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THE METHODOLOGY OF ORGANIZING INTERDISCIPLINARY RELATIONSHIPS IN THE DEVELOPMENT OF STUDENTS' COMPETENCES REGARDING EXACT AND NATURAL SCIENCES

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ABSTRACT:
This article provides information on the method of organizing interdisciplinary communication in the development of students' competences related to concrete and natural sciences of general secondary schools.

Keywords: exact sciences, natural sciences, interdisciplinarity, science-related competencies, physics, mathematics, chemistry, biology, practical competencies.

INTRODUCTION

Decree of the President of the Republic of Uzbekistan dated January 28, 2022 No. DP-60 "On the Development Strategy of New Uzbekistan for 2022-2026", Decree of the President of the Republic of Uzbekistan dated February 7, 2017 "Uzbekistan On the Strategy of Actions for Further Development of the Republic of Uzbekistan" Decree No. DP-4947, No. Decree of the President of the Republic of Uzbekistan dated March 19, 2021 "Measures to improve the quality of education in the field of physics and develop scientific research This article serves to a certain extent in the implementation of the tasks defined in the decisions DP-5032 and other regulatory legal documents related to this activity.

MATERIAL AND METHODS

In the process of teaching, consistent study and analysis of the content and essence of interdisciplinary relations forms philosophical, psychological and pedagogical approaches to the problem. In the implementation of the main tasks of teaching, it performs the functions of formation and development of interdisciplinary links - methodological, constructive, psychological and didactic. According to researchers, the methodological functions of interdisciplinary connections are to ensure diversity and unity of processes and phenomena studied by different disciplines. Therefore,

interdisciplinary connections are a generalized form of relations between the structural elements of academic subjects.

The integrity of interdisciplinary links-methodological, constructive, psychological-didactic formation and development functions-effectively organizes the process of teaching academic subjects and opens a didactic direction to its content structure.

Specific features of interdisciplinary connections in general secondary education often depend on the following situations:

the need to use didactic high levels of interdisciplinary connections;

internal and external types of interdisciplinary connections and their professional orientation;

specific features of organizational forms in the application of interdisciplinary connections.

One of the methodological aspects of the development of students' scientific competences is to combine the interdisciplinary connections of the invariant and variable components of physical problems with professional-technical and specialized sciences at the level of didactic integration in a dialectical unity. Based on the above-mentioned ideas, such opportunities require the development of methods and ways of interdisciplinary didactic integration and synthesis.

It serves students of exact and natural sciences in general secondary educational institutions to be able to form practical professional qualifications and skills and use them in their future professional activities. Looking at the connections between these subjects as general, special and a single category, they should be consistently reflected in the educational process. There are potential opportunities to create and solve interesting problems for students in practical training. These will give significant positive results in establishing and implementing connections between disciplines. From this point of view, it is appropriate to study the psychological and pedagogical aspects of creating and solving problems of general technical content for practical training in all departments of physics.

RESULTS

It is necessary to emphasize the fundamental foundations of science in the interdisciplinary teaching of exact and natural sciences in general secondary schools. In our opinion, fundamentalization is not a collection of pragmatic, narrowly specialized knowledge, but an educational system and structure that combines methodologically important, invariant core knowledge that helps to perceive the world as a whole. Fundamental education should be integrated.

The integrity of fundamental education should be considered as three different levels: the first - the highest level - the integrity of the components of all fundamental education is the core and ultimate goal of the new educational paradigm;

the second level is the integrity of general natural-scientific education, i.e. a set of natural-scientific sciences representing a single system of interdisciplinary relations

in terms of methodological essence to a common purpose, an object of study; the third level is the integrity of a specific science.

Since the theory of activity has a dominant position in the field of education, it is appropriate to increase the scope of practical and independent work of students. However, the goal of transitioning to a new educational paradigm is not simply to increase the number of class hours or subjects, but to form a person's general secondary education level competence, erudition, knowledge level and professional qualification that meet modern requirements.

The ratio of fundamental components of natural-scientific and technical sciences and multivariate components of professional orientation regulates the relationship between general and specific features of education, individual development of a person and his specific professional development. determines the dialectical relationship between.

From this point of view, scientists have proposed two main classifications of interdisciplinary connections: according to knowledge and form of activity. In the first, students acquire a generalized system of knowledge, in the second - the types of activities common to various subjects are determined. It is necessary to pay special attention to the knowledge of general methods of educational activity. Activities can be distinguished by different characteristics, for example: according to their form, time or method of implementation. However, one activity is distinguished from another mainly by their objectivity.

The role of interdisciplinary connections in the development of students' cognitive abilities is incomparable. In this case, the level of development of the student's learning skills is divided depending on their learning ability and learning activity. Learning skills depend on learning methods. If the method is rational, knowledge is absorbed intensively. Therefore, it is important to have skills and competences of a generalized nature, that is, they have a widely transferable nature. Interdisciplinary connections play an important role in solving these problems, they provide continuity in the formation of common learning skills and common concepts.

It is based on psychological information about the types of the main direction of movement and the structure of movement. In psychology, there are three types of direction of action and three types of learning corresponding to it: 1) trial and error methods in problem solving; 2) to understand the methods and methods of solving problems; 3) the activity of researching the learning process.

The basis of the first type of direction is that only examples of actions and their products are shown without showing their execution. Tasks are completed, but actions remain unstable.

The basis of the second type of direction is the instructions for the correct execution of actions to solve a new problem. In this case, the task is completed quickly, the formation of stability of actions to the change of conditions, and the transfer of skills

to the new task is carried out, although there is a limitation of elements similar to the previously performed task in the composition of the new task.

The main distinguishing feature of the third type of direction is that through a complete study of the problem-solving process, points of reference for the correct completion of new tasks are indicated and a plan execution of the analysis is offered. In this, the students create an approximate basis for their actions and follow it. In this case, teaching is more difficult and takes a lot of time, but the movement formed in it will have a large-scale character.

DISCUSSION

The scientific level of the content of the subjects of the general secondary education system and the increase in the amount of information, as well as the modern requirements for the development of the practical competencies of the students, make the educational process comprehensive, including the pedagogical-psychological and didactic aspects of interdisciplinary communication. requires extensive and in-depth research.

Three didactic concepts stand out in pedagogical literature and they are unifying processes - interdisciplinary connections; performs the tasks of interaction of internal science elements and didactic integration of sciences.

The independence and relative independence of these concepts are illustrated by the non-intersecting parts of the circles. The size and arrangement of Euler's circles indicate how important these concepts are in the pedagogical result. Many didacticians agreed on the following: integration is a concept that does not replace the concepts of interconnection and interdisciplinarity, but indicates a specific value of the density of these concepts, the stage of development and completion.

Often, various methodological and didactic categories are used as ways and means of applying interdisciplinarity in practice. Solving problems using the content of separate classes and scientific knowledge, the same methodological directions. Graduates of general secondary educational institutions are required to have a deep knowledge of the scientific basis of the principles of operation of various equipment used during their future professional activities. The extreme complexity of modern devices raises the special place and importance of general secondary education to a higher level.

On the example of natural scientific and technical sciences, the main rules of the conceptual model of interdisciplinarity were developed, which are as follows:

1. The form of interdisciplinary connections between natural scientific and technical sciences, educational modeling of laws that are combined with each other, creation of ideal technical models of technical devices, experimental devices, laboratory-demonstration equipment and the characteristics of specific educational tasks taking into account the transformation of ideal models into material models.

2. Study tasks and study-research tasks and modeling of combined laws are generalized methods of educational activities, they are a means of forming the system

of interdisciplinary knowledge. In this case, the center of gravity is transferred to the acquisition of scientific knowledge, the methods of implementation of appropriate educational tasks.

3. Interdisciplinary connections between natural scientific and technical sciences are the content of didactically processed relationships of integrative knowledge.

4. It is an invariant of the polytechnic and ecological knowledge systems, where interdisciplinary connections are formed based on the knowledge of basic physical and technical laws. Learning ability to transfer natural-scientific knowledge to technical sciences and conversely technical knowledge to problems of natural-scientific sciences, competences and skills of integrative mastering of natural and scientific laws in order to solve problems in the process of student activity, content of vocational training and polytechnic is the basis for the formation of culture.

5. The result of establishing interdisciplinary links between natural scientific and technical sciences is the formation of theoretical thinking, polytechnic culture, professional knowledge, skills and abilities in a comprehensively developed person.

Binary relations can be used in the study of natural and scientific sciences. Physics lessons activate knowledge of mathematics and chemistry, and mathematics lessons require the use of physical concepts and quantities, for example, in learning specific applications of derivatives or integrals. As a result, within the framework of natural scientific subjects, knowledge absorption skills, skills and abilities are formed. The science of physics helps to study general professional and specialized military-special sciences, therefore it provides basic knowledge and creates a methodological basis for studying these sciences.

CONCLUSION

Thus, the problem of interdisciplinarity is a complex pedagogical phenomenon, which reflects the integral and mutual unity of educational, educational and developmental functions in the teaching process. Therefore, their implementation in the educational process has a complex character. In our research, we used a systematic approach to selecting the optimal content of teaching, methods, forms and tools for studying physics, chemistry, biology and mathematics lessons, including the interdisciplinary relations of physics. In the educational process, interdisciplinary relations ensure the scientificity of teaching, strengthen the learning and learning activities of students. In addition, it increases the quality of their knowledge, it is manifested as a didactic principle in the formation of modern methods and technologies of professional and technical thinking and the scientific-physical outlook.

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