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DIDACTIC-PSYCHOLOGICAL FOUNDATIONS OF THE INTERDISCIPLINARY CONNECTION OF NATURAL-MATHEMATICAL CYCLE SCIENCES IN THE TRAINING OF FUTURE TEACHERS

Yusupova N.V.
Kokand State Pedagogical Institute,
Doctor of philosophy in Pedagogical Sciences (PhD) associate professor,

Roziqlova M. A.
Master Kokand State Pedagogical Institute

ANNOTATION
In didactics, the content essence of the three main types (content-informational, operational-functional and organizational-methodological), which are considered the objective basis for the division of interdisciplinary connections into classes, is covered.The types of inter-system and interdisciplinary Association and their significance as well as their role in the formation of interdisciplinary connections in students and students are discussed.

Keywords: content-information, operational-activity, organizational-methodical, didactic tikhim, psychologist-pedagogue, dialectical, ideological, constructive-technical, experimental, episodic, associative, reproductivity, conditional reflectors.

Pedagogical higher educational institutions are considered the main channel for the formation of future teachers in the field of education and are considered one of the most pressing problems of the development of modern science and technology. The educational goals solved by pedagogical universities play the greatest role in the qualitative training of future teachers for the educational system and provide for the effective use of modern scientific potential, a systematic approach to their preparation.

At this point, the idea of a systemic approach is fully justified, since ignoring the existing objective connections between nature and various branches of science leads to paral lelism, repetition and bias in teaching various academic disciplines and courses, disagreement of the efforts of the faculty. That is why the "mutual absorption" of academic subjects into each other serves to eliminate such helplessness, encourages future teachers to "primary" apply the knowledge, skills and skills acquired in the process of studying this or that subject, helps to form students ' scientific-dialectical worldview, actively develops their thinking-lashtiradi, pedagogy improves the methodological training of the CPSU.

Pedagogy in the theory and practice of professional-pedagogical and methodological training of future teachers at the University, insufficient attention is paid to the interconnection and interaction of methodological disciplines on the issues of implementing interdisciplinary connections in the subjects of the natural-mathematical cycle in general secondary schools, in some programs and courses on the methodology of teaching natural-mathematical cycle disciplines in pedagogical

The need to carry out interdisciplinarity as a didactic condition for improving the quality of students ' knowledge of interdisciplinary connections at school, as well as the role of teaching in the development of dialectical thinking of schoolchildren, are shown in the psychologo-pedagogical literature and research1-2. Numerous studies have shown that the programs of the natural-mathematical cycle disciplines in high school are not mutually adaptive, there is no general

interpretation of concepts, laws, theories for the natural-mathematical cycle Sciences, as well as a trace in their formation; the fact that the links between natural phenomena are weakly reflected in them, the knowledge gained by students in the natural and scientific disciplines remains scattered.

In didactics, based on the totality of the structure of academic disciplines, which is considered the objective basis for dividing interdisciplinary connections into classes, as well as the structure of the educational process, they can be divided into three main types: content-informational, operational-functional and organizational-methodical.

Each educational science is a didactic processed system of scientific knowledge, which also includes information from closely related fields of science.Any structural element of the academic discipline serves as the basis of interdisciplinary contacts in the process of teaching. In the content of each academic discipline (except for special Sciences), elements of methodological and ideological knowledge lie. Interdisciplinary connections can be attributed to the content-informational type based on the content of knowledge.

Educational activities have a complex synthetic nature. Its basis is cognitive activity, someone in the process of learning cognition, students carry out other elements of activity: practical, communicative, aesthetic, value-oriented.

Types of interdisciplinary connections of the operational-activity type differ according to the following criteria:

1) according to the methods of practical activity in the application of theoretical knowledge – "practical", such links help future teachers to generate movement, labor, constructive-technical,calculation-measurement, calculation, experimental, discovery-Chilik, speech, knowledge and skills;

2) on the methods of educational and cognitive activity in "searching"for new knowledge-"knowing", such links are generalized skills of learning, such as thinking, creativity, learning, tashki – liy-cognition (Planning, Organization and self-control), independent activity;

3) according to the methods of value-oriented activity – "value-oriented", such links are necessary for the formation of skills of assessment, communicative, artistic-aesthetic activity, which are of great importance in the formation of students ' worldview.

Interdisciplinary connections are carried out in the process of teaching with the help of one or another methods and organizational forms in force. This makes it possible to distinguish a secondary link of independent significance, subordinate to the first two types of organizational and methodological links. Interdisciplinary connections of this type enrich teaching methods, methods and forms of organization.

They provide students with effective ways to master professional knowledge and skills common to academic disciplines.

The types of bonds of this type are divided into:

1) by methods of mastering connections in knowledge of various manifestations (reproductive, exploratory, creative);

2) by implementation coverage (inter-course, within the cycle, Inter-cycle);

3) by implementation time (consistent, together, in perspective);

4) by the method of interconnection of Sciences (one-way, two-way, multi-way);

5) by the constant of implementation (episodic, continuous, systematic);

6) by the level of Organization of the educational and educational process (in the audience, thematic, etc.);

7) by the forms of Organization of the work of students and teachers (individual, in a group, in a team).

The versatility and versatility of the concept of "interdisciplinary connections" in the process of teaching in a pedagogical higher educational institution has shown that it turns out that the essence of this concept is not wax-kin to have the same definition. The phenomenon of interdisciplinary connections is multidimensional. They are not limited to the content, methods and forms of Organization of student training.

The regulation of the spiritual significance of this concept, like the regulation of the types of interdisciplinary connections, can only be based on a systemic approach.

The didactic phenomenon of " interdisciplinary connection" as a system has a structure consisting of three elements:

1)knowledge of one branch of science (qualifications);

2)knowledge of another field of science (qualifications);

3)These are the connections of knowledge (qualifications) in the learning process.

Each of these elements is distinguished by its variativeness. Links cover various fields of science of teaching – social, natural, technical sciences.

The combination (synthesis) of knowledge has a certain cognitive task in each concrete case - to explain cause-and-effect connections in common objects, to generalize and bring up new generalized knowledge, to concretize common concepts, to divide closely related phenomena into classes, to prove generalized ideas, etc.

Interdisciplinarity is a perceived, expressed attitude in a general form between elements of the structures of various academic disciplines in a logically completed form.

To conditional reflectors (or temporary nerve phenomena) I.P. Pavlov described it as both a mental and physiological phenomenon. Yu.A. Samarin in his theory I.M.Sechenov and I.P.Relying on Pavlov's works, he proved that "any knowledge is an assumption, or physiological temporal link; a system of knowledge is a system of associations or temporal links."

He divided the associasies into the following:

- local;-partially systemic;- internal systemic; - Inter-systemic.

Local association is the simplest neural link that allows indivdium to acquire the simplest knowledge about a thing or phenomenon.

It occurs at the first stage of the formation of the systemality of knowledge. Such a link appears at the initial stage of training in students. Local association is a relatively isolated link that is not tied to other knowledge, and therefore does not provide a full-fledged thinking activity.

It is said that partial-systemic associations are the simplest systematic associations that are formed in the study of a separate topic, something or phenomenon, and are partially connected with the knowledge of various phenomena that make up the content of the paragrifs of the previously studied chapters of the textbook. The presence of such associations allows students to first associate the acquired knowledge with the knowledge gained at the concrete stage of teaching, which testifies to the fact that the development of students ' thinking began, they began to know at least limited, separate facts of real reality. The selection of new facts and concepts, their comparison with existing ones, the generalization of the acquired knowledge-multiplication constitute the analytical-synthesis activity of students.

Internal associations of the system represent a higher level of the system of associations, the presence of which provides a more complex process of thinking in students. With the emergence of the internal Assos of the system-aces, the widespread use of knowledge within the framework of the studied science occurs. Students begin to know holistic systems of knowledge, such as linguistic, biological, physical, and other systems of knowledge. In this, the mental activity of students will be aimed at identifying in these systems the basic concepts, their general and individual signs, their causes and consequences. Yu.A. Samarin believes that"... each scientific science, and, consequently, educational science, with its own separate subject of study, represents a separate system of concepts, and the facts to be studied are organized into groups in the environment of this system, thus the reader is within a given system of knowledge (historical, chemical, psychological, mathematical, etc.).) must master concepts and attitudes, as well as skills and abilities.

The internal associations of the system can be dynamic and qualitatively different. While others reflect cause-effect bonds, others reflect time, the third – space, the fourth – quantitative, etc. Their formation is considered one of the

main tasks of the teacher, the solution of which helps to develop and motivate students and systematize their knowledge.

Inter-system and interdisciplinary associations are a high stage of students ' mental activity. They cover various knowledge systems, summarize them, allow you to look at a thing or phenomenon from a different angle, allow you to look at the problem that has arisen in the cross section of all planes. These associations are formed in the process of comparing the knowledge acquired by students in the study of various disciplines. Development of inter-system associations, yu.A.As Samarin noted, it goes in three directions:

formation of a system of beliefs as a natural result of multifaceted generalized knowledge acquired in the acquisition of various educational, practical and scientific systems;

formation of a single method of mental and physical (material) activity as a result of the use of multifaceted skills developed in the acquisition of various knowledge in the system of various relations;

the formation of a system of interaction of theory and practice as a result of the use of independent theoretical generalization of one's own practical experience.

These three areas of inter-system associations have a great influence on the cognitive activity of students in the learning process. Inter-system associations help to summarize students ' knowledge both in theory and in practice, which encourages generalizations to transform into harmonious systematic views on the surrounding world.

Groups of associations considered above, and, first of all, systemic associations are the basis of interdisciplinary connections in the process of teaching at school. Interdisciplinary connections are initially included in the content of the farcha subjects studied at school, in the content of the optional subject studied at school, elements of almost all other academic disciplines can be found, which are determined by the unity and interaction of all phenomena in the world that surround us: natural, social, cultural, etc. For example, in a physics course, knowledge of chemistry is given; chemistry knowledge always includes elements of physical knowledge; the zoology course includes knowledge of anatomy and physiology, the mathematical apparatus is widely used in physics and chemistry courses.

The use of interdisciplinary connections in the study of subjects of a professional nature, in particular in the subjects of the natural-mathematical cycle, has a negative effect on the goal-oriented preparation of students on the problem that surrounds them, without having a professional-methodical and pedagogical orientation of the practicums of solving issues.

It was determined that the acquisition of a method of transferring knowledge obtained from another in mastering one discipline brings a great goal-orientation to the solution of certain tasks to the analysis-synthesis activities of students, increases the activity of independent working methods, ensures a good organization of thinking activities, and, finally, develops logical consistency in solving both general and private issues.

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