APPLICATION OF MODULAR EDUCATIONAL TECHNOLOGIES IN THE PROCESS OF TEACHING CHEMISTRY IN THE SCHOOL EDUCATION SYSTEM

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Abstract. This work discusses the prospects and advantages of using modular teaching technologies in teaching chemistry in the school system. Modular education is a flexible, structured approach in which the educational material is logically divided into complete modules, each of which is aimed at achieving specific educational goals. The work analyzes the features of developing chemistry modules, the principles of their implementation in the educational process, as well as the impact of this approach on the formation of students' cognitive activity, the development of their independence and increasing their motivation to study science. Special attention is paid to the integration of modular technologies with modern digital teaching tools. In addition, the work presents the results of a pedagogical experiment confirming the effectiveness of modular teaching in increasing the level of mastery of chemical knowledge by schoolchildren.

Key words: modular education, chemistry teaching, school education, educational technologies, educational module, activation of cognitive activity, individualization of teaching, digital technologies, teaching methods, educational effectiveness.

Аннотация. В данной работе рассматриваются перспективы и преимущества использования модульных технологий обучения в преподавании химии в школьной системе. Модульное образование – это гибкий, структурированный подход, при котором учебный материал логически делится на полные модули, каждый из которых направлен на достижение

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конкретных образовательных целей. В работе анализируются особенности разработки химических модулей, принципы их внедрения в образовательный процесс, а также влияние такого подхода на формирование познавательной деятельности учащихся, развитие их самостоятельности и повышение мотивации к изучению естественных наук. Особое внимание уделяется интеграции модульных технологий с современными цифровыми средствами обучения. Кроме того, в работе представлены результаты педагогического эксперимента, подтверждающие эффективность модульного обучения в повышении уровня усвоения химических знаний школьниками.

Ключевые слова: модульное образование, преподавание химии, школьное образование, образовательные технологии, образовательный модуль, активизация познавательной деятельности, индивидуализация обучения, цифровые технологии, методы обучения, эффективность обучения.

Annotatsiya. Ushbu maqola maktab tizimida kimyo o'qitishda modulli o'qitish texnologiyalaridan foydalanish istiqbollari va afzalliklarini o'rganadi. Modulli ta'lim - bu moslashuvchan, tuzilgan yondashuv bo'lib, unda o'quv materiallari mantiqan to'liq modullarga bo'linadi, ularning har biri aniq ta'lim maqsadlariga erishishga qaratilgan. Maqolada kimyo modullarining rivojlanishi, ularni o'quv jarayoniga tatbiq etish tamoyillari va ushbu yondashuvning o'quvchilarning kognitiv faolligini rivojlantirishga, ularning mustaqilligini rivojlantirishga va tabiiy fanlarni o'rganishga bo'lgan motivatsiyasini oshirishga ta'siri tahlil qilinadi. Modulli texnologiyalarni zamonaviy raqamli o'quv vositalari bilan integratsiyalashga alohida e'tibor qaratilgan. Bundan tashqari, maqolada maktab o'quvchilari tomonidan kimyo bilimlarini o'zlashtirishni yaxshilashda modulli o'qitishning samaradorligini tasdiqlovchi pedagogik tajriba natijalari keltirilgan.

Kalit so'zlar: modulli ta'lim, kimyo o'qitish, maktab ta'limi, ta'lim texnologiyalari, ta'lim moduli, kognitiv rivojlanish, o'rganishni individuallashtirish, raqamli texnologiyalar, o'qitish usullari, o'rganish samaradorligi.

INTRODUCTION.

Modern education system training material high at the level mastery, students' independence and critical thinking to develop providing innovative approaches current to reach demand does. That 's how effective from methods one modular teaching to be, to study process further flexible and personalization opportunity This is especially true in chemistry. such as complex, theoretical and practical knowledge- rich subjects in learning important importance profession Modular teaching from technologies use school of students knowledge activity to activate, to strengthen knowledge and skills to form, as well as to educate from time to time effective to use help Education standards digitization and update under

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the circumstances this of the subject relevance at school chemical education quality to increase aimed at effective pedagogical solutions find necessity with depends.

Today, the use of innovative technologies in implementing the requirements of the “Law on Education and the National Program for Personnel Training” plays an important role in improving the methodological quality of educational technology in teaching, improving the effectiveness of learning in the educational process, and introducing new methodological elements in this process to prepare a competent generation [1,2].

Modern pedagogical from technologies use , ongoing teaching in the process modern pedagogical technologies application teacher's in class achieving of the results to the efficiency creative approach tree defines [3].

Currently, there is a need to introduce modular technology of teaching, which is one of the modern technologies of teaching. The essence of modular technology of teaching (module - a whole functional network, combining the content and technology of teaching into a single target system) is that the student or student independently or with a little help from the teacher achieves a specific goal in acquiring knowledge in the process of working with the module [4].

Teaching in chemistry lessons based on the modular system involves the teacher's traditional preparation for the lesson, the use of subject-related resources and their logical connection and schematic presentation. In this case, students perceive the topic simply, but this approach does not provide creative development in the student. Currently, teachers working on themselves use innovative pedagogical technologies in education. We have chosen the modular teaching method in our work. This is a new pedagogical technology in education [5].

Thus, the principle of modular learning technology is that students' knowledge level should meet state educational standards and have knowledge that is higher than them.

We present a module of this type in the Toyloq district 5th general education school for 8th grade students on the topic "Generalization of information about the most important classes of inorganic compounds". When conducting this modular lesson, we divided the students into 3 groups of 7 students, each group included students with average and good mastery and 1 strong student. This means that in the process of work, a strong student helps weak students and consolidates their knowledge.

Modular plan:

Summarize information about the most important classes of inorganic compounds.

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Module 0. Complex didactic objectives.
Module 1. Oxides.
Module 2. Fundamentals.
Module 3. acids.
Module 4. Salts.
Module 5. Inorganic compounds classes between genetic connection .
Module 6. Practical training " Experimental" issues "Eat and drink ."
Module 7. Test
Complex didactic goals.
1. Oxides, bases, acids and salts about knowledge to the system to plant and generalization, especially:
a) Given class compounds nomenclature complete to master achieve principle;
b) Every one class compounds every kind classification with acquaintance;
c) To study the physical and chemical properties of oxides, bases, acids, and salts, as well as methods for their preparation, using laboratory experiments;
d) To become familiar with the use of some of the substances of the given class in the national economy, industry, and life.
e) To make sure that there are connections between substances of different classes of inorganic compounds;
2. To develop chemical knowledge, mainly to learn how to formulate chemical formulas for oxides, bases, acids, and salts and to name some representatives, to prove the properties of substances of this class using chemical equations, and to explain the meaning of chemical formulas and equations;
3. Ability to master the techniques of conducting chemical experiments and document the observed results;
4. Learning to evaluate one's own and others' work.
Module 1
Oxides
Module structure .
0. Didactic objectives to determine;
1. and naming of oxides;
2. Oxides classification;
3. Oxides of being taken main methods;
4. Oxides properties;
5. Oxides application;
6. Conclusion;
7. Control;
Didactic goals to determine.

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1. Oxides definition , composition and to be named repetition;
2. Oxides every kind classification with acquaintance;
3. Oxides acquisition methods to determine;
4. Laboratory from experience using oxides physical and chemical properties to study to achieve;
5. Oxides application with acquaintance;

Oxides composition and naming.

Partially didactic goals:

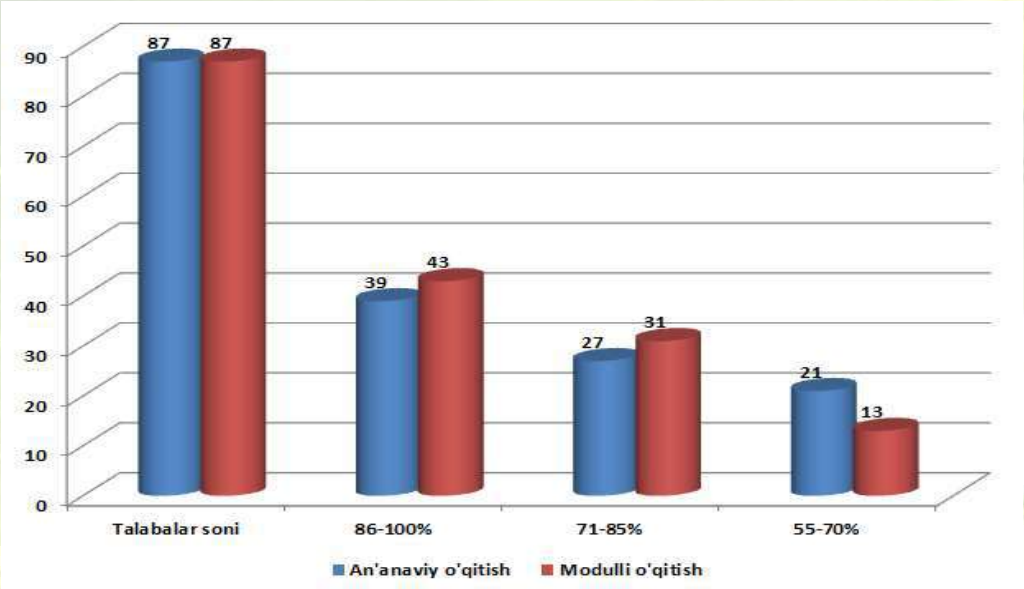
1. Oxides to determine repetition;
2. Oxides formula to compose to remember;
3. Oxides naming according to knowledge reinforcement;

The use of modular teaching technology in teaching chemistry increases the effectiveness of the lesson. It increases students' interest in science, encourages them to work more independently, use their time more efficiently, think, and draw conclusions based on the results of the work done. It allows you to self-monitor, assess your knowledge and skills, and determine the level of knowledge you have mastered.

Table-1

Traditional teaching results							Modular teaching results				
Group	Students number	Ratings			Quality indicator %	% of adoption	Ratings			Quality as shown %	% of adoption
		5	**4**	**3**			**5**	**4**	**3**		
8A	29	9	12	8	72.4	100	10	14	5	82.7	100
8B	26	21	3	2	92	100	22	3	1	96	100
9A	32	9	12	11	65	100	11	14	7	78	100

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Picture-1

The results of the analysis of the mastery of students in grade 5 of the Toylak district of the Samarkand region showed that the use of modular technology in teaching increases the effectiveness of the lesson. For example, in grade 8B, the quality indicator when using traditional educational technology is 72.4%, while when using modular technology, the quality indicator is 82.7%, or in general, it can be observed that the number of students who study for grades “5” and “4” has increased, which means that the use of modular technology in teaching chemistry significantly increases the effectiveness of the lesson compared to traditional teaching technology. This technology reduces the sequence of students' activities and increases the mastery of the material given to them based on their individual abilities to 100%, and its effectiveness reaches 87%.

CONCLUSION

So school in the system chemistry in teaching modular teaching from technologies use training material systematization, practical direction reinforcement and training process individualization through education quality to increase help gives. Modular approach to students stable knowledge formation, independent work, critical thinking and research activity skills develop opportunity Chemistry in teaching modular of technology current to be to study further flexible, adaptable and to the result directed does. Analysis and pedagogical practice results modular teaching school of students motivation to increase and training achievements to improve help to give confirms that and modern education modernization to do under the circumstances this approach current and promising will reach. Furthermore, we can say that the use of modular technology shortens students' adaptation to the university curriculum, improves academic performance, and enhances theoretical learning. Modular learning is an effective and flexible

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approach to studying chemistry, allowing students to better understand and retain material, learn at their own pace, and increase motivation.

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