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Formation of Independent Work Skills for the Purpose of Preparing School Students for Credit-Module Education

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Annotation: In this article, the credit-module-based teaching system, in general, education schools, the President of the Republic of Uzbekistan dated August 12, 2020 "On measures to improve the quality of continuous education and the effectiveness of science in the fields of chemistry and biology" No. PQ-4805 the decision and the works carried out within the framework of this decision are discussed.

Also, methods of developing students' independent work skills in chemistry classes in secondary schools are highlighted. The main goal of using chemical teaching manuals and other auxiliary tools, and information technologies in the lesson processes to organize independent work methods for schoolchildren is to achieve a new quality in education, to make the educational process methodical with the help of modern, mainly interactive, educational tools and forms. provision, as well as the creative activity of schoolchildren, and methods of development of independent work skills were discussed.

Keywords: Credit-module system, lesson efficiency, independent work, individuality, higher education, reactive, short time, skills, interactive educational guide, glossary, Boyle-Mariot law, Gay-Lussac law, pressure, volume, temperature, laboratory, virtual, information technology, impossible, modeling, creative activity.

Today, the rapid development of science and technology leads to great changes in all aspects, including human life. As a result of this, it is natural to observe the rupture of traditions, values, and principles that have been formed for many years. According to the scientific research carried out by experts of international organizations and influential scientists, the only way to eliminate and prevent the problems that exist now and are likely to arise in the near future is the knowledge, skills, qualifications, acquired experience, educational process, etc., is to effectively combine scientific research with the development of science and technology. This, in turn, places new tasks directly before educational institutions in the world, in particular, in our country.

The effectiveness of the educational process and scientific research in the educational system is directly ensured by the infrastructure aimed at the formation of the student's needs, the level of professors and teachers, the content of the educational literature used in practice, and the independent learning skills of the students. Therefore, the training of advanced pedagogues and scientific personnel, ensuring their competitiveness in accordance with the requirements of the world labor market, and training of independent and creative thinking specialists is closely related to the system based on which educational process is implemented in educational institutions [1].

It is known that on October 8, 2019, the Presidential Decree "On approval of the concept of development of the higher education system of the Republic of Uzbekistan until 2030" was signed. Relying on the experiences of advanced countries in the world, it was shown that by 2030, 85 percent of all higher education institutions in our republic, including 33 higher education institutions in the 2020/2021 academic year, will be transferred to the credit-module system.

It is known that the module is a part of the curriculum in which several subjects and courses are studied, and it is a set of several subjects (courses) aimed at students having the potential to develop certain knowledge and skills, to conduct the analytical and logical observation. In this, the teacher organizes the educational process, gives live, video, and audio lectures, and coordinates

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and monitors the student's activities. The student learns the subject independently and completes the assignments.

Today, four models of credit measurement system implementation are common.

These are the United States Credit System (USCS); Credit system of European countries (ECTS); Asia-Pacific Credit System (UCTS); UK Credit System (CATS). The most common of these models are US and European models. According to information, the Ministry of Higher and Secondary Special Education of our country is paying more attention to the use of the European ECTS system in the implementation of the credit system.

It is known that until recent years, the attention of professors and teachers of higher education institutions in our republic was mainly focused on searching for information, mastering it, and distributing it to students after initial processing due to the limited access to various international databases and their use. In other words, teachers were just subjects of receiving and transmitting the information. In this case, the student, as an object of the educational process, acted as a receiver of information and spent most of his time listening to lectures in the auditorium. To date, due to the acceleration of full enjoyment of the world of information, the expansion of opportunities to use international scientific and technical databases, and the acceleration of globalization processes compared to the previous ones, the issue of developing independent education of students has been raised on the agenda [2].

All information about the field of education and specialties in all HEIs of developed foreign countries, in particular, a brief identification of the subjects reflected in the curriculum, information about the professor-teacher, lesson description, the purpose of the subject, learning outcomes, teaching methodology, subject plans, literature, evaluation methodology (syllabus), professors and teachers who conduct classes in the field of science and their achievements, the brief requirements of the modern labor market, i.e. what kind of theoretical, practical knowledge, skills and professional qualifications they should have, are publicly available on the official website of the universities. will be announced. Applicants also struggle to find this information on university websites. The time to form a culture in this regard has already arrived.

Preliminary steps are being taken to abandon the negative aspects of the traditional education system and to organize work within the requirements of international standards.

Students studying in higher educational institutions form independent work skills and continue their work as teachers in general schools as pedagogues in the future.

Another important aspect of the transition to the credit-module system is that it increases the commitment and demand for professors and teachers of higher education institutions.

The work carried out in higher education institutions is certainly noteworthy, but since the credit-module system is aimed at ensuring the professional development and maturity of students by ensuring independent work, the process should be focused, first of all, on the formation of independent learning skills of students in general secondary schools. it would be important to start.

At this point, it should be noted that the decision of the President of the Republic of Uzbekistan dated August 12, 2020, No. PQ4805 "On measures to increase the quality of continuous education and the effectiveness of science in the fields of chemistry and biology" is a timely decision [3]. After the adoption of this decision, according to the order of the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan No. 87-02-664 of December 2, 2020, in order to improve the quality of education and the professional skills of teachers in general education schools, and to provide methodical support to the higher education of the republic Backward schools were attached to educational institutions. According to the order of the Minister of Higher and Secondary Special Education of the Republic of Uzbekistan dated September 8, 2021 No. 383, university Olympiads were organized for graduates of general education schools in Uzbekistan, and recommendations were made for students from each region to study chemistry. In addition, based on the joint decision of the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan and the Ministry of Public Education dated March 1, 2022, a "Mobile Methodological Group" was established at higher education institutions in the field of sciences.

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We know that each student's activity in the educational process is unique, and one does not repeat the other. Therefore, it is certainly inappropriate to evaluate their potential, talent, and behavior in the process of education in the same way, to see them in the same position. There is also a big difference in studstudent'slity to do independent work in class and outside of class, thinking, and potential. Organization of students' independent work, first of all, preparation for it is created by the teacher in such ways as problem-based presentation of materials. In this case, the following types of tasks can be regularly recommended: learning the material based on the textbook, sample independent exercises, new types of tasks, and creative works.

Independent educational work means any active activity of students, such as searching for new knowledge, understanding, strengthening, forming and developing skills and competencies, summarizing and systematizing knowledge, organized by the teacher to fulfill the didactic goal set in a specially allocated time. As a didactic phenomenon, the independent work of students is, on the one hand, an educational task for him, because by performing it, the student must definitely achieve some result, on the other hand, due to the implementation of the relevant activity, the student's memory is strengthened while performing the educational task, and his free and creative thinking increases. as a result, it leads to a completely new knowledge of the student.

It is today's demand that chemistry teachers at school always organize independent work with students as much as possible. Therefore, it is necessary for chemistry teachers to guide students' independent work and provide them with continuous materials. It is rare to find a new approach to the organization of students' independent work in chemistry in general secondary schools. Because of this, schoolchildren are not thoroughly taught the methods of independent work, and there are not enough educational and methodological manuals for chemistry and other auxiliary tools to organize independent work of students.

The independent work system develops in students individuality, logical thinking, and the desire to learn in the future. Systematic assimilation of knowledge by students develops psychological attitude and skills of acting in scientific and mass information flow while solving new tasks. Independent work plays an important role in the formation and development of educational skills, increasing the will and cognitive interests. It shows the individuality of each student, their intelligence and character are formed. All this allows acquiring knowledge at a deep and powerful level.

In many cases, the same type of work allows you to solve several problems at the same time. For example, when students independently study new material, read a textbook or perform laboratory experiments, along with the perception of new knowledge, their existing knowledge is improved, the results are self-checked, and in some cases, this is usually done in the form of a test. For example, in the 8th grade, when studying the genetic bonds between inorganic substances, students can be given the following task when studying a new material: using the appropriate reagents, write down the necessary reagents and the equations of the reactions that take place to obtain calcium oxide and calcium hydroxide from it on the basis of calcium.

Observing the activity of students is useful in determining the extent to which they have mastered the subject and the level of understanding of its content. For example, in an 8th-grade grade chemistry lesson, the teacher can determine the extent to which students have mastered the topic of neutralization reaction and the level of understanding of its content by observing the progress of the reaction between an acid and a base through the change in the color of the indicator.

Conducting experiments in chemistry provides students with new concepts, abilities and skills, as well as a way to check the validity of their acquired knowledge, as it helps to deepen the understanding of theoretical materials and master new knowledge and skills [4].

Laboratory experiments conducted by students are more complex than other forms of their independent work, so it is considered that students spend more time and effort in using it. Because it is always about observation. The student should understand why he is doing the experiment and what he needs to do to solve the problem. The student analyzes the work to be done independently and draws a conclusion based on the relevant theoretical concept. Students will write a report

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immediately after completing the experiment. He learns to form thoughts briefly and clearly, and to write correctly. They record their observations in special notebooks.

Improving the effectiveness of the lesson is the main task of the teacher. Its successful implementation largely depends on the teaching methodology that allows students to be armed with deep and powerful knowledge and to be taught to work independently. Due to the insufficient formation of organizational skills, students are not always able to plan their work independently, organize their work rationally, and exercise self-control. Such skills should be organized by the teacher using the independent work of students.

Wide use of students' independent work in the lesson allows to successfully solve many educational tasks: increasing students' awareness and ability to acquire knowledge; formation of skills and habits required by the curriculum; teaching ways to apply acquired knowledge and skills in life, socially useful work, developing students' cognitive ability, observation, curiosity, logical thinking, creative activity in the process of knowledge acquisition; forming mental and physical work culture in them, teaching them to work independently, efficiently and with interest.

Independent activity increases engagement, and teaching free-flowing learners to work independently ultimately pays off. Independent activity makes a person alert and responsive. This activity should develop harmoniously among schoolchildren. For this, first of all, it is necessary to mentally prepare students for independent activities, to make sure that they can do something and do it well [5].

Today, the methods of independent work organized in general secondary schools do not correspond to the credit module system currently established in higher education institutions. In most cases, students' independent learning concepts in general education schools are limited to the problems and exercises given in the textbook. This is not enough for students of our modern higher education institutions.

In the school chemistry course, students' knowledge and skills increase if special pictorial and dictionary style manuals are used for students' independent learning. This is because the chemical concept, terms, laboratory equipment and processes are illustrated in the methodical manual. These descriptions are presented with pictures, which, in turn, allows schoolchildren to understand the given term by reading and seeing it. For example, using the Boyle-Mariot law, it is possible to estimate the volume of a gas after changing its pressure.

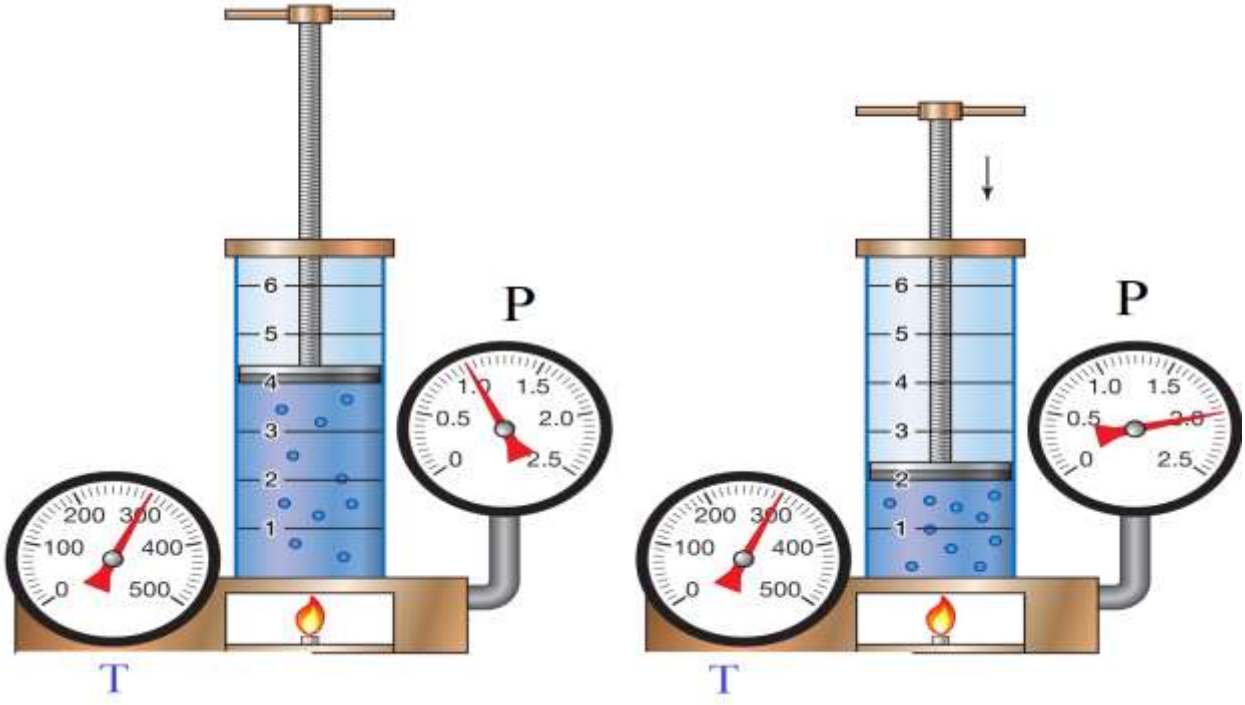

Figure 1. A method of estimating the volume of a gas after changing its pressure (T-temperature; P-pressure.)

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Gay-Lussac's law - the change in gas volume at constant pressure is directly proportional to temperature, that is, VT = const, where T is the temperature, K (Kelvin). For example, 1 volume of hydrogen combines with 1 volume of chlorine to form 2 volumes of hydrogen chloride: $H_2 + Cl_2 = 2HC1$, 1 volume of nitrogen combines with 3 volumes of hydrogen to form 2 volumes of ammonia:

$N_2 + 3H_2 = 2NH_3$ [5].

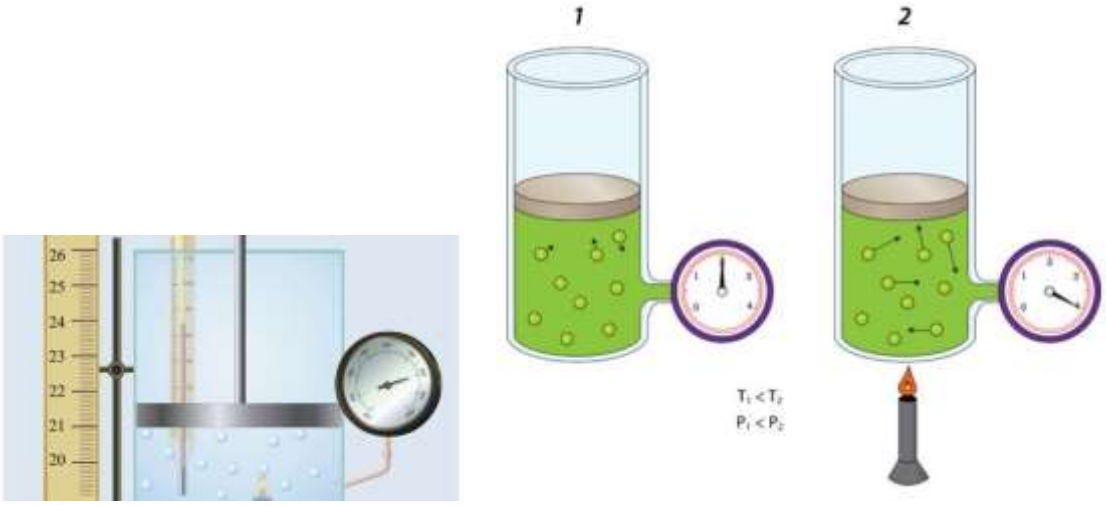

Figure 2. Gay-Lussac's law. Change in pressure at constant volume

It is natural that any student who has studied independently from the methodical guide with pictures and explanations of terms will increase his interest in chemistry and have a clear idea about the subject. It is clear that if students use an interactive study guide for chemistry based on 3D technologies, their knowledge and skills in chemistry will increase. Because today the use of modern information technologies does not cause difficulties for students.

In addition, general school students can see chemical reactions even in the absence of chemical reagents, i.e., their interest in chemistry will increase if they use the educational methodical manual, which includes non-standard laboratory works.

The introduction of such methodical manuals into general education schools will improve the effectiveness of the educational process and scientific research in the educational system, first of all, the needs of students, the level of teachers, the content of the educational literature used in practice, and the students' in-class and extra-curricular activities. directly provides the infrastructure aimed at the formation of independent education.

It is difficult to imagine chemistry without chemical experiments. It takes a lot of time and high technology to do chemical experiments with students all the time. Conducting chemical experiments on a virtual bench is very effective in order to save time and use chemical reagent resources wisely. That is, for general education students, tasks such as explaining new material, conducting experiments with toxic chemicals, using rare and expensive reagents in desired quantities, strengthening the studied topic, and drawing conclusions from the results of experiments are complete and short. they will be able to understand in time.

The advantage of performing laboratory experiments in computer programs for students of general secondary education is that they will have the opportunity to conduct laboratory experiments in a computer program without test tubes and chemicals. For example, in performing the laboratory experiment presented in Figure 3, very little time is required for the experiment, there is a need to observe the technical safety rules for the reaction of potassium metal with chlorine. In addition, in order to carry out the experiment of exposure of sodium metal to iodine, the technique of working in the laboratory must be very high. These chemical experiments and changes can be observed in a short time and conclusions can be drawn.

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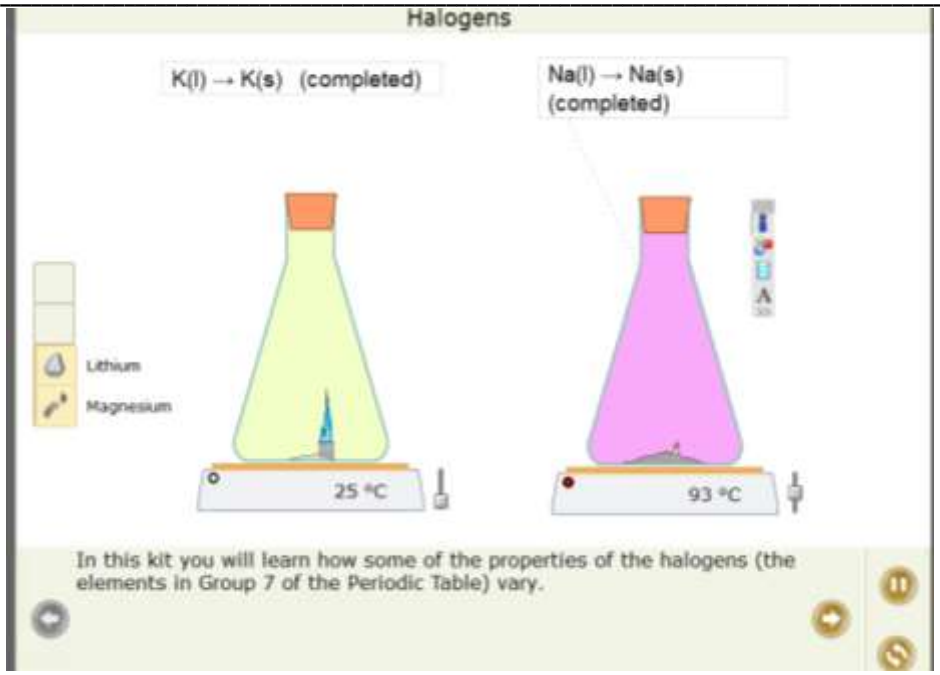

Figure 3. Reaction of alkali metals with halogens in virtual method.

Conducting lessons using computer programs in the educational process helps to achieve the following achievements: making the lesson more interesting and demonstrative; involve all students in the learning process; the need to purchase expensive equipment and jets disappears; the possibility of modeling experiments that are impossible to conduct in laboratory conditions; observing the experience in a short period of time; chemical laboratory safety; provides opportunities to use the virtual laboratory in independent and distance education.

The main purpose of using information technologies in the teaching process is to achieve a new quality in education, to provide the educational process methodically with the help of modern, mainly interactive, educational tools and forms, as well as to increase the independent learning skills and creative activity of schoolchildren. it helps a lot.

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