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USE OF SCIENCE INTEGRATION IN TEACHING CHEMISTRY (IN HIGHER EDUCATION)

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Abstract: This article discusses the use of science integration in the teaching of chemistry. In modern conditions, integration is taking on a new dimension. Its importance stems from the new requirements for education, the social order of society. Integration is necessary for a modern education system.

Keywords: chemistry, science integration, education, inorganic chemistry, pedagogical technology, problem-based learning, interactive education, module-credit system, distance learning.

Introduction

From the first days of independence, our state has been pursuing a state policy aimed at forming a new generation of highly qualified personnel. One of the main tasks in this direction is the creation of a new education system, which will be the basis for the development of independent Uzbekistan. At the same time, as in all times, the issue of increasing the effectiveness of education in the training of highly qualified personnel remains important today. To do this, it is necessary to choose the most effective model of education, to organize it, to find optimal ways to use it.

In modern conditions, it is advisable to use innovative forms of education in order to strengthen the learning activities of students, improve the quality and effectiveness of teaching. Today, practical games, problem-based learning, interactive learning, modular-credit system, distance learning, blended learning and master classes are recognized as innovative forms of education. We are talking about these innovative forms of education.[5]

The use of modern and information technologies in the education system, the formation and development of independent thinking and learning skills of our children is one of the urgent tasks facing the education sector. The use of modern pedagogical technologies plays an important role in the thorough and effective mastering of chemistry in all subjects. Students' understanding of the content of the given topics is carried out with the help of teaching methods in the acquisition of evidence-based information on the chemical concepts, laws, examples of certain substances reflected in it. The use of modern pedagogical technologies in chemistry education today is very effective in ensuring that all this is at the required level. In particular, the use of modern pedagogical technologies in the teaching of inorganic chemistry increases the level of comprehensibility of the lesson for students. As a result, the educational potential of students is growing.[9]

Main part

Today, our country pays a lot of attention to the natural sciences, including chemistry. There is a great demand and attention to pedagogical technologies in the world community. The reason is that the formation of the creative ability of the student is one of the most important aspects of today, the need for a

perfect mastery of the sciences in the development of the abilities that he has.

In modern conditions, integration is taking on a new dimension. Its importance stems from the new requirements for education, the social order of society. Integration is necessary for a modern education system. Modernization of education requires the use of non-traditional methods and forms of organization of education, including integrated methods, as a result of which students have a holistic view of the world, and this is a very important approach to education. It is impossible to rely on explanatory, descriptive and reproductive methods, which are widespread in teaching practice alone. Integration should be considered not only in terms of the interdependence of disciplines, but also as the integration of technology, teaching methods and forms. Pedagogical activity is a mixture of norm and creativity, science and art. Therefore, it is very important to combine the different methods of existing educational activities, the right combination. Success depends on it and therefore on the results of training.

An integrated lesson is one of the innovations of modern methods, which is one of the ways to connect educational programs and thus strengthen the connection of knowledge with the real needs of life. It is impossible to study any topic without establishing a connection with the teaching materials of different disciplines. For chemistry, these are the subjects of the natural sciences cycle: biology, geography, physics, ecology, life safety, and so on. The content of the chemistry course and the integration of other science materials will allow you to effectively solve the problems of teaching science in education. Integrated lessons have many advantages because they not only solve general learning tasks that allow students to form a holistic view of the world. The use of different technologies, methods and forms in integrated lessons allows us to solve another important problem in our education - the method of health education.[2]

An integrated lesson has a psychological advantage: it arouses interest in the subject, relieves tension, insecurity, helps to consciously master the details, facts, details, and thus ensures the formation of students' creative abilities, because it is not only educational, but also allows for research activities.

Today's demand is that the education of the younger generation should meet the requirements of the development of creative forces, the innovations of science and technology. Young professionals graduating from educational institutions should be ready to master not only the existing techniques and technologies, but also the high technologies that will be created in the future in the short term. This is evidenced by the fact that after the independence of our country, rapidly developing automotive, mining, oil and gas, chemical and light industries, the rapid introduction of the most advanced technologies.[7]

The establishment of a modern education system is closely linked with the introduction of information technology in the educational process. This is especially true of new forms and means of teaching based on information and telecommunication technologies. These include e-learning, which requires the active use of e-learning tools. Therefore, today it is important not only to teach future teachers the use of ready-made electronic manuals, but also to teach them the methods, ways and means of creating new forms.

Further improvement of continuing education is being carried out in our country and abroad. The use of information and communication technologies is seen as a force that develops an innovative approach to the organization of teaching and modernizes the

entire educational process. To date, not enough work has been done in Uzbek on the use of electronic manuals. Some electronic versions also have less animation and more text. The subject matter is often illustrated.

Literature review

Developing students' imagination is important in teaching chemistry. Issues related to the use of information technology in education have been studied by U.Yuldashev, R.Bakiev, F.Zakirova and others. There is very little work on the use of computer tools to increase the effectiveness of chemistry teaching, and the available resources do not adequately explain the potential of information technology in the educational process. There is very little research on the effectiveness of the use of information and communication tools in the study of chemistry. The available resources do not fully explain the possibilities of the educational process. No programs have been developed to transfer the chemistry course, in particular the “Periodic Law and Periodic Table” section of chemical elements, to new technologies using computer technology. There are a number of articles and websites on teaching chemistry using e-textbooks and e-textbooks on the subject in general. In this regard, P.A.Freshney's "Education Periodic Table" electronic manual created abroad contains a periodic table of chemical elements in electronic form, when and by whom each chemical element was discovered, their appearance in nature, their compounds, properties, world The location of the elements on the map allows to obtain complete information about the moving state of the spatial structure of the element atoms. There is an electronic manual of G.Umonkulov "Periodic system of chemical elements Mendeleev" in teaching chemistry in our country.[1]

Research Methodology

Integration is the deepening and enhancement of interdisciplinary knowledge (integrative knowledge), their formation. It is based on different types, methods, techniques, objects of interdisciplinary integration. Teaching newcomers to interdisciplinary and interdisciplinary disciplines is a fun and engaging process.

Analysis and results

The division of integration into groups can be done on different bases. For example:

a) based on goals and challenges

b) on the basis of its functions in the natural-scientific system of higher education

c) on the basis of the connected science branches

d) on the basis of methods and ways of integration

e) based on its place in the curriculum

f) based on the time spent studying the lesson:

g) based on the level of difficulty for students, etc.

It is important to note that teachers who have programmed such foundations often set themselves multiple goals and problem-solving tasks, so the teaching process is multi-purpose, multi-tasking.[3]

Considering the large number of programs and their attempts to implement them, we can distinguish the main directions of the construction of lessons in higher education and divide them into groups according to their nature. The classification of integrative education is as follows:

1. Integration of many disciplines. They can also be called universal or substitute for several basic system classes. For example, chemistry, biology, ecology, combining lessons into one general lesson.

Typically, the authors of such lessons combine natural science materials into a specific system and call their lessons integrative or complex (general). It is obvious that the correct sequence in the delivery of natural science materials in the education system can be achieved only by maintaining the structure of lessons. Some eminent scholars point out that this is also being addressed in traditional education through the sequential study of the natural sciences. A number of scholars believe that the tradition of separate teaching is widespread. To eliminate and simplify the systematic continuation of science teaching, many authors offer generalized lessons for the humanities classes. These include elementary science lessons, which provide an overview, serve to arouse students' interest in learning the natural sciences, and tell an interesting story about chemistry.[6]

2. Lessons based on border sciences. The process of broad integration leads to the formation of new natural sciences and scientific directions that link previous scientific directions. Following the study of chemistry in the groups, it is seen that the subjects of chemistry in biology, ecology, materials science (working with natural materials) are included. Close-knit sciences include molecular biology, biophysics, geophysics, biochemistry, astrophysics, and astrochemistry. On the basis of these disciplines the integrative natural sciences of higher education are formed.

3. Lessons based on basic subjects. It is based on the basic sciences that cover each section of modern knowledge. These include pedagogy, pedagogical technology, pedagogical psychology, human age psychology, pedagogical psychology studying the process of science development, studying the dependence of science on other human life processes: cybernetics-management, communication and information processing: the structure and properties of information the application of synergetics, which studies the relationship of systems, which is a scientific direction in the various processes of human life, informatics, which studies the role of personality in the formation of personality. The content of integrative lessons in this group is based on the meaning and structure of these subjects.[4]

4. Lessons based on general scientific concepts, laws, theories. The idea of creating integrative lessons on this basis gave good results. Concepts with a high degree of generality were widely used among the authors: "matter", "motion", "matter", "field", "energy" and others. Among the laws was the law of conservation of productive nature, the development of people due to labor activity, a sensitive view of nature.[7]

All of the above topics have an integrative content and great potential for implementation, unfortunately, such lessons are not yet widespread due to the complexity of the material and teaching methods used in higher education activities. In addition, today there are many attempts to implement integrative lessons on the basis of various local (local) and global (global) problems. It uses a combination of natural sciences based on problems. Integrative lessons in this group (mainly chemistry) are widespread in the work of educational institutions. The development of global education has also contributed to the development of problem-based integrated lessons. Proponents of this trend have argued that the development of the modern person today is strongly influenced by the global factor, which arises from the integral interdependence of the economy, science, politics, spirituality of countries and nations. The results of tests on the mastery of natural sciences show that Uzbek students, although learning more than foreign students, lag far behind in its application.[8]

Conclusion

Many believe that the reason for this is that the basic skills are not adapted. What is the reason? Maybe one of them is that for many years there has been no focus on integrative lessons in traditional education?

In short, the faster interdisciplinary integration enters higher education, the faster students will be able to combine theory and practice.

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