and more pages of information, primary data, samples, documents, videos, etc.

– Case - statement contains an account of any situations, problems, their solu-

tions, and conclusions.

- Case - illustration contains a small amount of data used for confirmation.
- Case - practical task contains a small or moderate amount of information
- Case study with structured questions provided a checklist of items after the

main text.

1. We offer options of cases that can be applied in the study of the subject «Chemistry»

CASE

People have long wondered

How metal they should protect?

And theory was created.....

That's about it...

1. What's the meaning?
2. What is it?
3. What types do You know?
4. What are some methods of protection?

Technology of problem-based learning.

Problem-based learning permeates the entire course of chemistry. All the lectures on organic chemistry are problematic. In addition, the study of inorganic and General chemistry is accompanied by consciousness on the lessons of problem situations and formulation of problematic issues. For example: General chemistry, the theme «the Theory of electrolytic dissociation». Almost the whole theme is built on the hypotheses, the creatures of problematic situations, staging problematic issues and searching for the answers to these questions, solutions to problematic situations. For example, one problematic situation:

– is it possible on the basis of molecular structure of sugar $C_{12}H_{22}O_{11}$ and alcohol C_2H_5OH , to establish why their solutions do not conduct electricity.

When studying the concept of «electrolytic dissociation» problem is created as follows:

– some scholars have argued that the ions in the solution formed by dissolving substances in water, others believed that they are formed under the action of electric current.

Which of the scientists was right, and how do I prove it?

How to explain, based on the characteristics of the dissolution process, the essence of the chemical reaction that takes place between solutions of substances, are there ions in solution before lowering the electron, or they appear under the influence of electric current?

At the lessons on other topics in the same way problem situation, issues and searching for solutions were created.

Technologies of method of projects.

Among the innovative pedagogical tools and techniques that provide individualized education, a special place occupies a design, as the main form of learning activities. Project (lat. Projectus – thrown forward) involves the development of a plan, the alleged search of the answer to the question, solving the problem in a different way. The project method implements the main meaning and purpose of education – creating the conditions for collaboration in the research community, thereby helping the learner to become a talented student.

In the practice of teaching chemistry, the project activity is implemented through:

- The lesson or practical lesson;
- Extracurricular activities: subject activities;
- Scientific and practical activities of students, protection of abstracts;

The teacher uses the following projects:

– The informational. Students study and use different methods of obtaining information (literature, library collections, media, databases), processing methods (analysis, generalization, comparison with the known facts, reasoned conclusions) and presentation. This type of project is systematically used in the classroom. Example: 10th grade «Vitamins: for or against».

– Creative projects will be held as follows: determination of requirements, survey, designation requirements for the facility design, the elaboration of initial ideas, their analysis, planning, execution, evaluation (reflection). The presentation of the results: video, holiday, expedition, reports, etc. Example: 10th grade: «esters control the whole world» (provision of results is a work, exhibition of drawings, photos).

Method of projects is focused on achieving the goals of the students. It forms a number of skills and abilities, experience of activity.

Information and communication technologies.

The use of information and communication technologies opens up new perspectives and opportunities for learning chemistry. Information and Communication Technology can be used at different stages of the lesson: explaining the new material, correction of knowledge and skills. Information technology makes the lesson vivid and interesting, develops cognitive abilities of students and their creative power. The solution of these tasks is achieved by conducting a series of multimedia lessons. Through animation, sound and dynamic effects, educational material become memorable, and help simulate the chemical process, conduct threat reaction. Students have the opportunity to take an active part in the creation of lessons, aided search and systematization of information, thereby, form the skills of independent work and computer technologies. In preparation for the lessons they use online resources, educational websites as an informational field that allows them to get more responsive, relevant information on the topic of the lesson.

The use of these technologies makes the chemistry more interesting, and it is one of the ways of developing cognitive and creative interests of the students to chemistry as a science, and the use of technologies also promotes activation of cognitive activity of pupils, which confirms the hypothesis of experience. Innovative technologies contribute to efficiency of learning the subject of chemistry, communicative qualities of the personality.

The technology of game learning.

This technology enhances students' interest in different types of learning activity and cognitive activity. Games are considered as an activity, as a form of organization of work of students and teaching method. "The game is almost the only kind of activity, specially exercising creativity not as an isolated ability to anything, but as a quality of personality. The game in the classroom stimulates thinking and relieves the tension". Teacher of chemistry and biology use this technology. Most often conduct the business game, where students act as lab technicians, technologists of the enterprises, managers, environmentalists. These games are held on topics that address environmental issues. In addition, summarizing lessons hold in the form of games – travels. For example, a journey on the continent "Chemistry". Students move from the "Kingdom chemical formulas" in "the Realm of chemical reactions", then "Empire of the Periodic system", etc.

There is a game on the subject of "the most Important classes of inorganic compounds" – investigation. The plot is the following: private investigative Bureau should to decipher a diagram with numbers and letters: $A \rightarrow B \rightarrow C \rightarrow D$. To investigate they have to buy the tips from the informant by doing some tasks. Also generalization of knowledge on the course of organic chemistry can be made through a team game "noughts and Crosses". Some lesson tests are held in the form of a game: a public review of knowledge. For example, the sections "non-metals" and "Metals" have a three-level ladder – the chopper. Most of the lessons in the 8 – 9 classes are held in the form of a game. They are: lessons stories, public demonstrations of knowledge, lessons – competitions, brain-rings, etc. Game learning helps to achieve strong absorption of the students' knowledge on the subject.

The technology of multi-level learning.

Effective organization of educational process is impossible without the use of individual-differentiated approach to students, in accordance with their inclinations, interests and capabilities. In chemistry a distinction is particularly important. This is due to the specifics of the subject: some students mastering chemistry is quite challenging, while others manifest a pronounced ability for studying the subject. The problem of durability of knowledge in chemistry can be solved through the technology of level differentiation. Realizing it, the following sequence of actions can be defined:

1. Determination of the content of educational material;

2. Development of technological maps for students;
3. Block studying material;
4. Creation of methodological tools (tasks of the multi-level nature) to prepare for the competition;
5. An oral examination on the subject (the students are divided into homogeneous groups, each group are offered the job corresponding to the level of development of students in the group);
6. Written-off;
7. Diagnosis of learning outcomes.

In the process of teaching students we navigate on the introduction of three standards:

1. compulsory General education (a level which has to reach every student): assimilation of ZUN in the curriculum;
2. advanced training, which is determined by the specified depth of mastery of the content of the teaching subject;
3. training at the level of in-depth study of the subject for those interested, capable students. Learning occurs at the individual maximum level of difficulty.

In conditions of differentiation the student determines the direction of self-realization on the basis of abilities, aptitudes, interests and chooses the educational path that is closest to him. Selection of the level of difficulty is rather fluid and is not forever. Students should be prepared to the self-selection of tasks, teachers should advise which task to choose, but the choice remains with the student. Monitoring and evaluation of students' knowledge are important to ensure that the rating reflects not only the learning but also the learner, i.e. the student has become the subject of educational activities. Let's not forget that the study of each subject in school is not a goal but a means of development of the child. To assess student progress you need to determine how internalized the content: at the level of reproduction of the facts, or variable level (the level of mental operations).

Sample of independent work on the topic: "chemical elements"

Option 1. Includes non-standard tasks of a creative nature.

Using the Periodic system of chemical elements of D. I. Mendeleev, define formulas five of binary compounds. Specify the oxidation state of elements. Give two formulas of substances of each class. Name these substances.

Option 2. Includes standard tasks, but contains elements of complexity.

Make formulas of oxides of nitrogen in which nitrogen exhibits an oxidation state 1,+2,+3,+4,+5.

Distribute substance in classes, write their formulas: iron hydroxide(II) sulphuric acid, magnesium oxide, aluminum chloride, zinc nitrate, sodium hydroxide, calcium oxide, nitric acid.

Option 3. Includes reproductive tasks.

1. Determine the oxidation state of elements in compounds by the formula: Na_2S , CuO , SiH_4 , CO_2 , Ba_3N_2 .

2. Formula dispense substances by grade: K_2O , KCl , NO_2 , HNO_3 , KOH , MgSO_4 , HCl , CuSO_4 , $\text{Ca}(\text{OH})_2$.

The technology of integration of didactic units.

It is used in the study of sections “Metals” and “Nonmetals”. Three programmatic themes “carbon Subgroup”, “Subgroup nitrogen and oxygen Sub-group” unite on the basis of the ideas of parallel structuring and consolidation of didactic units of study. This is possible because, by studying subgroups of the chemical elements, worked out the same structurally – related concepts, with information community.

They are: a chemical element, a simple substance, a volatile hydrogen compound, oxides, hydroxides, and salts. When students examined them separately, children aim at studying the particular, the private properties of chemical elements, simple substances and compounds. Not pay attention to the possibility of parallel consideration. This approach is not systematically applied previously studied theoretical principles for predicting the properties of substances. Students are deprived of the opportunity to acquire generic skills, i.e. to work out the algorithm characteristics of the element and its compounds.

Made up of the following learning topics:

1. Chemistry of nonmetals (installation lecture).

2. Characteristics of the elements nonmetals. The study of their properties in accordance with the periodic system (seminar).

3. Characteristics of simple compounds of non-metals. Their chemical properties. Allotropic modifications. The change of the physical and chemical properties of simple substances-metals in accordance with the position of chemical elements in the periodic system D. I. Mendeleev.

4. Hydrogen compounds of non-metals. Change their properties in the periodic system.

5. Oxides of nonmetals. Change their properties.

6. The hydroxides of nonmetals.

7. Salt. The composition and properties of salts – sulphates, nitrates, phosphates, carbonates, silicates, salts of ammonium.

8. Mineral fertilizer.

9. Preparing for the solution of experimental tasks on the topic (the workshop).

10. Workshop to address design problems.

11. The competition on the theme “Nonmetals”.

This approach to the study of the topic gives the opportunity to establish the relationship between the composition, structure, and properties of substances. Students

can predict them based on knowledge of the theory. You receive the possibility of multiple repetition with the students of the basic material. The conditions for the organization of active independent work of students based on previously studied material, there is the possibility for mutual learning of students in groups, pairs, individual and differentiated learning.

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ӘОЖ 547.1

Ж. ЗАМАНБЕКҚЫЗЫ, З.С. ДАУТОВА, М.Б. АБИЛЕВ

С. Аманжолов атындағы Шығыс Қазақстан мемлекеттік университеті,
Өскемен қ., Қазақстан

Н-ГЛИКОЗИЛАМИНДЕРДІҢ СИНТЕЗДЕУ ӘДІСТЕРІ МЕН ТҮЗІЛУ МЕХАНИЗМДЕРІ

Мақалада N-гликозиламин туындылары жайлы қысқаша мәлімет берілген. Оның синтездеу әдістері анықталып, түзілу механизмдері болжамданған. N-гликозиламиндердің әртүрлі ауруларды емдеуде қолданылу маңыздылығы көрсетілген. Дәрілік препараттар жасаудағы көмірсулардың рөлі анықталды.

Түйін сөздер: көмірсу, N-гликозиламин, конденсация реакциясы, моносахарид, антибиотик.

МЕТОДЫ СИНТЕЗИРОВАНИЯ И МЕХАНИЗМЫ ОБРАЗОВАНИЯ N-ГЛИКОЗИЛАМИНОВ

В статье дана информация об производных N-гликозиламинов. Определены методы синтеза и даны их предположительные механизмы образования. Рассмотрены вопросы использования N-гликозиламинов в лечении разных болезней. Определена роль