

The systematic approach is one of the most important ways to address methodological and theoretical teaching ways. The systematic approach should penetrate deep into the sense of pedagogical events. The main advantages of this approach in the field of pedagogical events are in the fact that due to them new problems, new challenges, search directions are born to improve the quality of teaching. The authors have developed a methodological handbook with the program of "Concepts of modern natural science" course and teaching methods which comprises two cycles:

I Cycle - lectures, reflecting a new concept of evolutionary development of any systems including the achievements of modern science, highlighting universal, fundamental laws of their development. These laws operate and manage the processes in physical, biological, chemical, economic and other complex systems. The complex systems being various according to their nature, consisting of a large number of interacting subsystems, are capable of self-organization (synergetic processes) and evolving under certain conditions.

II Cycle - seminars held in the form of a conference after the full course of lectures. Prior to the conferences, each student hands in the report on 25-35 pages, designed according to all contemporary requirements for publication: 1) title page; 2) abstract at least in two languages (Russian and English, or Russian and German are compulsory); 3) contents of the report; 4) introduction where it is necessary to present the connection between the topic being studied and the theory of the chosen system evolution; 5) contents of the chapters with illustrations; 6) conclusion; 7) references; 8) tests on the report topic designed by the author; 9) glossary of terms used in the report.

At the conferences students make presentations on the topic of their reports, using various means of illustrations: mathematical conclusions, drawings, diagrams and flow charts, both on the board and using modern means for presentations, colourful posters, and even movies. Much attention is attracted by the reports presented in the form of a dialogue in the problematic style with co-authors of the report. The reports made in foreign language are of great interest too. The translation shall be distributed beforehand or read aloud by a co-author during the presentation. Such form of seminars encourages students' mental activity and develops competences in all four directions.

The exclusion of "Concepts of modern natural science" course out of the Bachelor's degree curriculum in specialty "Mathematics" with the supposed reference to the presence of a natural and scientific discipline component within the course "Theoretical Mechanics" is unjustified. Knowledge of the world cannot be limited by the same kind of matter – "substance". Mechanics does not deal with "substance-field". Modern civilization development is based on use of the field form of sub-

stance: electromagnetic field, gravitational field. All forms and types of information links on the Earth and in the Space are based on the latest information and innovative technologies that will evolve and grow. Modern biotechnology is being created at the intersection of sciences. Energy technologies require different specialists having high mathematical literacy, and mathematicians in their turn are required to have knowledge about processes of nature. The exclusion of "Concepts of modern natural science" course from the curriculum may result in the increasing the gap between knowledge itself and its application. "Concepts of modern natural science" course improves the quality of educational technologies, and as a result, increases the level of mastering cognitive processes in all cognitive areas, including intellectual processes: algorithmic, heuristic, etc. In other words, the dynamics of interiorization increases, i.e. formation of mental actions and interior consciousness concept through a student's mastering of external links with objects and processes in technology and nature, forming competences in practice, that are necessary for a graduate in his practical activities.

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METHOD OF FORMING THE RECEPTION OF EDUCATIONAL ACTIVITIES OF STUDENTS

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Wielding methods of students of academic work depends on the methods used in the three levels of training. The first level corresponds to the explanatory and illustrative method of learning, a second - reproductive, finally, the third level corresponds to

the problematic methods of presentation, partially exploratory research and teaching methods.

Applying the learning process chosen for pedagogical essence methods of instruction, the teacher can deliberately lead students to assimilate their content at any particular level.

In modern didactics are the two interconnected aspects of the learning process: the activities of teachers and students' activity. In the learning activities of students that learning is informative, there are three interrelated components: 1) the acquisition of knowledge; 2) mastering the techniques (methods) educational work; 3) acquisition of skills.

Education students of learning methods combine both content knowledge and techniques of mental activity of students.

In school practice, according to E.N. Moeller-Kabanov [1], methods of mental activity are methods of academic work. Skillful execution of any human activity requires the use of one or more methods mental work, and together they constitute the method of operation, including both thought and action.

Learned methods characterized by the fact that a student takes him to new challenges, that it uses the new conditions. Receiving academic work can be formed at the level of the student ability or skill level. When teaching subjects of natural and mathematical cycle most of the techniques implemented at the level of skills that require thought and attention for their application. At the level of skill the students solve only a small number of educational problems. This is due to the fact that simple methods can only be formed at the level of skill of pupils.

Methods of academic work formed the lessons can be grouped into several groups such as:

1. Methods of academic work are typical for one academic subject (reading geometric drawing, recognition of the type of chemical reaction, reading wiring diagrams, etc.).

2. Common methods. These include techniques for working with a textbook, planning of academic work, self-control, note-taking, self-organization.

3. Methods of mental activity - a comparison, analysis, synthesis, generalization, specification, extraction of essential features, abstraction, establishing causal relationships, etc.

Each of these groups of methods have their own features for their formation. However, the formation of methods of academic works have several common features:

1. Basis of formation of methods of academic works are knowledge of theories, laws, facts, leading ideas, system concepts.

2. Methods are formed through a system of exercises and cognitive tasks.

3. Reliance on previously learned knowledge and methods of interdisciplinary nature of academic work. Transfer methods of academic works.

4. Management of cognitive activity and mental development of students by teachers. Self-governance in the process of learning student

5. Implementation of a gradual transition from work on the model to independent creative application methods.

Receiving of academic work formed after studying theoretical material, it is aimed at the process of digestion, binding, and then he can become a means of mastering new teaching material.

In the methods of organization of process of studying, aimed at assimilation of methods academic works with students, the teacher is supposed to work, and receive formative activities of students and assimilating them.

Methodologically is very important to organize activities for students receiving content comprehension and retention of knowledge about actions. This is facilitated by verbal or written instructions, memos, plans, as well as the system of independent works, the most rational selection of learning tasks of increasing difficulty to master the technique and the development of his ability to transfer, as well as the organization and synthesis methods.[2]

Quality of mastering of one way or another reception of academic work depends on a number of objective reasons: the level of previous training of students, their age level of mental development and individual differences, techniques and features formed by the reception, etc.

At formation of methods of academic work make special demands for the selection of tasks, didactic material. Aimed at the development of logical thinking system tasks and assignments can be grouped according to the methods of mental activity. For example, this job require:

1. Analysis, synthesis, abstraction, generalization and systematization of knowledge:

- Issue of the main and substantial in content to learn the academic material, visual aids, educational experiment;

- Determination of cause-effect relationships of the studied phenomena, processes, mathematical objects;

- Isolation (abstracting) of the essential features of the process, a mathematical object;

- Definition of natural and mathematical concepts, summarizing the facts, summarizing them under a general concept;

- Identify common patterns of development process, phenomenon;

- Detailed or brief description of the phenomenon, the law, a process task to prove or to build;

- Consideration of group of identical phenomena and processes, and facts in certain logic.

2. Matching, comparison, classification, generalization:

- assimilation of similarities and differences, general and specific;

- establishment of the changes occurring at different stages of the same phenomenon, process;
 - the establishment of similar patterns of development processes and phenomena.
3. Reasoning and conclusions:
- clarification of the essence of processes and phenomena;
 - the correlation of certain facts with the general course of events in the process of action with certain regularity;
 - summarizing repeated facts and dependency under law.
4. Proof of correctness of the conclusions:
- confirmation of the facts output;
 - justification or refutation of the hypothesis;
 - playback progress proof theoretical conclusion;
 - implementation of knowledge of the laws to substantiate proxy conclusions, to refute proxy assumptions.
5. Localization of events and processes in time:
- to establish the duration and sequence of events, processes, phenomena, to determine their synchronicity;
 - the ratio of history of the discovery of phenomena, processes the historical period;
 - read drawing, graphics, tables, and use their content as a source of knowledge.

In academic work methods perform several functions:

1. Methods of academic work contribute to the formation of theoretical knowledge as welcome in this case is the communication method of practical actions of students with their knowledge assimilated; On the other hand, the acquisition of knowledge is achieved by repeated application of its students for the solution of various cognitive tasks, which is possible only under the condition of ownership of students methods of academic work.

2. Formation of methods academic work contributes not only to give students the methods of cognition and the ability to work with the literature, but also to prepare students for future independent practice, to continue self-education.

3. Methods plays a great role in developing training, which is based on the development of pupils' thinking. Forming methods equips students with the natural cycle of the general methods of mathematical self-cognitive work with the active use of reception of mental activity.

4. Mastering the methods promotes the formation of students scientific worldview - dialectical method of cognition, which is characterized by the study of natural objects and phenomena in the development, historical approach, establishing relationships and contradictions.

We proceeded from the fact that one of the main indicators of developing education in the implementation process is a qualitative shift in student

mental activity, the emergence of new parties in its activities.

We relied on three main levels of quality changes of mental activity of students:

- the level of the transposition of methods of educational activities, which is accompanied by their restructuring and finding new ways to solve;
- level determined by the transition from unconscious use of techniques - to conscious, on this basis, the emergence of a qualitatively new feature - a shift in mental activity;
- the level of qualitative changes in the motivational sphere of the individual student, the emergence of new cognitive interests, motives and goals.

Dedicated levels, in our opinion, should be associated with different levels of implementation of interdisciplinary connections with the activities of teachers and, consequently, with different levels of formation of interdisciplinary links in student learning activities.

Basis for isolation levels is the idea that the content side of disciplines includes the experience of scientific thinking (scientific methods) that must be learned in one form or another student[3].

In this case the content side can be mastered by students depending on the training methods used at one of three levels[4]:

1. Level consciously perceived and recorded in the memory of knowledge (it is characterized by the possibility of students to use ready intersubject knowledge);

2. Level of readiness to use knowledge in similar conditions, modeled;

3. The level of preparedness for the creative use of interdisciplinary knowledge in new learning situations.

The considered levels achieved with the appropriate teaching methods. The first level corresponds to the explanatory and illustrative method of learning a second reproductive, finally, the third level corresponds to the problematic methods of presentation, partially exploratory research and teaching methods.

In the learning process of any teaching method is implemented with his usual training methods and their combination.

So, for explanatory and illustrative method intrinsic forms of submission are any ready-made knowledge. Consequently, teaching techniques aimed at mastering students study material filed in the form of ready knowledge will be teaching the essence due to boundaries explanatory and illustrative method. Therefore, for the organization to achieve the first level of students mastering the content can be used, such as teaching techniques intonational emphasizing important points logically teacher present material; instructing students (by drafting tables, diagrams, work with text tutorial); hint - hint containing information ready;

presentation of students reformulated questions, text assignments to facilitate their understanding of the meaning, etc.

Reproductive method intrinsic advocate any forms of single or repeated playback students studied under standard or easily identifiable proximity to the sample. Therefore, any training techniques, this objective can be used to achieve the organization of the students of the second level of mastering content.

Intrinsic problem for presentation will be included in any form of disclosure teacher contradictory process of solving the problem of evidence.

For partially - search method as essential will be performing any form of student learning the individual steps of the creative search. Hence, teaching techniques aimed at mastering exploded students damn creative activities under the guidance of a teacher, will be linked to the achievement of the third level of learning.

For research method are intrinsic any form of holistic self-paced learners creative tasks. Therefore, all methods of training, aimed at organizing students mastering content subject to creative tasks

can be used to achieve full assimilation of the third level. This assimilation is accompanied by the formation of their methods work, mastery of which is a measure of mental development.

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