



**METHODS OF USING AN INTEGRATIVE APPROACH IN TEACHING THE
SUBJECT "ZOOLOGY" IN HIGHER EDUCATIONAL INSTITUTIONS OF
PEDAGOGICAL EDUCATION**

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Abstract: The article presents effective methods of teaching natural sciences using modern pedagogical approaches, interactive methods and technologies. It also discusses the impact of integration methods on students' motivation and their role in increasing their ability to apply knowledge in practice.

Keywords:

Natural sciences, integration methods, teaching methods, modern pedagogy, interactive education, science teaching, critical thinking;

Аннотация: В данной статье освещаются эффективные методы преподавания естественных наук с использованием современных педагогических подходов, интерактивных методов и технологий. Также рассматривается влияние интегративных методов на мотивацию учащихся и их роль в повышении способности применять знания на практике.

Ключевые слова:

Естественные науки, интегративные методы, методы преподавания, современная педагогика, интерактивное обучение, преподавание наук, критическое мышление.

Annotatsiya: Ushbu maqolada tabiiy fanlarni zamonaviy pedagogik yondashuvlar, interaktiv usullar va texnologiyalar asosida o'qitishning samarali usullari bayon etilgan. Shuningdek, integratsiyalashgan usullarning o'quvchilarning o'quvga bo'lgan motivatsiyasiga ta'siri va ularning bilimni amaliyotda qo'llash qobiliyatini oshirishdagi roli muhokama qilingan.

Kalit so'zlar: Tabiiy fanlar, integratsiyalashgan usullar, o'qitish usullari, zamonaviy pedagogika, interaktiv ta'lim, fanlarni o'qitish, tanqidiy fikrlash.

The functions of pedagogical integration are the ways of manifestation of its activity in the performance of a certain task. In pedagogical works there are direct indications of the presence of integrative functions, M. N. Berulava describes the methodological, system-forming, polytechnical, organizational and other functions of the content of education; V. S. Bezrukova identifies the functions of pedagogical integration based on the attitude to the relationship [1].

Implicit (hidden, latent, ostensive) indicators of the presence of pedagogical integration functions include provisions that reveal its role and significance for pedagogical science and practice. In this case, special attention is paid to the developing role of integration. "Integration," notes A. P. Belyaeva, "accelerating the pace of development of productive forces and production relations, creates conditions for the formation of a creative personality, requires future workers to have diverse knowledge" [2]. In her opinion, integration "is a lever for optimizing the final result of professional training, serves as a condition, a means of increasing efficiency and reducing the time it takes for future workers to master the basics of professional skills in educational institutions".

In light of the above, we can conclude that there is no generally accepted list of integration functions. Consequently, there are grounds to talk about the possibility of identifying the most general, invariant functions of pedagogical integration, which will be relevant to all of its varieties: methodological, developmental, technological. Each of them is capable of accumulating a number of smaller functions. 1. Methodological function. Based on the provisions of the article by V. S. Bezrukova "The Theory of Pedagogical Integration as Methodological Knowledge" [3], we will



highlight three aspects of the methodological function of pedagogical integration: heuristic, ideological-axiological, instrumental

The heuristic aspect is associated with the ability of pedagogical integration to serve as a starting point for developing new pedagogical concepts. For example, M. A. Choshanov points out that "the integration of didactic theories and methodological ideas underlying the problem-modular approach determines the integrative approach to the methods of designing the content of education"

The ideological-axiological aspect manifests itself primarily in the fact that pedagogical integration is a means of intellectual and spiritual enrichment of participants in the pedagogical process. An integrative worldview is the most important component of modern "critical thinking", the main properties of which are dialecticism and alternativeness, i.e. the ability to find consensus between different, including opposing, points of view [4].

The instrumental aspect expresses the ability of pedagogical integration to play the role of an instrument:

- a) knowledge and transformation of pedagogical science (as a result of the rapid development of integration processes, it is turning into one of the leading scientific constellations that determine the further movement of science in general and the humanities in particular; pedagogy occupies a central position in the structure of modern human studies);
- b) knowledge and transformation of educational practice, which is confirmed by the intensification of the processes of development and actualization of integrative technologies;
- c) ensuring the continuity of the new and the old, theoretical knowledge and practical experience.

2. Developmental function. The concept of the developmental function was proposed by G. Spencer. The categories of integration and differentiation in their totality reflected for him the entire process of formation and development of living things. "Evolution," wrote G. Spencer, "is the integration of matter, which is accompanied by the dispersion of motion and during which the substance passes from a state of indefinite, incoherent homogeneity to a state of certainty, coherent heterogeneity, and the preservation of motion by the substance undergoes a similar transformation" [5]. The ideas of "developmental" integration were developed in the works of O. Comte, E. Durkheim, P. Sorokin, and others; in modern definitions, integration is characterized as "the aspect of development associated with the unification of previously disparate parts and elements into a whole"

Integration contributes to the development of not only the species, but also the individual. At one time, I. M. Sechenov pointed this out, noting that development occurs through differentiation of the whole, the allocation of functions, behavioral acts, and their new integration, unification into a new whole [6]. The role of integration and differentiation in the formation of personality is recognized by a number of Western researchers (G. Werner, K. Levin, D. Kretsch, G. Allport, and others). They believe that differentiation leads to the emergence of new actions (perceptual, mnemonic, mental, etc.), the multiplication, enrichment and improvement of mental activity, integration – to the ordering, subordination and hierarchization of their results. Integration in this case serves as a means of forming new mental formations, a new structure of activity. Thus, development and learning, integration and differentiation are combined in one semantic field, their dependence on the conditions of development, including learning and education, is emphasized.

"Learning purposefully influences these processes, setting the learner the task of breaking down certain acts of behavior into parts, identifying various components in them and combining them into a new whole" [7]. Foreign and domestic educators point to the connection between learning and integration, emphasizing, in particular, that "thanks to the integration of actions consistently performed by the learner... the objective content of the surrounding world becomes the property of the learner's consciousness".

Integration plays a leading role at all levels of human existence and development. This can be proven by the model of the integrative foundations of human development, constructed through a



thought experiment: protein synthesis lies at the foundation of human biological development; the starting point of human species development is the interaction of biogenetic and epigenetic components; the initial basis of individual-personal development is various forms of human integration with the environment, with other people, with oneself. It is also impossible to ignore the fact that the functioning of human thinking is ensured by the integral activity of the brain. Based on the heterosis (hybrid force) effect discovered in genetics, the following pattern can be deduced: the richer and more diverse (more diverse) the composition of the initial data of integration, the higher its development potential. Of course, the mere presence of diverse initial material does not automatically mean obtaining the desired result. Well-organized, targeted integrative work is needed to achieve it. Moreover, “any regularity... is realized in its pure form only under ideal conditions” [8].

Let us take programmed learning as an example, for which a minimum of developmental opportunities is characteristic. The reason for this is its “piecewise-summative” structure, the homogeneity of its composition, formed by a set of strictly regulated operations. As a result, the assimilation of knowledge occurs as a process of summing up a certain number of educational “steps” (“portions”): knowledge is superimposed on each other, like “bricks”. It is hardly possible to talk about the development of thinking, especially creative abilities, in the case of programmed learning.

The additive-homogeneous nature of this type of learning contradicts the laws of functioning of human thinking: new knowledge is formed not by simply superimposing it on existing knowledge, but “through restructuring, restructuring of previous knowledge, rejection of inadequate ideas, posing new questions, putting forward hypotheses”. In programmed learning, we have to talk not about the development of personality, but about the deformation of the human thinking paradigm, given to him initially as a species and an individual. From this we can conclude that there is a certain danger emanating from the excessive increase of the technological approach in pedagogy.

Another example is problem-based learning, which, due to its heterogeneity, alternativeness, stochasticity, insight and unpredictability, is based on search educational and cognitive activity, and not on training (putting forward hypotheses, posing new questions, etc.). Numerous experiments conducted under the supervision of M. I. Makhmutov and his students have shown the unconditional positive influence of problem-based learning on human development [9]. Using integrative pedagogical terminology, we can say that in the course of problem-based learning, true integration is carried out: here, there is not an overlapping of knowledge, not its simple build-up, but its transformation and the emergence on this basis of psychological neoplasms in a person. One of the main reasons for this situation is the heterogeneous nature of problem-based learning. Even when solving the simplest problem situation, the student is forced to use knowledge of the most different origins, to perform various types of mental activity.

It should be noted that it does not deal with a ready-made set of uniform characteristics, but with a search model containing an infinite set of data of different quality, the right to select and synthesize which is given to the student himself. Much of the above applies to vitagenic (requires the student to actualize the entire set of knowledge, skills and abilities acquired by him in the course of carrying out any activity), contextual (initiates the process of modeling the subject and social content of future professional activity in the training of specialists) and model (promotes the development of the student's cognitive, social and professional activity in the course of solving situational problems of a social, industrial, managerial and other nature) training. Integration in pedagogy can serve as a means of developing and improving scientific and pedagogical knowledge and the pedagogical process itself [10].

3. Technological function. Based on the article by O. E. Liseychikov, we will highlight the following components: compression, compaction of information and time; elimination of duplication and establishment of continuity in the development of knowledge and skills; interpenetration of knowledge and skills of some disciplines into others; systematization of concepts, facts, skills and abilities; denial of some part of the acquired knowledge, skills in the development of generalized



integrative properties; establishment of subordination and coordination between the cooperating knowledge [11].

The paragraph highlights and describes the invariant functions of pedagogical integration - methodological, developmental and technological. The central place among them is occupied by the developmental function, affecting all areas of educational theory and practice, including the subject of education itself - a person. This does not indicate that integration has negative aspects, such as the ability to destroy established traditional knowledge systems in the process of creating integrative courses, but only confirms the idea of the need to develop conditions that ensure a positive impact of integration on all components of the pedagogical (scientific and pedagogical) process and, above all, on the person himself.

Modern Integration Methods in Teaching Natural Sciences

Natural sciences — including subjects such as biology, chemistry, physics, and geology — cover many theoretical and practical aspects in the learning process. Therefore, using modern integration methods in teaching these subjects is essential. Integration methods help students see interdisciplinary connections and deepen their understanding of the material.

Integration Methods and Their Importance

Integration methods are pedagogical approaches aimed at studying the relationships between different subjects and combining them effectively. Through these methods, students:

- Understand interdisciplinary connections;
- Learn how to apply their knowledge in practice;
- Demonstrate creativity in solving problems.

For example, by combining biology and chemistry, students can better understand the process of photosynthesis in plants. In this case, chemical reactions and biological processes are studied together

Modern Technologies and Integration

Modern technologies are a crucial component of integration methods. Interactive learning platforms, virtual laboratories, and online resources provide students with opportunities to conduct experiments, analyze data, and apply theoretical knowledge in practice.

For instance, with the help of online simulators, students can observe chemical reactions in a virtual environment. This allows them to test theoretical knowledge practically and helps teachers make lessons more engaging.

Teacher Preparation

To effectively use modern integration methods, teachers must also be well-prepared. They need to be familiar with modern pedagogical approaches, technologies, and methodologies. Organizing seminars, training sessions, and master classes can help improve teachers' professional skills.

Teachers should use interactive methods in their lessons to ensure active student participation. This makes the lesson more interesting and effective.

Conclusion

In conclusion, using modern integration methods in teaching natural sciences is an effective approach to expanding the knowledge of primary school students, fostering creativity, and helping them understand interdisciplinary relationships. Teachers should support the use of modern technologies and engage students through interdisciplinary projects. For this process to be successful, teacher preparation also plays a crucial role.

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