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DIDACTIC CONDITIONS TO THE CONSTRUCTION OF EDUCATIONAL SUBJECT CAUSING ENFORCEMENT OF METHODOLOGICAL COMPONENTS OF KNOWLEDGE

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The article has systematized nomenclature of components of methodological knowledge, necessary and sufficient for the full acquisition by pupils of subject knowledge of disciplines of science cycle that form the basis of pupils' methodological culture. The necessity of introduction of such didactic element as the subject of study in education content has been proved. The subject of study sets a holistic view of the study area. The basis of its distinguishing and content disclosure is methodological provisions of system approach. The materialized form of presentation of the subject matter is presented by conceptual diagrams.

Keywords: Methodological Knowledge; Didactic Conditions; Subject of Study.

I. INTRODUCTION

Methodological knowledge is an important component of school education content. The need to find ways of their mastering by pupils in the course of comprehensive education is defined by the requirements of didactic principle of scientific character of training, as well as the principle of consciousness and activity of students' learning. In terms of implementation of these principles, developments to improve content, methods and forms of education have been carried out for a long time at different levels of education. Interest in this issue has increased in the last quarter of the previous century in connection with the new challenges of the education system related to training of a creative personality that is able to quickly orient himself/herself in new social, economic and industrial situations. Studies have been conducted in a wider setting, solving the task of pupils' philosophical training.

Accomplished studies gave reasons to the developers of the concept of structure and education content at school to point at strengthening methodological component as one of the areas of content updating, as well as at the need to ensure the integrity of students' ideas about the world through the integration of education content [15].

This principle is reflected in the requirements of state educational standards. For example, in the standard, defining education in physics, it is established that the content of the subject must include the scientific method of knowledge, that is, the problems of the methodology of natural sciences also serve as a critical component of the content of school physics course [38]. However, the standard

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has not yet defined the range of methodological knowledge, the continuity of its assimilation, the load of individual subjects within which this knowledge can be effectively formed.

For the successful promotion in this scientific direction we should base on the theory of knowledge, on the psychological theory of activity, as well as on principles of the system approach, developed in the framework of philosophy.

Traditional training, as well as many didactic systems that are currently being developed are based on the existing ideas about the mechanisms of assimilation of knowledge and students' development. They rely on the principles of the analytical method, which sets procedures of disclosure of object of cognition that is substantially different from system method. Contradiction of these two schemes, two logics: logic of knowledge and logic of learning, has long been noted by many experts. This contradiction gives rise to fundamental research problem.

II. PROBLEMATICS

It includes development of theoretical basis for modification of subject content and process of its acquisition, in which the logic of training will be adequate to the objective laws of students' cognitive activity. The problem of this study includes also development of specific teaching conditions for the construction of a subject causing the enforcement of methodological component of knowledge.

The aim of the article is to examine the possibilities of modifying the content of a subject by enhancing its methodological component, in which the training logic will correspond to the objective laws of students' cognitive activity. It also includes research of the nomenclature of the necessary methodological knowledge and the conditions of their formation in pupils in the course of mastering science disciplines.

The main objectives of this study are to analyze the existing traditional training approaches to understanding the role of methodology in acquiring knowledge and the students' development; and based on the main principles of pragmatist concept of mentality and systematic approach principles, to develop didactic requirements for the construction of an educational subject causing the enforcement of the methodological component of knowledge.

Approaches to the definition of the place of methodological knowledge in the content of general education, as well as ways of their acquisition at school. Traditionally, this problem was considered in terms of the implementation of principle of scientific character of training, principle of consciousness and activity in training, giving it developmental, creative nature (M.N. Skatkin, V.S. Lednev., I.Ya. Lerner, V.V. Krayevskiy, Ch. Kupisevich, A.V. Khutorskoy, I.G. Shamsutdinova). In the development of science studies the special role of philosophical knowledge has been defined, which perform an integrating function in the formation of scientific outlook, in increasing the creative potential of the person. The need to introduce the philosophy in the content of school education is actively asserted in modern didactics (V.S. Lednev).

Nowadays the acquired knowledge is considered to be the main asset. Students' scientific literacy and their research success to a great extent depend on the system of education and the approaches which provide students with methodological knowledge.

Many works of foreign authors deal with the issues of developing students' research skills, the ways of improving their scientific knowledge, the possibilities of acquiring scientific notions, research methods and principles, categories [26, 13, 8, 21, 4, 11, 37, 3, 12, 33, 20, 25, 18, 32, 36].

Students can gain their theoretical research knowledge at different levels. Many foreign authors deal mainly with research training in higher educational establishments where it is involved in undergraduate and graduate programs. Research-methods courses are a mandatory component in post-graduate programs as well. Many students develop their thesis. Acquisition of research knowledge is not a goal in itself. Scholars pay attention to the fact that theory and practice, research-methods courses content and research practice should be interwined; and students should "exercise their theoretical research knowledge in a practical environment" [19].

Action-oriented approach in acquiring theoretical knowledge is studied in many works. Scholars suggest many useful ways for it. These include evidence-based practice [29], the role of ICT and multimedia [10, 22], engaged learning when it is part of "authentic participation in "real-life" settings" and may involve small group work, project-based learning [16]. Some authors speak about creating "the thinking curricula", the first component of which "is centered around the content of the discipline, focusing on learning facts", when the second component requires "higher order thinking" [42]; the new curriculum is centered on various thinking strategies, which are not mere memorization and recall, but a vehicle that help students "make explanations, draw conclusions, suggest theories, plan experiments, etc." [42]. Advising on research methods can also be an appropriate way to acquire methodological knowledge by students. Students are given different assignments, for example to write a "paper on a topic that occurs in methodological consultancy" [1].It is possible only at higher level of education.

Students can solve problems better if these problems are built on what they have already learnt. This process has a cumulative nature and displays a chain-of-inquiry character [35].

An interesting experiment is described by physicists from Stanford and the University of British Columbia [8]. In order to make good progress by students in making decisions they are suggested holding repeated practice based on data during their introductory lab courses with feedback on their decisions. Students in an experimental group were repeatedly instructed; the instructions were slowly faded across the course and at a certain stage were removed. The findings are that students in the experimental group "showed much more sophisticated reasoning about their data" and are "four times more likely to identify and explain a limitation of a physical model using their data" [14].

Some scientists underline the importance of step-by-step acquisition of research skills by students with the simultaneous anchoring of education in the practical context [5]. The organization of the relation between theory and practice involves five implementation levels: 1) theory-based or discipline-based, when students absorb conceptual, theoretical and methodical knowledge; 2) case-based, which assumes learning generalized methods to the built-in problems; 3) task-based or problem-based, when students identify a problem and then collect relevant (scientific) data to analyze and conceptualize this problem; 4) inquiry-based; students perform a research (theoretical and practical) to expand their knowledge about a problem; 5) practice-based or project-based; it presupposes students' participation in research projects and their work together with the owners of the problem [5].

III. METHODS

Methods used in the study are as follows:

- historical analysis of theoretical views on the organization of the process of developmental teaching;
- formative experiment;
- wide pedagogical experiment.

Psycho-pedagogical and methodological basis for the restructuring the program of educational subject, in which the logic of training will be adequate to the objective laws of cognitive activity is activity theory of mentality, as well as methodological principles of the system approach. In didactic terms, these bases define a set of interrelated requirements for the content of the subject and the process of their acquisition.

IV. RESULTS

The basis of philosophical comprehension and transformation of reality are methodological knowledge. The concept of "methodological knowledge" has enough broad interpretation. The most generic definition of methodology is given in philosophical sciences: "Methodology is a system of principles and methods of organization and construction of theoretical and practical activities, as well as the doctrine about this system... highlighting conditions, structure and content of knowledge in it and also paths leading to the truth". The methodology includes particularly the theory of techniques – "a set of methods and operations of practical and theoretical understanding of reality". "Significant diversity of the methods of science and the very creative nature of scientific thinking makes it possible to build a unified theory of scientific method in the strict sense of the word very problematic – the theory, which would give a complete and systematic description of all existing and potential methods" (A.G. Spirkin, E.G. Yudin).

This fact complicates the efforts of developers of educational subjects in reasonable choice of methodological framework for selection of training content and design of the process of learning. In this regard, there is a considerable scope in determining the composition of methodological knowledge and skills that should be mastered by students and included in the process of thinking in the course of solving a variety of cognitive tasks.

Difficulties in the development of this problem are due to its interdisciplinarity, the need to correlate the provisions of various branches of knowledge: philosophy, science studies, didactics, general and educational psychology. New perspectives of the problem make it necessary to rethink and differently interpret some sprcific scientific concepts.

In the didactic guidelines, the problem of strengthening the methodological component of educational activity was studied by some authors. Thus, I.Ya. Lerner highlights the basic operations of thinking which should be necessarily taught: analysis, synthesis, abstraction, generalization, comparison, specification and ordering. However, the author notes that the rules of correct thinking, specified by formal logic are not sufficient enough to ensure the successful movement of knowledge to the truth. Only dialectical logic, understood as a set of laws of activities of cognitive thinking, is able to solve tasks of understanding the world in accordance with the laws of development. At the same time "categories and laws of dialectics are not available for students up to the tenth grade, and therefore cannot be clarified in advance" (I.Ya. Lerner). Compromise, according to the author, involves special organization of specific training material that would form the mental and cognitive structures bearing the features of the dialectical approach.

Another problem relating to methodological issues of constructing an academic subject is connected with the determination of the ratio of different languages to describe the subjects of knowledge. In studies within the framework of systemic and activity approach, the "three-layer" conceptual apparatus that expresses the content of cognitive process has been adopted. The first consists of the concepts of a particular science, the second – the conceptual structure of the method of system analysis, the third – the language of activity. Meanwhile, it is evident that the independence of the language in a particular activity may be only relative. Thus, the language of the system analysis inevitably affects the interpretation of specific scientific concepts. The language of activity "in its sublated form" is also embodied in the language of specific science, forming its semantic and lexical expressions.

Performed as part of the activity learning theory of study, the research articles focus mainly on psychological issues of learning process management. Research position in this case required the separation of investigated factors and their dependencies. In contrast, didactic development of the construction of educational subject, based on this theory, and more than that, its methodical realization requires research of environment that allows connecting and implementing phenomenon revealed in studies in order to achieve maximum impact of training and development.

The content of the subject, as a rule, highlights relatively independent sets of educational material. They bear the names of the sections or areas of one or another course. However, within these organized things, material is presented in the sequence corresponding to the logic of the analytical method. We can say that the subject of the study is not highlighted in the academic subject properly.

The subject of the study is an image of future knowledge, a set of successively studied facts, concepts, laws, etc. without it represents “a pile of particulars”. The methodological basis of the development of the subject of study is a systematic analysis method, the conceptual apparatus of which applied to a particular subject material allows selecting a didactic unit in the curriculum which is equally functionally important.

Principle of mediacy of activity orients the creators of educational technologies to identifying, developing mastering conditions and conscious use of activities. These means can belong to different levels of methodological knowledge: operational (“serving”), subject-specific (concrete-scientific), scientific methodology, philosophical (reflective) (Table 1).

The operational level provides cognitive processes of higher levels of logical operations and techniques of mental activity without regard to the content of specific tasks. The content of operational level consists of any activity skills necessary for the implementation: logical (summarizing for a concept, drawing deduction, etc.), mathematical (use of coordinate systems, solution of equations, systems of equations, operations with vectors, geometric objects, etc.).

The level of subject-specific (concrete scientific) methodology incorporates, firstly, methods of recording of observations and methods of experimental research of objects under study; secondly, analysis and problem solving techniques based on laws of subject area.

TABLE 1: LEVELS OF METHODOLOGICAL KNOWLEDGE

4 level	Philosophical
3 level	General scientific methodology
2 level	Subject-specific
1 level	Operational

The need to develop methodological knowledge relating to the subject-specific level is realized by didactics and methodists. However, the problem of their acquisition is not put in such a binding manner, as the task of mastering subject knowledge; it is not accompanied by all the necessary instructional techniques.

The range of methodological knowledge specified for students' acquisition can be identified from the analysis of the philosophical literature and research data on the problems of the methodology of scientific creativity. However, their diversity, the high degree of abstraction creates a problem of selection of methodological knowledge, acquisition of which is feasible at different levels of schooling. In this regard, it is necessary to carry out an "inventory" of methodological tools by other means as well. To do this, an analysis of the array of problems – not only traditional, but mostly nonstandard (contest, competitive, developmental, etc.) has been performed, in which the difficulty of the decision is not connected with the subject material, but with the need to find the original schemes of its analysis. Each of these tasks has its own reception, heuristics or an original way of solution on methodological level. However, these particular practices embody generalized approaches and strategies, and can be organized and presented as a generalized content recorded by scientific concepts.

The undertaken analysis showed that the following components of methodological knowledge can be engaged to form the generalized landmark foundations of the cognitive actions aimed at resolving the problematic issues.

Notions: abstraction, additivity, axiom, algorithm, analysis, attribute, probability, interaction, genus and species, thing, law, idea, idealization, changes, hierarchy, quality, quantity, constancy, concept, object and subject, explanation, definition, correlation, paradox, behavior, notion, contradiction, synthesis, property, connection, system, symbol, state, structure, fact, element.

Methods: analogy, analytical, genetic, deduction, induction, classification, simulation, observation, contradiction, reductio ad absurdum, systemic, theoretical, experiment.

Principles: complementarity, convertibility, preservation, symmetry.

Categories: absolute and relative, external and internal, necessity and randomness, cause and effect, appearance and essence.

Categories of duration: activity, subject of activity, action, operation, functional characteristics of action (orientation, execution, control and correction), objective and product, subject and means of activity, internalization and externalization, reflection.

Acquisition of methodological knowledge and subject content is supposed to be supported by the requirements of the system and activity approach. The first requirement is about the student's comprehension of the structure of activity in its generalized form. Such categories as objective, subject, means and product of activity have to be perceived by the student and should represent the organizing principles of his/her own actions. The student should reflect on his/her own position as an active bearer of knowledge about these components of activity. While performing his/her own activity, the student should, first, identify its functional characteristics: orientation, execution, control and correction. This structure should be learned in the form of theoretical and practical activities focused on performing some special tasks. Second, methodological notions, similar to subject matter notions, are not formed at once, i.e. by providing their definitions. Such notions are established in the course of some certain evolution starting from domestic, everyday notions up to the comprehensive scientific notions. The notion becomes truly scientific only when it is included in the system of methodological knowledge. Third, the abovementioned evolution develops in its close relations with the student's acquisition of some concrete subject content. At the initial stages of subject content acquisition the methodological component supports the establishment of subject knowledge helping comprehend its notional contents, connections, correlations and regularities of the subject area that are revealed before the student within the framework of practical and educational tasks. At the next stage, when the subject knowledge achieves the level at which the students acquire competence in specific subject-related methods and task solving techniques, they are expected to perform comparative tasks. This type of tasks is aimed at making the student analyze and identify the common things that are contained in the learned methods of solving the tasks related to different subject contents. These common things are the solution strategies which generalized characteristics are expressed through the conceptual construct of general methodology. The next stage is focused on practicing the students' skills in constructing the required task solving techniques on their own. Thereat, this process implies combining the whole aggregate of operations and methods relevant to the problematic contents of the task. These skills should be practiced on the tasks that have been specifically developed for the purpose.

To fulfill this didactic objective, it has been suggested that the text tasks of investigation type should be used. Their specific feature is represented by multivariance of probable outcomes depending on the combination of the parameters that characterize the elements and the interrelations that exist between them within the present situation. Thereat, the determination of the number of probable options of the system's behavior and of the conditions under which that or another option is realized will require the construction of the relevant theoretical model.

Methodological knowledge is practiced not only within the series of special tasks. It has to perform its instrumental function in producing the new subject knowledge acquired by the students based on their own conclusions. This section of the study will formulate the general requirement to the organization of educational actions of the students to fulfill this didactic objective.

The principle of objectness stipulates that the educational subject should include "Introduction into the subject" that should predetermine the system of the basic notions of the subject area, identify the essential, systemic connections and correlations in this subject area.

In this investigation the requirement that the initial exposition of the subject should be done within Introduction has been realized as "conceptual" schematics of the subject.

The level of general scientific methodology encompasses the methods, principles, strategies, etc. that are the means of description of the subject knowledge of different nature and, correspondingly, of the analysis of different task situations. To acquire this type of knowledge, two ways have been identified. The first way supports the deployment of the subject material and is subordinated to its logic. Methodological skills in this case represent the by-product of working with subject contents.

Pursuing the second way the logic of the subject is replaced by the "logic" of the method. This way is basically founded on the correlations that exist between the solutions to specially selected tasks in different subject areas. The tasks are split into the groups concentrating on the idea, method, principle or category that are selected for the purposes of learning.

The systemic principle that expresses the style of modern scientific cognition was realized in this study in several areas: first, in the approach to establishing the structure of the learning material, as it has already been noted above; second, during the process of systematizing the variety of meanings of principle physical and mathematical notions. For example, the classification of forces represented the following principles: fundamentality (strong, electromagnetic, weak, gravitation), denotation (mechanical, electromagnetic, gravitation), contextuality (normal pressure, bearing pressure) and, finally, the effects produced on the "behavior" of the system (accelerating, braking, pressing, pushing, etc.). Third, this principle was realized in the process of solving the tasks based on systemic analysis in cases when other methods proved inefficient. The examples of such types of tasks of secondary school physics and mathematics have been presented within the framework of this study.

The principle of subjectness brings focus on cognitive motivation as on the most efficient incentive for learning activities within the system of developmental education. This principle also asserts the priority of inferential knowledge acquired by the students on their own; and it primarily finds its realization in those sections of the learning material where knowledge itself performs the instrumental function of producing the new knowledge. Thus, special tasks are focused on learning such scientific notions as "object" and "subject" of activity, "a part and the whole", and also on learning such category as "correlation". Among the concrete-scientific physical notions the inferential form has been employed in the course of studying such topics as "Units of measurement of physical values", "Vectors and related operations". Significant role in acquiring methodological inferential knowledge is played by the investigative tasks of two types. The first type is represented by laboratory investigations and it simulates the methodology of scientific research.

Thereat, the development of the program of investigation and the analysis of its results are focused not only on obtaining some certain results relevant to the subject knowledge, but also on the reflection on the applied general methods of investigation. The second type is represented by theoretical investigative tasks. They are characterized by the multivariance of the solutions that depend on the correlations between the parameters preset by the specifications of the task. Notwithstanding the fact that such tasks simulate real investigative problems faced in scientific and practical environment and their share in traditional education is unreasonably small.

The principle that the activity is determined by the purpose highlights the need to set before the student the nearest learning objectives in clearly defined manner. Within the system of developmental education the objectives are formed "in terms of tasks". Such an objective can be fulfilled only when subject-related and methodological knowledge is applied as complex combination.

The principle of genetic connections and structural similarity of external and internal activities predetermines the need for balance between the processes of "internalization" and "externalization" that ensure acquisition, practicing, development and application of knowledge.

The principle of systemic arrangement is presented at several levels: (philosophical, general scientific, concrete scientific). Consequently, its didactical reflection changes as follows:

- at philosophical level, it is presented as the idea of the systemic nature of the world and of the knowledge about it;
- at general scientific level, it is presented as the expression of the integrity and unity of the description of the investigated objects, as their representation through systemic categories (system, structure, element, systemic connection, internal and external environment, behavior of the system, etc.);
- at concrete scientific level, it is presented as a subject of this particular branch of science, as the fundamental aggregate of notions that construct the studied subject area.

Thus, in classes the objective was to make the students acquire relatively small but quite important range of methodological notions that predetermined the initial cognitive mindsets for perceiving the learning material. They, in the first place, included such notions as "object" and "subject" of study. The difference between these notions was explained to the students using concrete examples. Say, one of the most widely known objects a man has to deal with is represented by water. It possesses the unimaginably large number of properties. Different branches of science identify some certain aggregates of these properties for further investigations. For instance, such properties as transparency, fluidity, electric conductivity are studied by physics. The ability to react with other matters and to form new substances comes into the terms of reference of chemistry. The aggregate of the properties selected by some certain science for further investigations is called the subject of its study. The branches of one and the same science differ in terms of the subjects of their studies. For example, the students are asked to describe the changes of space, time and force characteristics of the interacting bodies in the situations as follows:

1. The sledge slides down the hill and, upon having travelled some distance along the horizontal surface, stops.
2. The toy spring pistol shoots a bullet along the upward vertical, etc.

If the level of the majority of the corrections class students makes it possible to refer to the mathematical calculations, then, apart from quantitative description of the principal experimental laws, the teacher and the students together deduct the formulae to express energy for the phenomena under study. In the corrections classes, the share of the knowledge acquired within the full cycle of cognitive stages increases. Inferential knowledge is mostly acquired on this basis. Thus, playing the didactic game "cops and robbers" the seventh form students learn, while playing, the notion of vector and the rules for operations with vectors, although in usual classes this topic is taught within the eighth form program of mathematics and is associated with considerable difficulties.

Formal logic, which does not represent the universal mechanism of human cognition, performs the instrumental function in the process of learning only to some limited extent.

The specified principal difficulties faced by traditional teaching technology can be overcome applying system and activity paradigm. The systemic approach is focused on developing another "reference point" in the process of interpreting the contents of the school subject, namely, on the initial fixation of the general features of qualitative determination of the system of knowledge that are structured according to the general requirements of the method of systemic analysis. In cases of the natural science disciplines the subject of the study is revealed based the conceptual schematics that invariantly reflect the contents of the knowledge to be acquired. The conceptual schematic orients the student within the subject at the very beginning of the learning process and helps project further cognitive development in this subject.

The activity concept sets the functional principles of human psychics: its objectness, indirectness, subjectness, activity determination by purpose, genetic connections and the structural unity of external and internal activity. Learning as the type of activity should be revealed through the specified categories. Thus, the principle of subjectness is realized, as it has already been mentioned elsewhere, through the initial exposition of the subject of study within the special section of the program, namely, "Introduction into the subject".

The principle of indirectness makes the education program developers focus on identifying and classifying the methodological component of knowledge and also on the development of the required methodological techniques to learn them. Methodological skills are formed most effectively within "task" situations that contain the elements of different subjects but are unified by the methodology and by the strategy for their solution.

Implementation of the principles of subjectness and indirectness opens the opportunities for stimulating the cognitive attitude of the student. Possessing the landmarks for his cognitive development and the means for the upcoming cognitive actions the student obtains the ability to plan and to carry out the next cycles of learning activity with a larger degree of independence.

General scientific and concrete scientific methodologies supplement considerably the toolkit required for solving heuristic tasks that occur in the course of professional and social practices of man. Principal differences between the teaching technologies under traditional and under system and activity approach are shown in Table 2.

TABLE 2: PRINCIPAL DIFFERENCES BETWEEN THE TEACHING TECHNIQUES UNDER TRADITIONAL AND UNDER SYSTEM AND ACTIVITY APPROACHES

Principal constructs of teaching technique	*Traditional*	*System and activity*
Objectness	The subject of study is not defined. Orientations for cognitive development within the subject area are not determined.	"Introduction into the subject" provides the exposition of the subject, of its qualitatively specific system of the notions that construct this subject. It makes it possible to build the trajectory of cognitive development within the subject.
Indirectness	Subject knowledge priority. Methodology does not represent an integrated system. "Internal" cognitive means are insufficiently reflected and are not used to perform the instrumental function. Formal and logical determinism.	It proceeds from the assumption that "The method is more important than the result". It shifts educational focus toward strengthening the methodological component. It is aimed at developing methodological techniques to form methodological skills and to use them for the purposes of instrumental functions.
Subjectness	Founded on memory, on involuntarily passive attitude of the students. Learning activities are stimulated through external incentives.	Inferential knowledge priority. Stronger "internal" cognitive motivation of learning.

Within the system and activity approach a great number of investigations have been dedicated to separate didactic aspects of educational process engineering. In line with these ideas quite capacious sections of school program in physics have been developed. Experimental education was practiced with different groups of students, teachers and students; it proved the possibility to modify the educational process considerably, to boost its developmental effects without any additional educational load. To strengthen the methodological component of the acquired knowledge and skills, the interconnections between the school subjects also have to be established and developed.

The possibility to fulfill this didactic task has been demonstrated within the school program of physics that is conceptually close to math.

CONCLUSIONS

1. System and activity approach requires that such didactic unit as the subject of study should be recognized within the contents of the school subject.

   Generalized contents of the subject of study should be visualized in the form of conceptual charts. The conceptual chart establishes the landmarks for the student within the studied subject area, sets potential routes for cognitive development within the learning material.
2. The efficiency of applying the knowledge acquired in the course of education and the indicators of mental development of students are largely predetermined by methodological knowledge and skills learned by these students. Strengthened methodological component in educational contents does not create any extra subjective difficulties in the process of learning, but, on the contrary, it establishes the preconditions for simultaneous implementation of didactic principles of accessibility, of scientific and developmental nature of education.
3. Rational formation of scientific methodological knowledge is possible upon certain reconstruction of a school subject. Didactic and methodological requirements to its development should reflect the basic principles of the activity concept of psychics, namely: its objectness, indirectness, subjectness, its determination by purpose and the structural unity of external and internal activities.
4. Acquisition of methodological knowledge and skills by students presupposes the interaction and mutual enforcement of theory and practice. Students gain research skills with evolving research activities, participating in educational activities where they can relate course content to their scientific knowledge and research practice.

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