THEORETICAL AND METHODOLOGICAL BASES OF INTERDISCIPLINARY RELATIONS OF THE NATURAL MATHEMATICAL CYCLE IN PREPARATION OF A FUTURE TEACHER IN A PEDAGOGICAL UNIVERSITY

Nazokathon Yusupova
Teacher at Kokand State Pedagogical Institute
Republic of Uzbekistan

ABSTRACT

In paper author try to explore many problems of future teacher in a pedagogical university a specially natural mathematical cycle, In other words, a high level of mastering the fundamentals of sciences in a certain type of educational institution can be achieved only under the conditions of a systematic and planned implementation of intersubject communications, reflecting the actual relationships between phenomena and processes of objective reality

Keywords: Preparation, teacher, pedagogical spheres, mathematical cycle.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

A decisive role in increasing the productivity of teaching the fundamentals of sciences at all stages of education belongs to the purposeful selection and improvement of the content of various training courses, which seem to be effective only in the conditions of their close mutual correlation and coordination, wide transfer of knowledge, skills and abilities acquired when mastering the studied disciplines. In other words, a high level of mastering the fundamentals of sciences in a certain type of educational institution can be achieved only under the conditions of a systematic and planned implementation of intersubject communications, reflecting the actual relationships between phenomena and processes of objective reality. This approach to learning contributes to the optimal development of the dialectical thinking of students and students, the formation of their scientific worldview, holistic views and beliefs, which is the goal of any training.

It is known that the phenomenon of intersubject communications is multidimensional. It is characterized by a multifaceted content and a variety of teaching methods and forms and represents the basis of the relationship between the educational and cognitive activities of students and the educational activities of a teacher. The occurrence of the problem of interdisciplinary connections in teaching is historically determined by the subject structure of the educational process, which contributes to the formation in students' minds of individual systems of knowledge about various phenomena of the real world

The psychological, pedagogical and methodological literature covers a wide range of issues related to theoretical and practical problems of the interconnections of natural-mathematical, psychological, pedagogical, humanitarian and technical and technological disciplines and, based on them, the training of a future specialist - teacher (Gruzdeva N.V., Danilchenko M.G., Dvorovenko A.A., Dyma E.A., Eremkin A.I., Zagrekova L.V., Zankov L.V., Zverev I.D., Kadirov B., Kelbakiani V.N. , Kuzmina N.V., Kulagin P.G., Maksimova V.N., Minchenkov E.E., Nugmonov M., Sokolova F.T., Tretyakov P.I. , Thamofokova ST., Usova A.V., Fedorova V.N., Pancheshnikova L.M., Pinsky A.A., Shablykin A.P., Sharifov F., Shcherbakov A.I.,

Yurov A.K. and etc.).

The problem of intersubject communications in high and high school is devoted to dissertation research by M.I. Aliyev, A.R. Bektenyaroy, P.M. Burdina, V.E. Vaskovskoy, Yu.V. Vasiliev, N.I. Gorbachev, G.G. Grakovsky, M. B. Dyakova, F.G. Zeynalova, L.V. Ishkova, F.G., Z.A.A. Kantero, R.B. Litstein, N.A. Novruzova, E.N. Orlova, A.A. Khomich et al. In these works, the importance of interdisciplinary connections is shown in improving the educational process in secondary and higher educational institutions, including pedagogical universities, in improving the quality of students' knowledge and professional training of a future teacher.

Since the idea of interdisciplinary connections, in particular, interdisciplinary connections of subjects of the natural mathematical cycle in high school and, in part, in high school were considered in various studies and publications of various authors, therefore, in this section we want to briefly dwell on the key issues relating to this phenomenon and directly related to our problem.

The problem of interdisciplinary communications began from the time when the school introduced separate teaching of academic subjects, due to the basic development of science.

If we consider the problem of intersubject communications in the historical context, it becomes clear that this problem was paid much attention to teachers of the past and researchers of the present. As V.N. Kelbakiani notes, “this problem was considered in different aspects: the history of its development, its methodological and theoretical significance, the content of intersubject communications in academic disciplines, the motives for their implementation in the process of training and education ...”.[i]

During the Renaissance, progressive educators, speaking out against scholasticism in teaching, emphasized the importance of forming students' ideas about the interconnections of natural phenomena and processes.

Classic world pedagogy Ya.A. Komensky argued: "Everything that is in mutual connection should be taught in the same connection, for it is very important for the formation of system knowledge."[ii]. He believed that it was important to establish a connection between academic subjects for the formation of a knowledge system. According to Ya.A. Comenius, you need to "teach everyone everything." He believed that the school should provide children with a comprehensive education that would develop their mind, morality, feelings and will.

Another famous teacher and philosopher of the XVII century. John Locke believed that each subject has a core around which the knowledge acquired by him through the senses combines. He considered the idea as such a core that the content of one subject should be filled with definitions, elements and facts from another subject, in order to obtain knowledge not only on the fundamentals of sciences, but also various skills for their practical application in life.

Teachers and didactics such as I. Pestalozzi, I. Herbart, A. Disterverg and others spoke about the connections in teaching teaching subjects. They understood the importance of connections between academic subjects as a way of gaining deeper knowledge so that students could see the world around himself in all its diversity and unity. About the relationship between the studied subjects, which just contributes to the correct perception of the surrounding reality, wrote I.G. Pestalozzi. He noted: "Bring in your mind all essentially interconnected objects into that very relationship in which they really are in nature," speaking about the danger of

separation of one object from another, especially in high school.

The same idea is postulated in the works of a German teacher, psychologist and philosopher of the 17th century. I. Herbart, who believed that the mental activity of students directly depends on the relationship between academic subjects. Presenting the subject system of teaching, the German pedagogue-democrat, follower I.G. Pestolozzi, A. Dysterberg also advocated the need for intersubject communications in the study of various academic disciplines.

It is known that the idea of interdisciplinary connections in the teaching of school subjects at school was widespread in Russia. Russian democrats XIX and XX centuries. advocated the free and active assimilation of knowledge, they opposed scholasticism and formalism in learning: V.G. Belinsky, N.A. Dobrolyubov, N.G. Chernyshevsky, A.I. Herzen, D.I. Pisarev and others with deep understanding approached this idea. So, V.G. Belinsky put forward the idea of "integrity" of the education system, under which all academic disciplines are taught in unity and interconnection. In turn, N.G. Chernyshevsky advocated such knowledge that, having been acquired in one subject, would not have remained barren for the assimilation of other disciplines of the school curriculum.

In addition to the Democrats, during the same period, the most complete justification of didactic significance of interdisciplinary connections in classical pedagogy was developed by the famous Russian teacher K.D. Ushinsky. He made an attempt to justify the need for interdisciplinary relations from the point of view of only emerging in the XIX century. science of psychology. K.D. Ushinsky spoke of various types of associative relationships between objects: in contrast, similarity, time, unity of place, rational part, etc.

He believed that without a connection between academic disciplines, students cannot have systemic and holistic knowledge. The lack of such a connection, in his opinion, is the main flaw of the scholastic school, which formed people who learned a lot of theoretical material, but did not know how to use it in real life: "A head filled with fragmentary, incoherent knowledge looks like a pantry in which everything is in disorder and where the owner himself will not find anything; the head, where only the system without knowledge, is like a shop in which there are inscriptions on all the boxes and the boxes are empty, "he wrote. [Composition, vol. 8] K.D. Ushinsky believed that the knowledge and ideas communicated by any kind of science should be organically built into a bright and, if possible, broad view of the world and its life, that is, be a harmonious, orderly system.

He criticized K.D. Ushinsky such a system of teaching at school, in which teachers are limited by the problems of only their subject, do not pay attention to the general mental development of students.

In addition to criticism, this great Russian teacher set forth his point of view on the phenomenon we are studying: “When distributing the subjects of teaching in general educational institutions, they should not bear in mind separate sciences, but the soul of the student in its entirety and its organic, gradual and comprehensive development.

The ideas of the Russian democrats, as well as the theoretical legacy of K.D. Ushinsky and other teachers and didacts of the past had a huge impact on the development and development of the theory of intersubject communications, which was reflected in the works of many teachers of the late XIX and early XX centuries, in particular, in the works of V. Ya. Stoyunina,

D.D. Semenova, N.F. Bunakova, V.I. Vodovozova and others. In the studies of these didactic educators, the following principles for the organization of training based on interdisciplinary connections were identified: establishing a connection between academic disciplines at school; elimination of various contradictions in the use of common terminology by teachers of different subjects; continuity in teaching the content of individual subjects; the interpenetration of knowledge gained in different disciplines; the connection between theory and practice; teamwork of teachers to develop the intellectual abilities of their students.

Based on the foregoing, we can conclude that many outstanding teachers of the XIX and early XX centuries. recognized the need for intersubject communication in the learning process, and, above all, in school. However, it should be noted that their ideas were not accepted by contemporaries - contemporaries and sufficiently implemented in practice-training.

For the first time in Russia, the idea of the relationship between different academic disciplines was put into practice in the Soviet school in the 30s of the XX century. During the creation of a new school (a single labor comprehensive school), the content of education, training and upbringing of the younger generation was radically revised. A large role in the formation of a new school, in the practical implementation of the problem of intersubject communications is assigned to the famous educational figure of that time A.V. Lunacharsky, who fought for a broad general education, for truly scientific knowledge, for the connection of training with work, for the connection of polytechnical education with the mental, labor, physical, moral and aesthetic. As for the idea of interdisciplinary connections in the teaching of subjects of the natural mathematical cycle, they were developed in the 30s of the last century, when the classroom lesson system again arrived.

During this period, another famous education activist N.K. Krupskaya convincingly showed that the theoretical substantiation of the idea of intersubject connections and its implementation are possible only on the basis of a dialectical approach to cognition, the essence of which is reflected in science by philosophy: "To really know an object, you need to embrace, study all its sides, all connections and mediations. We we will never achieve this fully, but the requirement of comprehensiveness will prevent us from mistakes and from necrosis ", (Pedagogical essays. - M .: Publishing House of the Academy of Pedagogical Sciences of the RSFSR, 1958, v. 2). In her opinion, the ideas of interconnected teaching Ecclesiastical disciplines should be thoughtfully reflected in the curriculum.It revealed concrete examples of interdisciplinary connections, emphasizing that they stimulate cognitive activity, promote the comprehensive development of students, and broaden their horizons in various fields of science.

Having substantiated the subject system of education, N.K. Krupskaya pointed out that the transition to such a system should not mean breaking all kinds of connections between various objects. The aim of the school should be to communicate knowledge that students could practically use in life. “This approach connects all sciences together with one common goal, creates an internal connection of enormous power between them” (ibid.), And for this, the foundations of the sciences studied at school should be closely connected.

Expressed in the 30s N.K. Krupskaya’s ideas were the basis for comprehensive education (characterized by the close interconnection of polytechnic and general education), which, for a number of objective reasons, did not justify itself in practice. As a result, the absolutely correct, from our point of view, principles of interdisciplinary education did not find support either from theorists or from practitioners of didactics and pedagogy until the 1950s.[iii]

The problem of intersubject communications reached its greatest growth and development in the mid-1950s. This period of development of pedagogy, methodology and didactics is associated with the school reform of 1958, with the transition of the school to a new teaching content based on the integration of sciences. At this time, a number of large didactic studies appeared on the pages of the press (M.A. Danilov, B.P. Esipov, etc.), and from the beginning of the 60s a series of methodological studies appeared on the problem of the implementation of intersubject communications in the educational process (C .N. Nikonova, A.V. Osinova, V.A. Klassen, M.A. Kolmakov, A.I. Yeryomkin, L.N. Bogolyubov, N.A. Loshkaryova, P.G. Kulagin, Sh.I . Ganelin, A.K. Bushley and others.) In these studies, the problems of continuity in learning and the relationship between subjects. One of the fundamental ideas of organizing the education system put forward by these scientists was the establishment of relations both between subjects of the same cycle and between subjects of different cycles.

Foreign researchers also showed interest in the interdisciplinary connections of the educational disciplines of the secondary school. Scientists from a number of states, in particular, England, the USA, and France advocated the merger of several academic subjects into a single subject, motivating this by the emergence of new branches of science: astrophysics, biochemistry, physical chemistry, space biology, computer medicine, and others.

In the United States, the study of the Earth was introduced for high school students, the content of which includes elements of physics, chemistry, geography, geology, crystallography, soil science, paleontology, biology, and others. Instead of chemistry, physics, biology, students from the schools of England and France began to study natural science, the content of which is a complex of chemical, physical, biological, geological, astronomical knowledge, selected differently in different cases, depending on the program. A significant drawback of this approach to learning was that the teaching of disciplines based on their integration was carried out by one teacher, who, naturally, could not provide the necessary level of training throughout the course due to his lack of competence.

Thus, the formation of interdisciplinary mutual penetrations allows the student to go beyond the framework of one academic subject, promotes the use of knowledge from different fields of science, subordinating them to each other. The emergence of stable intersystemic associations is possible only in close connection with other types of associations, indicated above, primarily intrasystemic and partial-systemic.

At the level of intersystem associations, schoolchildren form general concepts about the real world surrounding them. In psychological literature, the term “concept” is considered as a form of rational cognition, a psychic phenomenon, an element of thinking inherent only in man and an elementary form of the existence of thought: a reflection of the most essential properties and connections of an object, a phenomenon, fixed by a word. Concepts are divided into two types: by the nature of the relationships and relationships reflected in them; - on the basis of community. In studies of the Soviet and post-Soviet period, various issues of intersubject communications of subjects of the natural-mathematical cycle are also considered, both in high school and in the training of the future teacher. So, F. G. Zeynalov[iv], who studied the influence of intersubject connections in teaching subjects of the natural mathematical cycle on the formation of the scientific worldview of students, found that in the context of the targeted implementation of interdisciplinary connections of a physics course with chemistry, nature studies, mathematics, biology and astronomy, extracurricular activities not only form a scientific worldview in high school students, but it also provides necessary and useful scientific information that students are not always able to obtain independently. However, the issues of

preparing a teacher for the implementation of intersubject communications in high school are not considered in this paper. A.A. Khomich[v], considers the system of intersubjective tasks as a means of forming the scientific worldview of schoolchildren in grades 9-10. A.R. Bektenyarova [vi], explores interdisciplinary communication as a condition for the activation of students by the example of studying economic and social geography in high school.

M.I. Aliev [vii], Having studied intersubject communications as a condition for enhancing students' educational activities based on the material of psychological and pedagogical disciplines in pedagogical universities, he pays special attention to the implementation of the interconnections of pedagogy courses and general psychology in the preparation of students of a pedagogical university. It is noted that the activation of students by establishing links between pedagogy and general psychology and their professional preparation for the implementation of the interconnections of school disciplines are in dialectic unity, and that the reflection of the requirements of intersubject communications in programs, textbooks and teaching aids of pedagogical universities is an important condition for improving the training of secondary school teachers . However, he does not consider the role of subject methods in the implementation of intersubject communications of subjects of the school cycle. Burdin P.M.[viii], pays special attention to interdisciplinary relations in the polytechnic training of students of a pedagogical university.

Cantero Z.A [ix], in his dissertation research, he pays special attention to interdisciplinary connections in the cycle of natural science disciplines of a pedagogical university as a factor in increasing the effectiveness of training a chemistry and biology teacher. At the same time, special attention is paid to the relationship in the content of chemistry and biology of secondary schools[x].

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