MAIN ISSUES OF PEDAGOGY AND PSYCHOLOGY (MIOPAP)
https://miopap.aspu.am/

# ADVANCED LEARNING AS AN IMPLICIT MODEL OF CONTINUOUS EDUCATION[‡‡]

**DOI: 10.24234/miopap.v1i11.19**

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***Abstract***

*By modeling and analyzing the levels of knowledge of students in school disciplines, the great didactic significance of more general and universal ideas in the process of forming students' thinking during learning has been revealed. Presenting particularly important aspects of the process of generalization of students' knowledge and existing interpretations of one model of advanced learning, ways to implement the ideas of continuous education within the framework of fundamentalization and strengthening of the methodological approach of the educational process are identified. The application of the presented model of advanced learning allows to generalize fundamental ideas, universal concepts and methods, which are the basis for the formation of thinking in the following discipline by using general logical methods of scientific knowledge (analysis, synthesis, induction, deduction, modeling, analogues, etc.). The subject of the study is to reveal the fundamental possibilities of advanced learning in the process of implicit transfer of students' knowledge. The purpose of the article is to substantiate the development and implementation of an advanced learning model aimed at improving the quality of learning in the context of continuous education, based on the implicit transfer of student knowledge. It is shown that in advanced learning, the objects of advance are such fundamental ideas, concepts, and methodological approaches which in their essence are core for the process of knowledge transfer. Consistent application of advanced learning is an effective tool for generalizing students' knowledge which contributes to the formation of students' thinking. As a result, the concept of "Advanced learning as an implicit model of continuous education" was has been put forward.*

***Keywords**: advanced learning, continuous education, implicit transfer of knowledge, formation of thinking, generalization of knowledge.*

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## INTRODUCTION

Research and study of educational and methodological literature on the topic under consideration shows that for the effective organization of various educational processes (revision, advanced learning, etc.), there is a need to group the content of educational material and the teaching methods. We are talking about the generalization of students' knowledge which allows us to systematize knowledge, methods of activities, and teaching aids within the framework of particular concepts, laws, theories, and universal methods. This approach will allow the learning process to be focused on the fundamentalization and methodologization of the content of education. Presenting the essence of one model of advanced learning, it is shown how the potential, skills, and abilities of teachers can be effectively used during the current learning while implicitly modeling the educational process. The above-mentioned reserve has not yet been sufficiently studied and developed in the methodological literature. The principles of the ways of selection and methods of transferring knowledge to the future during advanced learning are presented indicating their implicit nature. The latter allowed us to put forward the concept of "Advanced learning as an implicit model of continuous education".

## METHODS

When choosing methods and techniques for the scientific search for improving advanced learning, we have been based on the ideas of the integrity of the content and structure of each discipline, taking into consideration the students' age and psychological characteristics, implementing:

- the idea of generalizing the educational material of specific disciplines (Babansky Yu.K., 1978).
- a concept in which education is considered as an educational model of science (Samarsky A.A.) (Samarsky A.A., 1989).
- the provision of the creative activity of students depending on the unity of the objective-subjective principles of this activity (Vyalitsyna A.P.) (Vyalitsyna A.P., 1986.).
- the idea of an implicit learning method,
- the idea of implementing continuous education.

Currently, philosophical knowledge has had and continues to have a significant influence on the formation and dynamics of pedagogical systems, first of all, through the construction

of a methodology for pedagogical activity, and secondly, through the development of ideological paradigms of education and pedagogical activity.

Modernization of education at the present stage of development of society is aimed at methodologizing and increasing the scientific level of education, aimed at the development and implementation of such forms of education in which, according to academician A.S. Kondratiev "... the content of education is shifting from purely informational to methodological" (Kondratiev A. S., 2006).

In light of this, at present, in didactics, those teaching methods are more valuable in the frame of which the genesis of theory is realized through the content component, aimed at ensuring the systematicity of theoretical knowledge, its internal development, and generalization. Analysis of the development of education and modern teaching technologies allows us to outline the main trend in the development of learning theory and determine ways of improving it.

Teaching any discipline at all levels is subject to various changes over time in connection with the development of basic science and the transformation of didactic goals and objectives accepted by the scientific pedagogical community at each stage of development of pedagogy. Speaking about the cycles of development of science, the American historian and philosopher Thomas Kuhn clearly divided its three main manifestations into : normal science, extraordinary science and the scientific revolution (Kuhn T., 1977). According to Kuhn, within the framework of the latter, new paradigms are formed, which means the recognition of all scientific achievements which over a certain period provide a model for posing problems and their solutions to the scientific community. Science must be ahead of life, and, therefore, education must always respond on time to changes that are taking place.

At present, philosophical knowledge has had and continues to have a significant influence on the formation and dynamics of pedagogical systems, first of all, through the construction of a methodology for pedagogical activity, and secondly, through the development of ideological paradigms of educational and pedagogical activity. Modern teaching methods, multimedia technologies in the educational process, the use of distance learning methods, and, finally, tasks associated with continuous education, involve the search for new models of learning and suggest the direction of the vector of main ideas on which the subsequent paradigm (model) of education should be based.

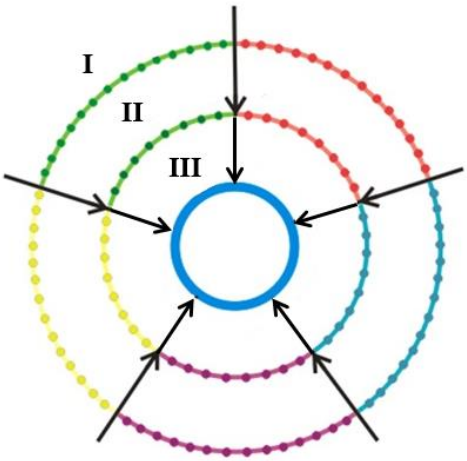
Within the framework of the new educational paradigm, the student must be taught not a sum of knowledge, but a way of thinking to develop creative abilities, the ability to independently look

for new ways to solve problems, and to freely carry out activities in both standard and non-standard situations.

In our opinion, paradigms, which are models, should be used to solve not only research, but also practical problems. In particular, the learning paradigm is a learning process in which the educational material is presented to students "focally", the students' attention is concentrated on the main facts and events (Tsaturyan A.M., 2014).

Research regarding the levels of knowledge of students in school disciplines shows that from a didactic point of view, the new educational paradigm should be aimed at fundamentalizing and methodologizing the content of education.

In the work of (Tsaturyan A.M., 2014), conditionally, with the help of circles (Fig. 1), which represent a set of certain knowledge, three levels of knowledge of students and the logical path of mental activity (algorithm) of the transition from one level of understanding to another are schematically presented. The latter can provide the formation of thinking inherent in basic science.




**Pic. 1**. Levels of knowledge of educational material

**I -** level of knowledge of specific educational material

**II –** level of knowledge of particular laws and general concepts

**III** – level of knowledge of fundamental laws and ideas of a methodological nature

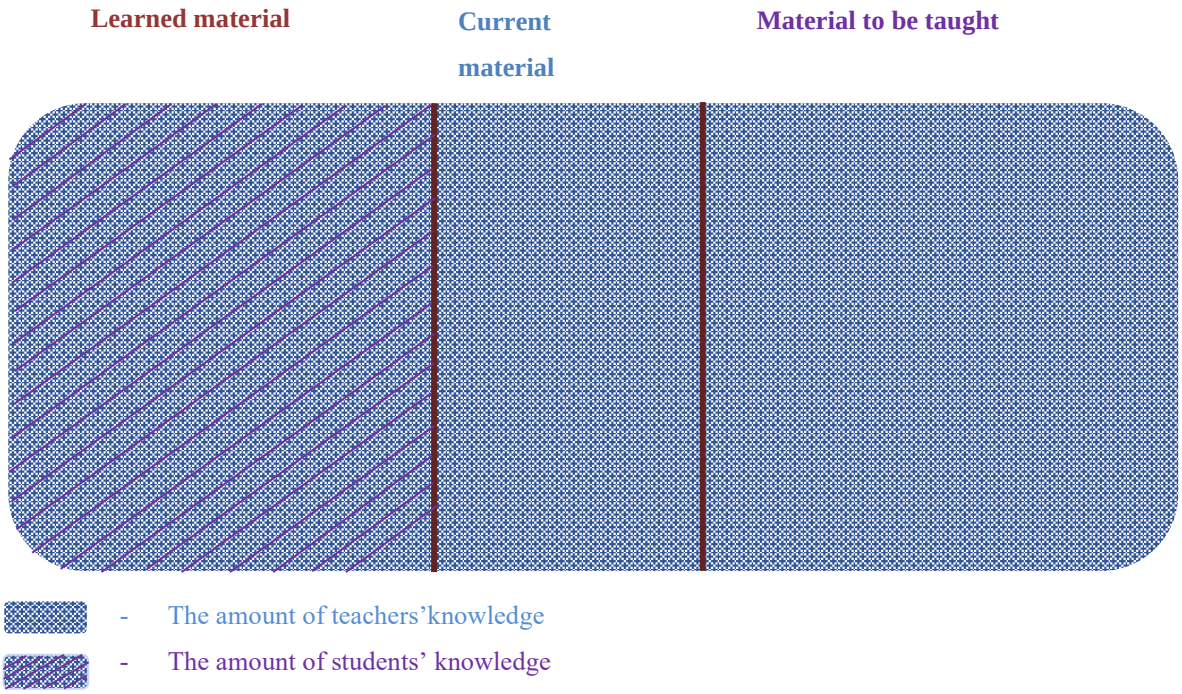
When teaching, the teacher should strive to organize the educational process so that in each lesson elements of the transition from level I to level II are manifested, and over time to level III.

Achieving Level III of knowledge at first glance requires a long time and effort

but with the right choice of methodological approach to the learning process, this can be achieved relatively easier. The main thing is to fully understand the epistemological and logical connection between all stages of learning (previous, current, subsequent) and create an educational and methodological system that allows you to demonstrate the role and significance of each stage. At first glance, it seems that it is impossible to include elements of the subsequent stage in the process of current learning, that is, to transfer the acquired knowledge to the current level and vice versa. But there is a large and, most importantly, important reserve of the teacher's pedagogical activity, which is aimed at implementing the "interaction" of the current and subsequent stages of education.

The reserve in question represents the amount of skills and knowledge of educational material that the teacher has, as opposed to the student.

Indeed, as schematically shown in Picture 2, the scope of students' knowledge is, at best, limited to the material covered previously, while the teacher masters the entire volume of a given course (past material, current material, and material to be taught).




**Pic. 2** The amount of knowledge of teachers and students

The existing "advantage" can be viewed as a resource for implementing advanced learning, since the latter relates to the relationship between current and future learning.

The training period can be divided into three periods: current, completed, and subject to teach. From a didactic point of view, the “interaction” of these three periods of learning is important. If the “interaction” of the periods of current and completed learning is obvious, then establishing a relationship between current and future learning, at first glance, turns out to be unrealistic. The fact is that in the first case we are dealing with specific educational material, and in the second case, students do not know the material that is subject to further training; only the teacher masters the latter. But such a reserve is not used in any way for didactic purposes as a means of increasing the effectiveness of teaching. We are talking about the implementation of advanced learning, which until recently was mentioned very superficially.For the first time, the work of (Tsaturyan A.M., 2013) put forward the idea of one advance in teaching physics, associated with the transfer of knowledge of current material to the future.

In teaching practice, the widespread use of interdisciplinary and intradisciplinary connections are important and key components of the learning process and solve a number of important didactic tasks, as previously acquired knowledge is transferred to a new situation, which helps to reveal the essence of the new material.A natural question arises: what can current learning provide in the future? It is entirely reasonable to pose such a question since, otherwise, the purpose of learning and its developmental function disappear.

Interaction of periods of training means the transfer of knowledge and skills from one period to another and vice versa.Within the framework of the concept “Education is an educational model of science”, when studying current topics, with a view to their further application in the study of new ones, it is possible to widely use scientific methods of cognition in relation to the learning process, which allow the widespread use of general logical methods of cognition, such as analysis, synthesis, generalization, idealization, induction, deduction, analogy, modeling, etc. Teachers who can see the perspective and the learning outcome, during continuous learning, should create the prerequisites for making certain connections when studying subsequent topics, to reduce objective difficulties, develop the creative abilities of students, and prepare them for continuous education. Indicating those universal ideas and concepts considered as the material of advance during teaching, based on general logical considerations and the characteristics of a particular discipline, the teacher must indicate the place and method of their possible manifestation in the future.

With this approach, the gained “advanced effect” has valuable didactic value and is in tune with modern teaching requirements. Such appropriately organized teaching should find its rightful place in the theory of teaching methods.

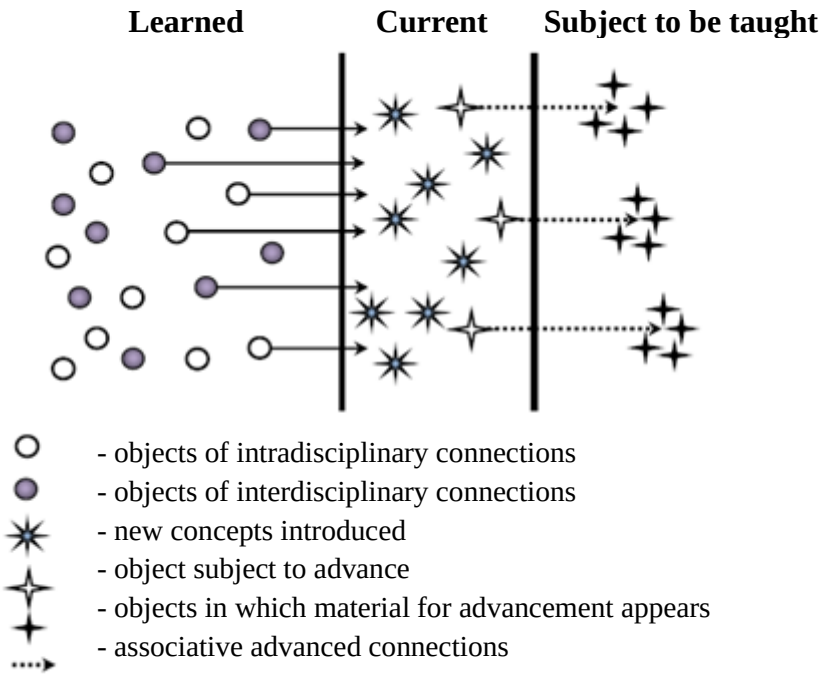
In one of her first works S.N. Lysenkova (Lysenkova S.N., 1989, Lysenkova S.N., 1988) put forward the need for advanced teaching to schoolchildren.According to the theory of S.N. Lysenkova, the bases of advanced learning are, on the one hand, commented control, as an opportunity to establish teacher-student feedback, to save time in the lesson, to foster independence, attention, and the ability to concentrate, on the other hand, support and scaffolding schemes that allow each student to be engaged in active processes of all lessons, bring ideas on the topic being studied to the formation of concepts and stable skills.

The work of (Tsaturyan A.M., 2017) proposes a variant of the model of advanced learning, in which, in contrast to traditional ideas, advanced learning is considered one of the important stages of continuous learning, when the teacher, through general logical methods of scientific knowledge (analysis, synthesis, induction, deduction, analogy, modeling, etc.) creates associative and advanced connections and carries out an implicit (implicit) transfer of students’ knowledge into a new situation, where they should be specifically manifested in further learning.

It is assumed that with such a way of teaching, there are good opportunities for implementing the methodological aspect of teaching, since the issues of transferring such knowledge, which are of a universal and generalized character, modeled within the framework of some system, come to the fore (Tsaturyan A.M., 2019).

The essence of the proposed model is to highlight and reveal the essence and meaning of certain concepts, ideas, methods, etc., for further transfer during the current lesson, which, in addition to their particular, concrete manifestations, have a wider range of application and are universal.

We are schematically representing the transfer of knowledge from one stage of learning to another (Pic. 3).




**Pick. 3.** Schematic representation of knowledge transfer during teaching

In the work of (Tsaturyan A.M., 2013), which is devoted to a brief image of the organization of advanced learning and the definition of its role in teaching physics, specific examples show how learning with advanced elements can be a prerequisite for continuous learning of physics and general revision, since the principle of advanced learning allows the teacher to create a “bridge” between topics in advance in such a way that, in the process of studying the previous topic and subsequently, to capture the “spring impulse ” of the next topic (Tsaturyan A. M. 2013).

The fact of the implicit nature of advanced learning, which acts as one of the principles for the implementation of continuous education, allows us to consider advanced learning as an implicit model of continuous education. This means, first of all, placing the learning process on a methodological basis, in which the role of general ideas and reliable qualitative and quantitative research methods dominates.

In the process of continuous learning, when transferring knowledge and skills from previous experience, we are dealing with an explicit teaching method, since both the material being transferred and the place where it is being transferred are known. The latter allows to influence the

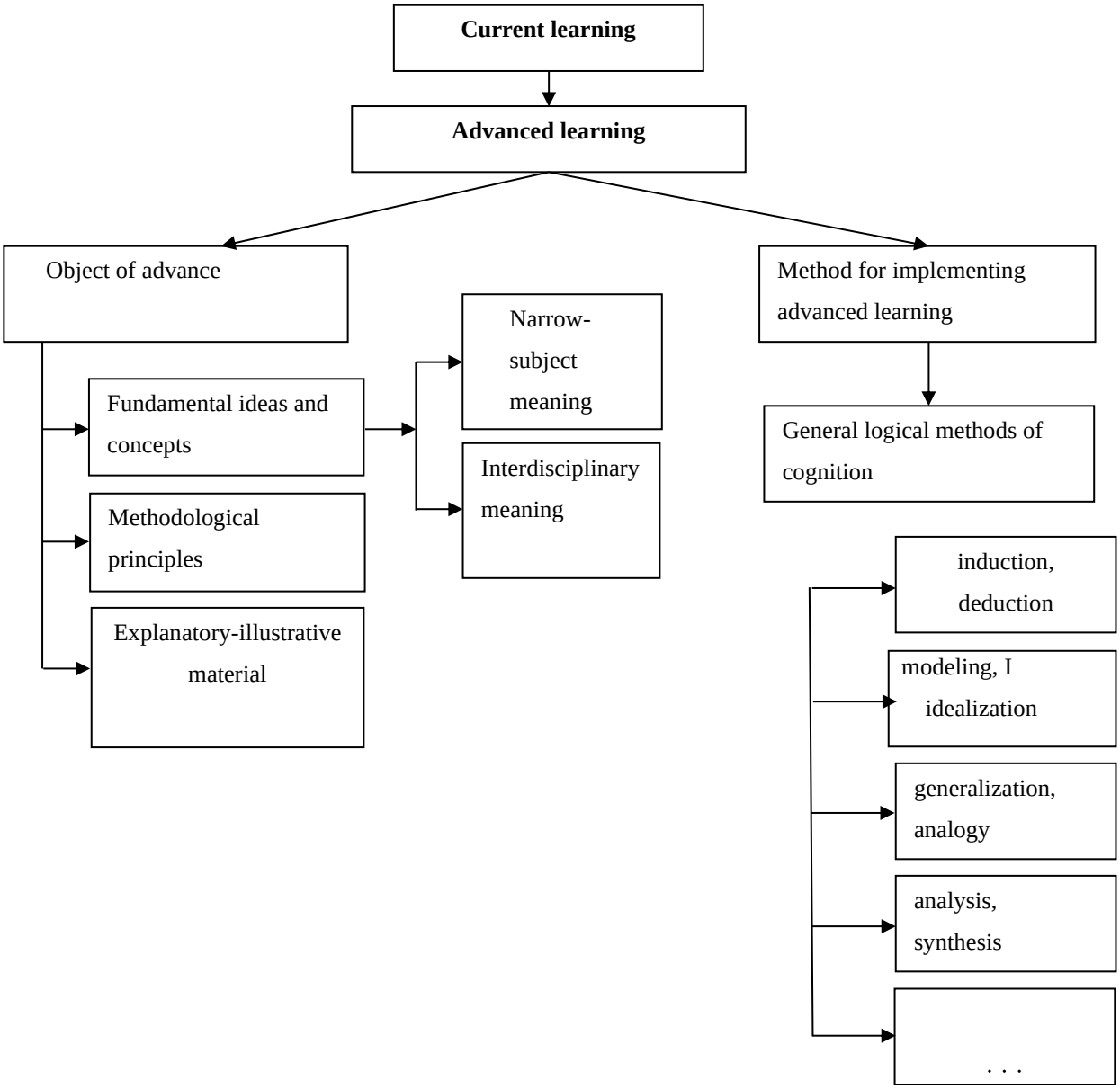
student's personality directly and openly. In contrast to this, with advanced learning, when knowledge is transferred to the future, another mechanism appears and the entire process of transfer is of an implicit nature, containing systems of hidden, implicitly expressed mental actions. In this case, only the material that is to be transferred is clearly expressed for the student.And the place of transfer is formed as a result of established associative connections existing between various kinds of concepts, methods, processes, and phenomena, which are based on similar ideas. Since these ideas and concepts have a generalized nature within the framework of a certain system, therefore they are suitable at all levels of education in a particular discipline and can play a systematizing, generalizing role in the process of continuous education. When implementing advanced learning, interdisciplinary and intradisciplinary connections manifest themselves differently, since they are implicitly aimed at the future both in time and in information, but during continuous learning, appropriate trajectories are designed for them with the help of various forms of mental activity. The latter is implemented using various associative ways when the teacher indicates existing connections between individual events, facts, objects, and phenomena that should naturally arise in the future.At the same time, a new type of connection is emerging, which can be called associative-advanced.We can insist that we are dealing with a new type of connection in learning when there is an implicit advance of students' knowledge to further transfer it.

When implementing advanced learning, the teacher must be able to identify the educational material that is subject to advancement and the methods of transferring this material using general logical methods of cognition.

In general terms, the algorithm for implementing associative-advanced connections can be presented as follows:

- identify objects for the implementation of associative-advanced connections;
- emphasize those properties of the object and method that determine its universal and generalized character;
- illustrative examples and ways to show its possible manifestation in similar situations;
- describe in general terms a situation where it is potentially possible to use portable objects and methods.

We are schematically representing the place of advanced learning in current teaching, as well as its object and methods of implementation (Pic. 4).



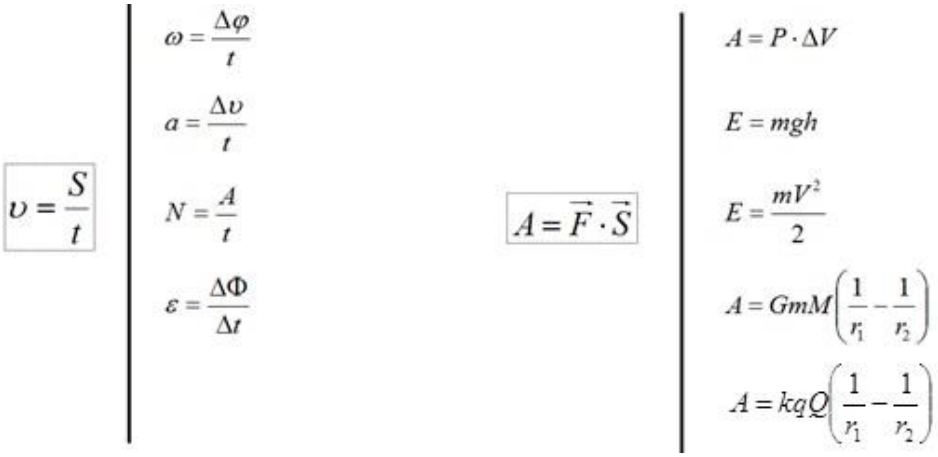

**Pic. 4.** Objects and methods of implementing advanced learning

The work of (Tsaturyan A.M., 2019) shows that the object of advancement mainly is: fundamental ideas and concepts, methodological principles, explanatory and illustrated materials, and the role of implementation methods are general logical methods of cognition, such as induction, deduction, modeling, idealization, generalization, analogy, analysis, synthesis, etc Taking into account the objects and methods as a factor of the successful implementation of advanced learning, the following principles that must be followed are of no small importance:

- taking into account the age and psychological characteristics of the students;
- taking into account the level of preparedness of students;
- taking into account the degree of universality of the selected advance objects;
- evaluate the feasibility and effectiveness of the methods used to implement the implicit transfer of knowledge into the future.

In Science and Mathematics, good opportunities for applying the proposed advanced learning model are available as these disciplines are based on the most fundamental laws, patterns, theories, characteristics, concepts and general ideas. And, in some individual cases, the content of the transferred material goes beyond the boundaries of the discipline and is interdisciplinary. A typical measure of this is the concept of speed. Depending on the age characteristics of students, there is a need at different stages of teaching Physics to present the concept of speed not only in a narrow sense but also in a broad sense, since in different sections of Physics and other disciplines (Chemistry, Biology, Mathematics, etc.) students often encounter with this concept (Tsaturyan A.M., 2013). With this approach, as work experience shows, later, students easily learn many quantities and characteristics, which are based on the concept of speed.

Another similar example is the concept of work in Physics, which students encounter in almost all sections of the course. Picture 5 schematically depicts the above-mentioned quantities to be transferred and later their private manifestations in other sections of Physics.




**Pic 5.**Quantities of the concepts of Speed and Work and their further manifestations in the course of Physics.

The work of (Tsaturyan A.M., and Karhanyan G.G., 2017) identifies several ways advance introduction of the material being studied in physics. However, these developments can also be taken into account in humanities. Let's mention some acceptable ones:

1. Advancement in general theories, laws,general methodological principles of physics (humanitarian disciplines), laws, and fundamental ideas of physics (humanities).
2. Advancement in individual physical quantities and concepts.
3. Advancement in mathematical calculation methods.
4. Implicit advancement, embedded not in the program, but in the teaching methodology.
5. Advancement in preparing solutions to problems on the topic being studied.

Within the framework of the criteria for classifying pedagogical technologies by level of application, the proposed model of advanced learning is general pedagogical, based on a philosophy that is based on the dialectics of science and education. In terms of structure and content, in different forms and at different levels of education it manifests itself as educational, general educational, and heuristic.On the other hand, it can be argued that in terms of the quality of approaches applied to student learning, advanced learning is person-centered and collaborative.The characteristic features of the technology of this model of associative advanced learning are:

- development of dialectical and abstract thinking of the individual,
- methodological approach to teaching,
- giving significance to more general ideas, concepts, methods,
- implicit transfer of knowledge to the future during continuous learning,
- development of various associative connections,
- development of skills in knowledge generalization and modeling.
- creating a basis for the development of continuous education.

## CONCLUSIONS

Work experience and research on the topic under consideration show that the learning process should be based not only on the previous experience of students, but also be guided by their further educational activities to ensure the continuity of acquired knowledge in the future, facilitate learning, and create the prerequisites for the generalization of fundamental ideas and general logical

methods of cognition. Therefore, the main goal of advancing learning is to improve its quality by establishing associative connections during continuous learning using general logical methods of cognition. To achieve this goal, a number of problems have been solved in the work, in particular, the optimal structure of a lesson for solving didactic problems has been analyzed, possible ways and means of implementing advance learning have been identified, basic requirements have been developed for the selection of criteria for material for advance, the substantive foundations of the methodology for implementing advanced learning; an educational and methodological system has been developed and justified to ensure the effective implementation of advanced learning.

According to our ideas, advanced learning is primarily intended through various methods of scientific knowledge (induction, deduction, analogy, etc.) to highlight more universal ideas (methods, approaches, models, concepts, quantities, etc.) when studying current topics for their further application when studying new ones. At the same time, the achieved advanced effect has valuable didactic weight, since it allows the first stage of methodological knowledge to be transferred to a new situation.

The proposed concept of "Advanced learning as an implicit model of continuous education" allows us to evaluate from a new perspective the role of advanced learning in the development of lifelong education, which consists in the transfer of certain, generalized knowledge and skills from the current lesson to the future by applying implicit teaching methods.

***Acknowledgements:*** *The authors would like to thank the editors and anonymous reviewers for their constructive feedback.*

***Funding:*** *This study was not supported by any internal or external funding sources. All research presented in the article was conducted at the expense of the author(s).*

***Availability of data and materials:*** *All supporting data generated or analysed for this study are available upon request.*

***Ethics approval and consent to participate:*** *Not applicable.*

***Consent for publication****: Not applicable.*

***Competing interests****: The authors declare that they have no competing interests.*

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***Received: 17/01/ 2023***
***Accepted: 10/ 04/ 2024***

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