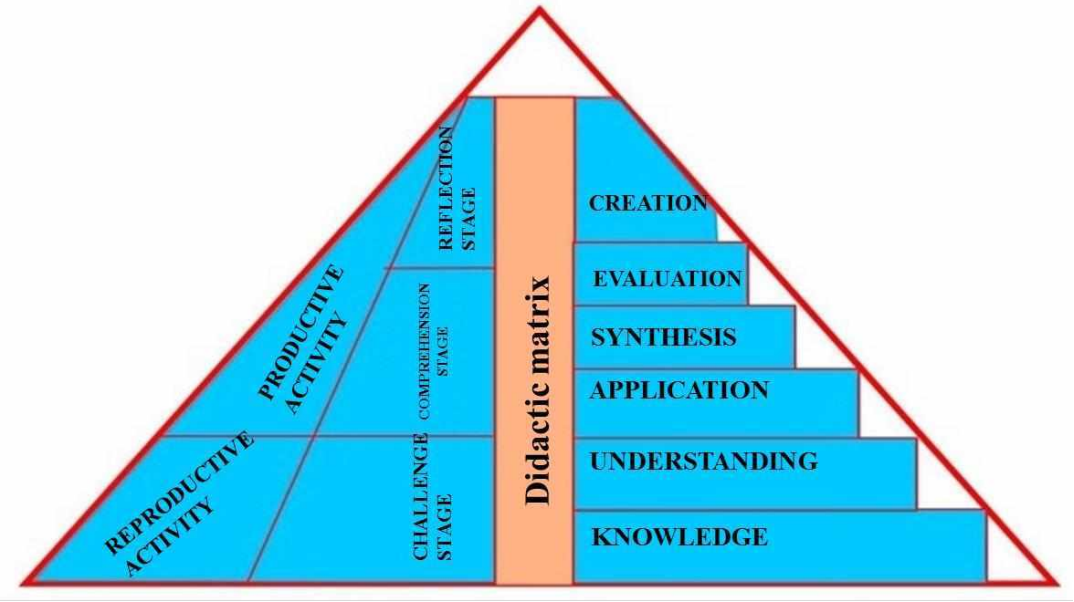
ZHAUMBAY KARAYEV

TECHNOLOGY OF THREE-DIMENSIONAL METHODOLOGICAL SYSTEM OF LEARNING

(Annotated Theses of the Author's Conceptual Ideas)



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This manual presents brief theses of conceptual ideas of Professor Zhaumbay Karayev on the development of author's pedagogical technology. The technology of three-dimensional methodological system of learning of Professor Zhaumbay Karayev has been successfully used in schools of the Republic of Kazakhstan since 1995 and has shown its effectiveness in improving the quality of education. A detailed description of the technology is presented in the monograph "Technology of three-dimensional methodological system of learning: essence and application" (Karayev Zh.A., Kobdikova Zh.U., Almaty, Zerde, 480 pp., 2018).

1. The Significance of Technological Development in Educational Process.

In our opinion, the main reason for the need to develop and introduce pedagogical technologies into school practice is the fulfillment of the requirements of the third paragraph of Article 51 of the Law of the Republic of Kazakhstan "On Education". Paragraph 3, Article 51 of the Law of the Republic of Kazakhstan "On Education", which establishes the duties of educators, states that pedagogical staff must ensure that students' knowledge corresponds to the requirements of the State Compulsory Education Standard in terms of developing life skills, competences, independent learning and creative abilities. However, the analysis of UNT results shows that annually on average 20% of students do not achieve the threshold level, which corresponds to the lowest level of learning "recognition" established by the State Compulsory Education Standard. This means that teachers, who teach these students, do not comply with the requirements of the third paragraph of Article 51 of the Law, i.e. violate the rule of law! It turns out a paradox: in other spheres, employees who violate the norm of law are punished, and in the sphere of education it is allowed. A dilemma arises: either the requirements of this rule of law are too high, or teachers need to master such a didactic toolkit that ensures that all students achieve at least the level of mastering at "recognition" stage. Scientific researches and anecdotal evidence show that the use of traditional teaching methods does not create an educational environment conducive to learning and achieving desired learning outcomes for all students. Therefore, pedagogical technology should be applied to instruction.

As is known, in any industry, manufacturing products with defects is considered unacceptable, therefore, the effectiveness of industrial processes is constantly evaluated, more efficient methods are being developed (for example, minimizing materials, time and energy needed) to optimize processes in order to obtain products of higher quality.

However, in education (with approximately 3 million school children and more than 300,000 teachers), errors are allowed, assessment process is biased, application of effective methods and the achievement of higher quality receive lip-service. Quality of education, i.e. educational achievements of students are not evaluated based on designed criteria, because often knowledge mastery at the level of "recognition" or "memorization" is evaluated as "good" and "excellent." Therefore, it is not surprising that many students taking UNT cannot solve logical problems included in the tests (in spite of the fact that their number is negligible). Because of this, an enormous number of applicants (more than 40%) annually cannot pass the test to receive "Altyn belgi" award.

This problem cannot be solved by introducing "updated" curriculum and interactive teaching methods into school practice, as they answer the questions "what to teach?", "how to teach?" and "why teach?". These questions and the question "how to teach effectively?" are answered only by the application of

pedagogical technologies in the educational process.

Pedagogical technology should ensure that all students acquire knowledge and skills that are not lower than the requirements of the State Educational Standards and, in addition, promote the development of life skills, subject matter knowledge and key competences, functional literacy, and creativity. Therefore, at present, technological development of educational systems has become a new promising area of pedagogical science and practice.

Moreover, technological development of the educational process makes it possible to implement the conceptual ideas of humanizing education in practice.

2. What is pedagogical technology and what does it consist of?

Pedagogical technology is a scientifically based didactic algorithm, allowing teachers to design lesson plans to guarantee best learning outcomes for each student.

Pedagogical technology is a project of the pedagogical system, the application of which guarantees best results (V. Bespalko).

According to V. Bespalko, pedagogical system (PS) includes a certain set of interrelated teaching aids, methods, content, organizational forms, learning objectives (i.e. methodological system of learning (MSL)) and the processes necessary to create an organized, purposeful and deliberate pedagogical influence on the formation of a personality with given qualities [1] .

Thus, PS = MSL + Apr = MSL + M + Ca + C, where M is the motive, Ca is cognitive activity, and C is control. In turn, Ca = IBA + Ea + Corr + Cd; [1], where, IBA are the indicative bases of the action, Ea - executive actions, Corr is corrective actions, and C is control actions.

At the core of all pedagogical technologies, besides the guaranteed result of training, lies the idea of creating adaptive conditions for each student, i.e. adaptive to students' goals, content, methods, forms of learning with the main focus on independent cognitive activity of students, the expansion of its subjective functions.
From this point of view, the above definition of V. Bespalko is the most complete, supplemented by the following requirements:

1) diagnostic goal-setting and an objective evaluation of the quality of mastering learning material by students;
2) principle of integrity (structure and content) of the entire teaching and educational process, coherent integration of all elements of the pedagogical system;
3) pedagogical technology in educational process that determines the structure and content of the student's learning and cognitive activities, personal development as a whole;
4) minimization of the pedagogical impromptu in practical teaching, guaranteed achievement of learning objectives [1].

Note that the above requirements for teaching technologies, defined by V.Bespalko, are aimed at modernizing pedagogical system based on personality-

activity approach. Moreover, they assume the fulfillment of all the requirements of the humanistic education paradigm to modernize the methodological system of learning.

Thus, main components of pedagogical technologies include a diagnostic goal, a motive, engagement, a methodological training system aimed at developing student's information and research skills, self-management skills, i.e., didactic process. In the didactic process, motivated cognitive activity of a student is accomplished through mastering the basic components of the methodological system of learning. Traditionally, students master educational content through methods, forms and means of instruction under the guidance of a teacher. However, in the activity approach, content should also become an instrument of development, independent acquisition of knowledge and skills. Forms of learning - the learning environment of active and interactive interaction of all subjects of the didactic process. Methods and means of teaching should be transformed into means of independent search and study of a student in the educational environment.

3. What are diagnostic goal-setting and three-dimensional methodological system of learning?

Diagnostic goal-setting of the training is characterized by learning outcomes expressed in the actions of students, which can be accurately identified and measured [4].

V. Bespalko reasonably believes that the diagnostic method of goal-setting is a starting point for the development of pedagogical technologies, proving that in modern school practice and pedagogy there are still no diagnostic goals, and this is the main reason for a lack of progress in school practice, "childless" and formal pedagogy [1]. "Today, the educational process is carried out, paradoxically, without a clear goal-setting and an objective results evaluation. Omitting the goal-setting process, teachers immediately rush to design curricula, programs, manuals and other teaching and methodical tools. This waters down, or makes the conceptual basis of education amorphous, leaving enough loopholes for the spread of known negative phenomena - formalism and prioritizing high quantitative performance indicators - in school practice, as well as other factors thwarting reforms, asserts V. Bespalko [1].

As is known [4], the goal is a specific, qualitative, future idea of the desired (expected) result, which a student can reach at a specific point in time. Diagnostic goal-setting suggests that when formulating objectives, there is always a mechanism (method) that allows you to check whether the result is consistent with the goal. Hence it follows that the goal and result must be presented, measured, characterized, described in some units, or parameters [4].

The most well-known system of goals with such properties is the taxonomy of learning goals of the American scientist B. Bloom. Bloom’s system of goals has the

following components that are hierarchically dependent on each other: knowledge → comprehension → application → analysis → synthesis → evaluation.

Thus, Bloom justified the hierarchical structure of learning objectives (Bloom's taxonomy), i.e., vertical hierarchy of one of the elements of a holistic methodological system of learning. It should be noted that Bloom's taxonomy of learning objectives, developed in the middle of the last century, played a progressive role in the development of the theory of learning, in general, of didactics. In the world practice, Bloom's taxonomy serves as a basis for planning and assessing students' academic success. Abroad, Bloom's conceptual ideas laid groundwork for the development of "theory of complete assimilation" and learning technology that applies this theory, focused on result. However, foreign scientists did not investigate the hierarchical structure of other elements of the holistic methodological system of learning (content, methods, forms and means of teaching), as well as the hierarchical essence of the motives of learning, levels of learning by students of educational material and other components of the educational process in conjunction with diagnostic goals-setting.

The phrase "learning outcomes expressed in the actions of students" in the context of diagnostic goal-setting, means that: (a) training should be organized around independent cognitive activity of students; b) results of training form a hierarchically dependent structure, since the activities of students are characterized by a hierarchy: reproductive, transformative and productive activities [2].

Based on this hierarchy of activities, scientists have identified relevant hierarchies of learning outcomes. For example, Academician V. Bespalko describes the following levels (hierarchies) of content mastery: discipular, algorithmic, heuristic and creative levels of learning [1].

When designing a pedagogical system based on technological approach, V.Bespalko suggests implementing consistent knowledge acquisition, i.e. gradual transition of the cognitive activity of a student from a reproductive level to transformative level, then to productive level [2].

Diagnostic goal-setting in education requires a hierarchically structured content of education, because hierarchical actions of students are aimed at the development of hierarchically systematized educational material. It should be noted that the hierarchical structure of educational content constitutes its developmental and procedural basis.

Traditional informative content gives knowledge at the level of "memorization" and is used procedurally only for reading completed texts, rules or facts. Such content does not serve a developmental function that allows students to fully immerse themselves in research activities throughout the entire educational process. The hierarchical structure of educational content fully reveals its procedural possibilities, as it becomes in this case the conductor of the developing activity of a student in the didactic process, allowing to cover the entire range of its activities from reproductive to productive level. Thus, the content transforms from

informative text to the part of the cognitive activity of students; students, perform level-based assignments, acquiring skills of a higher level.

Our research has shown that not only goals, but all components of the methodological system of learning (goal, content, methods, forms and means of teaching) form a hierarchy and are interlinked in level-based relation [2,3]. Note that the structure of the first two elements (goal, content) of the methodological system forms a strict hierarchy, and the hierarchical structure of the remaining elements is a "derivative" of them. The hierarchical structure of educational content is scientifically substantiated in the works of Lerner and Taba [2]. Taba defined three successive, hierarchically co-ordinated stages of formation of thinking and, accordingly, three types of study assignments: 1) formation of concepts; 2) interpretation of data; 3) application of rules and principles. It also proves that each of these types of educational and cognitive activity corresponds to a specific learning strategy. Thus, she developed hierarchically co-ordinated strategies in accordance with the three main types of cognitive tasks identified. It is not difficult to see that Lerner's theory of the four-element basis of educational content is confirmed by conceptual conclusions of Taba. Figure 2 does not show the fourth element, or the emotional relationship, which determines the educational function of the content. The requirements of this element will be taken into account when constructing the content of level-based study assignments.

It should be noted that the hierarchical essence of the content emphasizes not only its structural and informative bases, but also procedural and developmental aspects that, under conditions of "knowledge-based" content, are not visible and almost do not function.

We called the methodological system of learning, elements of which form a hierarchical multilevel structure, a three-dimensional methodological system of learning (see Figure 1).

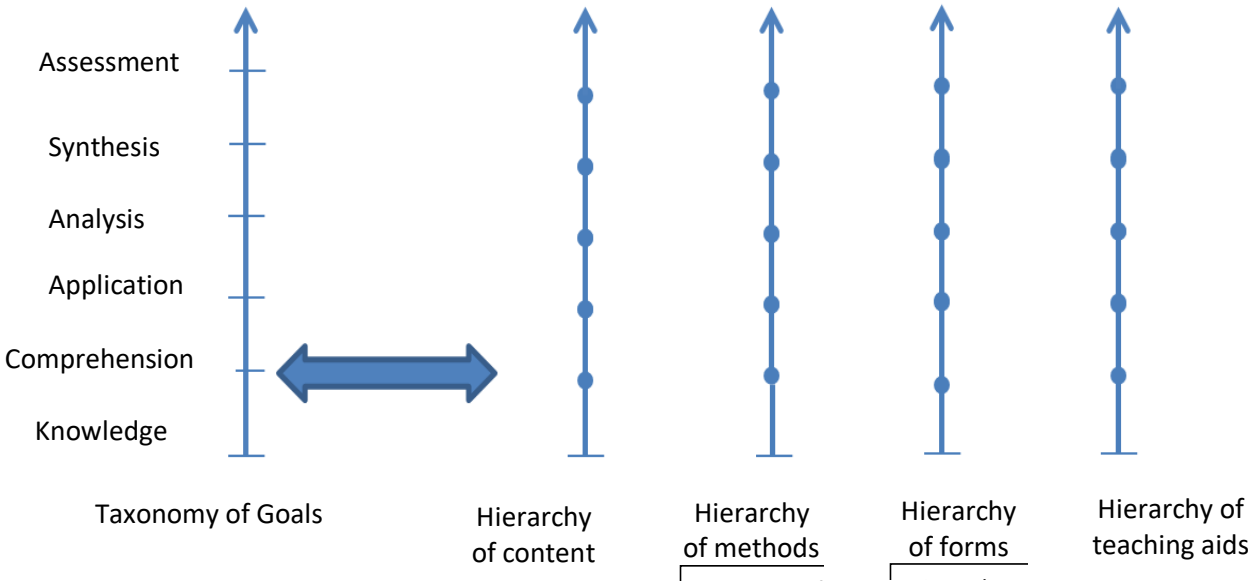

Fig.1 Three-dimensional methodological system of learning

"Three-dimensional" implies a multilevel hierarchy, i.e. vertical axis relative to each component of the methodological system of learning: purpose, content, methods, forms and means of teaching. Thus, three-dimensional methodological system of learning is a scientifically proven extension of Bloom's idea about the taxonomy of learning goals for all components of the methodological system.

Traditional "knowledge-based" content corresponds to "knowledge-based" learning, that uses the components of the first level of the three-dimensional methodological system of learning. "Wrapped" around the first level of three-dimensional methodological system, "knowledge-based" system stopped the educational process in the zone of student's nearest development, educational achievements of children were evaluated based on knowledge and understanding. For this level of mastery, students received "good" and "excellent" grades, that is why, as was shown above, a number of straight-A students did not receive "Altyn belgi" award.

In the didactic process formula Dpr = M + Pd + Ypr, the methodological system is clearly not present. In the process of learning, based on the humanistic paradigm, including the personality-activity approach, the main component of the methodological system - educational content becomes a means of developing exploratory and cognitive abilities of students, included in the components of IBA and Ea. Gradual transition of activities from reproductive to transformative level, further to productive, is ensured by three-dimensional content.

At the same time, the methods of activity organized by a teacher gradually form an ability of independent work, forming a hierarchical structure of level-based content.

It is worth noting, that students performing level-based tasks (mastering three-dimensional content), independently set goals for problem-solving. The skills of

independent goal-setting, while tackling three-dimensional tasks, gradually transform into students' ability to independently set goals for performing creative tasks. The forms and means of teaching, following the taxonomy of goals, three-dimensional content and methods of instruction, acquire a hierarchical structure.

Only three-dimensional methodological system adequately meets the requirements of developmental instruction and student-centered approach, by engaging in independent cognitive activity, gradually performing level-based tasks, starting from the level of "knowledge" and completing the level of "creation", students acquire research skills, skills of independent acquisition and application of knowledge, allowing to form functional literacy. Note that the formation of subject matter knowledge in students occurs when their level of assimilation is not lower than the level of "application". Activities that move from the reproductive level to the productive one, or developmental learning, are achieved by students' consistent performance of level-based tasks of three-dimensional content. Our research has shown that the transition from knowledge-based content to three-dimensional content requires, in turn, the modernization of existing theories of educational content, textbook theories and teaching theories [2,3].

Traditional principles and criteria for selecting educational content, corresponding to the requirements of a "knowledge-based" model of education, need to be revised. Three-dimensional (hierarchical) content acquires all its functions: dialogue-content, procedural, developing, activity-oriented, and through the realization of the fourth element (Lerner) - the upbringing aspects of modern content designed on the basis of the personality-activity approach. The new theory of the textbook should be based on a new theory of the content of education. It should be noted that the development of "workbooks" or developing textbooks on the basis of three-dimensional content of training is becoming topical. Textbooks with encyclopedic textual content will in fact be replaced by developing textbooks, textbooks-interlocutors, consisting of tasks of three-dimensional content.

Three-dimensional methodological system of learning, combining the entire range of goals, content, methods, forms and means of learning, becomes an evolving component of the constructive model of learning.

4. Didactic matrix - the basis of technology of three-dimensional methodological system of learning.

Our study showed that the structure of the levels of motivation, skills, quality of knowledge and assimilation also has a scientifically justified hierarchy [2].

The table of their relationship with three-dimensional methodological system of learning, components of which are related to each other both vertically and horizontally, we called the didactic matrix (see Figure 2).

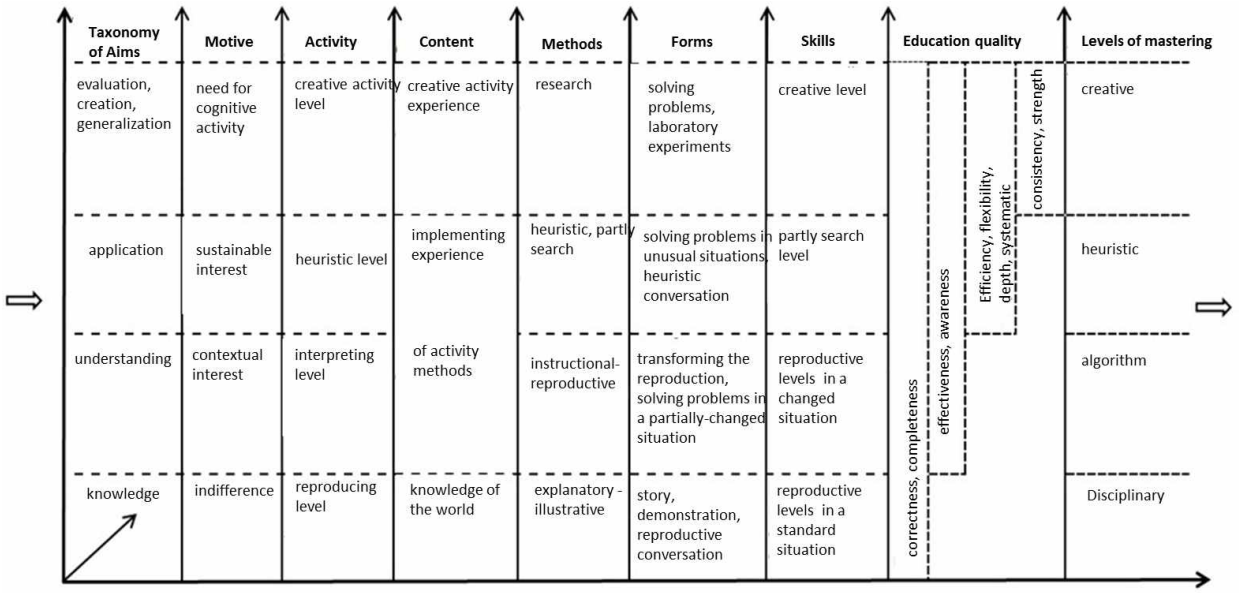

Figure 2. Didactic matrix

Since the methods of thinking activity: analysis, synthesis, comparison, main ideas highlighting, generalization, etc. are applied in all levels of learning (knowledge, understanding, application, etc.) in varying degrees of complexity, the didactic matrix includes a refined version of the Bloom's taxonomy, developed by Anderson and Kratvol, excluding the methods of "analysis" and "synthesis", combining the methods of generalization, evaluation and creation. As you know, creativity, not included in the earlier taxonomy, is the highest level in the new version. To perform creative tasks, students generate ideas, plan and produce (create).

In our opinion, only such a taxonomy of goals (knowledge, understanding, application, creation) adequately corresponds to the hierarchy of the level of learning (the result of training), justified by academician V.Bespalko [1].

We posit that only by organizing a didactic process aimed at realizing the level-based relationship between the elements of the didactic matrix from the bottom up, it is possible to organize a developing, productive and result-focused training.

Didactic matrix allows you to visualize not only three-dimensional methodological system of learning, but also the entire educational process, which V.Bespalko describes by the formula Ap = M + Pd + Y [1]. The "entry" into the process begins with the diagnostically set learning goals, the "exit" is characterized by levels of assimilation.

This work [4] proves that the quality of teaching can be measured as the ratio of goal to result, as a measure of achievement of goals, while the goals (results) are only diagnosed and predicted in the zone of the student's nearest development. Based on these findings, didactic matrix allows to visually and hierarchically depict the quality of students' knowledge [2] (see Figure 2).

The process of forming a motive in developing learning has a hierarchical structure. The motive is provided by the problem statement with a contradiction, or

surprise that encourages the person to solve the task. Gradual ascent along the ladder of the didactic matrix of the student is promoted by the motives of the corresponding level. At the same time, we rely on the concept of Maslow's hierarchy of needs, that a person needs an environment (group, class), respect for himself (seeks to become a leader), and achieving everything he is capable of (creative self-expression) [5]. The hierarchy of Maslow's needs is the basis of the "process motive", which ensures gradual movement of the student up the ladder of the didactic matrix from the level of "knowledge" to the level of "creation." An important role is also played by the stimulating approach of assessing students' educational achievements [2,3].

Group and independent cognitive activity of a student lies in the implementation of all stages of research activity and the consistent performance of level-based tasks. The management component consists of self-monitoring of educational achievements in the stages of research activities and in the solution of level-based problems, as well as the implementation of necessary corrective actions.

Thus, didactic matrix is a synthesis of all hierarchically presented components of the didactic process and the methodological system of learning. At the same time, it allows to present them in interrelation, in dynamics, covering motivational, content-methodical, evaluative, procedural and developing aspects of the educational process.

Moreover, didactic matrix makes it possible to visualize the gradual transfer of the quality of the subject from the "zone of proximal development" of the student to the "zone of its actual development" (ZAD) [6,2]. As scientists correctly point out, Vygotsky describes these development zones statically, although as students master the skills of a higher level, ZPD moves towards ZAD.

Since we assume that learning is directed from the lowest step of the didactic matrix to the higher one, this process of displacement can be described as a gradual "absorption" of the ZPD to ZAD. In the conditions of applying the technology of three-dimensional methodological system of learning, which is designed on the basis of didactic matrix, this movement of the ZPD takes place in an orderly, systemic manner [2].

If learning occurs when students master new content, then ZAD is the level of "knowledge", and ZPD represents remaining levels of the learning process. Performing tasks corresponding to the level of "knowledge" and, relying on the acquired knowledge and skills, students complete tasks of the level of "understanding", which is already in the "near development zone" at that moment, thereby the level of "understanding" is included in the ZAD, then the student, relying on skills of this stage, strives further, etc. The boundary between the zone of the student's actual development and the zone of proximal development that is available for independent completion of tasks is that complex task with which the child is not able to cope independently and for which he needs the help of an adult. Thus, in the context of TTMSL application, Vygotsky's conceptual idea of what a child

is doing today in cooperation with a teacher, he will be able to do tomorrow independently. Consequently, in this case, learning leads to development.

5. The essence of three-dimensional methodological system of learning.

The technology of three-dimensional methodological system of learning is understood as a project of a pedagogical system developed based on didactic matrix (including three-dimensional methodological system) that allows students to perform search and research activities, integrate group and individual forms of instruction, and guarantee a critical (objective) evaluation of each student.

The technology of three-dimensional methodological system of learning (TTMSL), which is a project of a pedagogical system developed with the support of didactic matrix, integrates the didactic possibility of two main trends in the system of pedagogical technologies:

1) learning presented in the form of a research process (constructivism, critical thinking technology, etc.) in the synectical part;

2) results-focused learning in its second part [2].

Thus, the technology of three-dimensional methodological system of learning unites the innovative potential of technology focused on research and technology, focused on result. Active and interactive teaching methods are used in the synectical part of TTMSL. Our experience has also shown the effectiveness of critical thinking technology, in the synectical part of TTMSL, consisting of three stages: challenge, comprehension and reflection [2]. At the same time, the transition from one stage to another is more systematic, with the support of components of three-dimensional methodological system of learning, as well as the procedural and developing potentials of the didactic matrix. The stages of critical thinking technology form a hierarchy. This hierarchy corresponds to hierarchies of taxonomy of goals and levels of mastering educational content. Three-dimensional content in this case is characterized by tasks presented in the form of "thin" and "thick" questions at the stages of challenge and understanding, and also in the form of tasks in the process of reading a "lecture with a stop" or during a heuristic conversation. Appropriate methods of research are used at each stage of the research process, i.e. and in this case the applied methods of independent search and cognitive actions form a hierarchy. Defining learning objectives and implementing is carried out within the framework of diagnostic goal-setting. Moreover, the research and development skills of students formed by both parts of TTMSL allow them to act at the level of heuristic and creative assimilation of educational content.

The main goal of integrating two trends of pedagogical technologies is not only the application of their combined innovative potential in the educational process, but also the avoidance of some of their shortcomings.

Effective use of critical thinking technology in primary school becomes a difficult task, since children have not yet fully developed required thinking skills [2]. To fill this gap, it is recommended to introduce developing games in preschool

education, and study assignments aimed at the formation and application of thinking techniques in primary school. Therefore, we suggest that primary school teachers use various interactive methods of teaching in the synectical part of technology.

Practice also shows that the use of active and interactive teaching methods in the synectical part (including critical thinking technology), because of the group nature of the organization of mastering the teaching material, makes it difficult for a teacher to apply criteria-based assessment, therefore, to accurately evaluate educational achievements of each student and provide timely support [7].

In the technology of critical thinking, even a fairly successful implementation of all its three stages, does not guarantee that all students (except for a small group of leaders) will comprehend and apply reflection.

Second part of TTMSL, focused on result, makes up for the drawbacks of the technology of critical thinking, i.e. synectical part of TTMSL. Consistent independent performance of different tasks by each student individually, gradually forms skills corresponding to the levels of "knowledge", "comprehension", "application", "assessment" and "creation."

Many researchers believe that the use of technology, focused primarily on result, constricts creativity and independent activities of both teachers and students, limiting their actions to a chosen algorithm. However, our study has shown the illegitimacy of such judgments, since a motivated decision to perform level-based tasks requires the use of techniques of thinking activity, which in turn contribute to the formation of research skills. The main disadvantages of results-focused technologies include the predominant personalization, prioritizing students' autonomy, resulting in poor group work and spontaneous discussion.

Thus, the need for effective goal-setting, transition from informative content to activity-based and developing content of training, introduction of objective pedagogical qualimetry, including criteria-based assessment, formation of functional literacy of students suggest the implementation of a part of TTSML, focused on result.

The common basis of both parts of the TTMSL is the didactic matrix (see Figure 3).

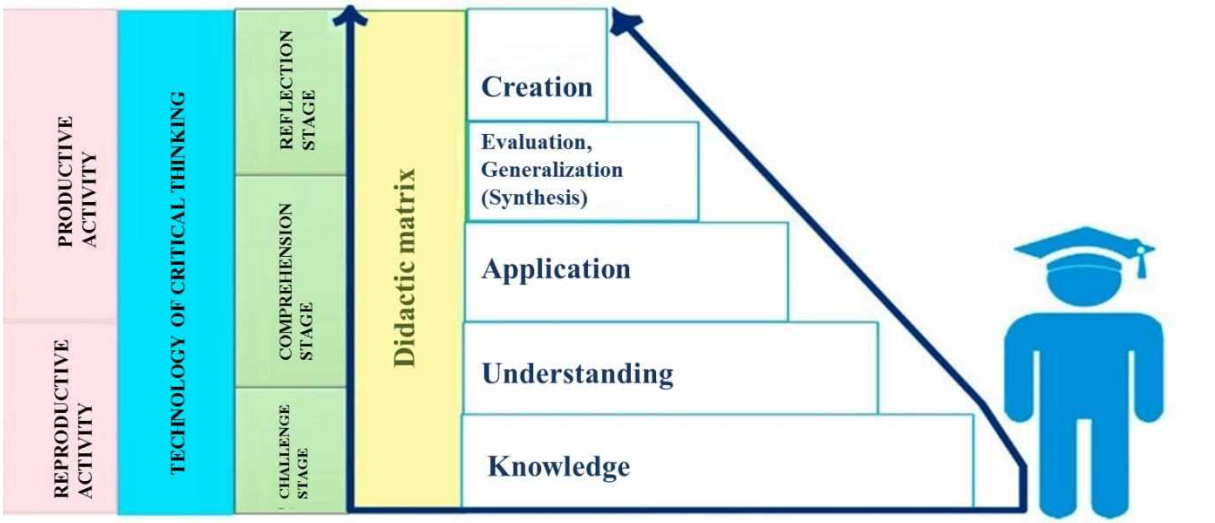

Figure 3. **The relationship of the two parts of TTMSL**

In the synectical part of TTMSL students, working in a group, using the technique of interactive learning and critical thinking, ascend the "ladder" of the didactic matrix. Stages of critical thinking, such as challenge - comprehension - reflection correspond to the hierarchy (levels) of thinking: reproductive, productive (creative) and hierarchy of steps of the didactic matrix.

In result-focused part, students, independently solving level-based tasks, rise individually on the steps of the didactic matrix development and at the same time brush up subject matter in the synectical part. Note that the formation of functional literacy of students requires the organization of training covering the levels of "application", "generalization, evaluation and creation" using didactic matrix TTMSL.

Thus, the two parts of TTMSL, complementing each other, improve learning effectiveness; reinforce the innovative potential of this integrated technology, or TTMSL.

Note that when implementing TTMSL, with respect to the result of learning, each subsequent stage of the hierarchy narrows, so the logical-structural model of TTMSL takes the form of a pyramid (see Figure 4).

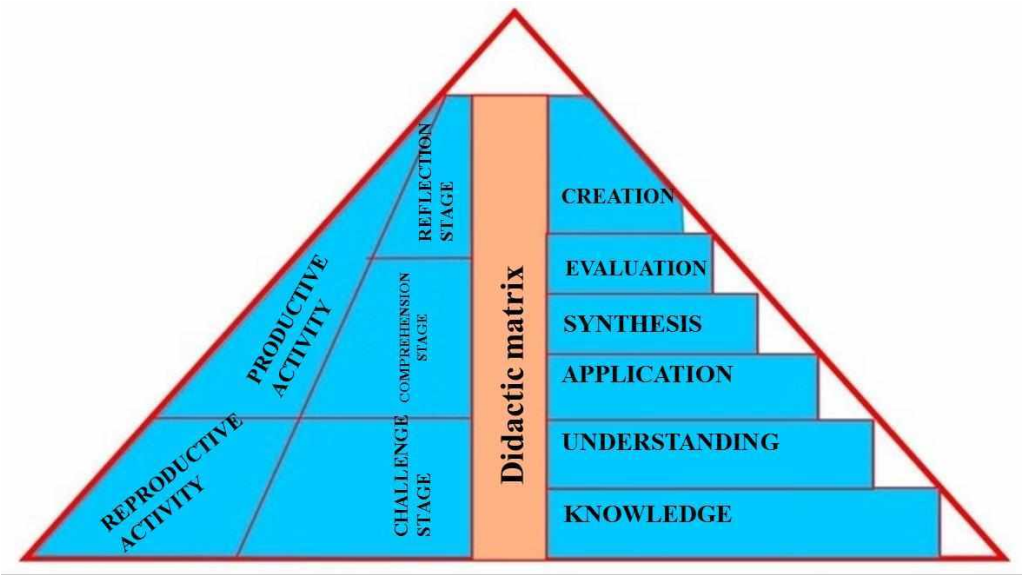

Figure 4. **Model of TTMSL**

The TTMSL pyramid consists of the Bloom's taxonomy of goals, the hierarchy of stages in the implementation of interactive forms of learning and the technology of critical thinking, as well as the types of activity whose core is the didactic matrix. The TTMSL pyramid, combining two models of learning through a didactic matrix, becomes a project of a pedagogical system modernized on the basis of a personality-activity approach, i.e. algorithm for designing a technological map of constructive learning [2].

With such training, individual student's development trajectory is characterized by a gradual transition of student activities from a low reproductive level to a higher productive level. In the synectical part of TTMSL, a student "ascends" the "ladder" of the didactic matrix in the small group.

When applying this technology, the goals of the first and second levels (knowledge, understanding) are realized by 100 percent [2]. Such effectiveness is guaranteed by sequencing level-based tasks of different complexity (knowledge, understanding, application, synthesis, evaluation, creation), high motivation and activity of students, and a stimulating assessment approach [2,3].

This is the distinguishing feature and advantage of the technology of three-dimensional methodological system of learning.

In doing so, we take into account that the independent cognitive activity of a student is carried out based on the methods of thinking activity (analysis, synthesis, highlighting main ideas, generalization, etc.), which are applied at higher levels of learning more in-depth and consciously.

6. Designing Three-Dimensional Study Assignments.

Our long-term experience in applying TTMSL in practice showed a high developing effect of level-based study assignments [2].

As the learning paradigm is chosen as a personal-activity approach, the content of each level of three-dimensional methodological system consists of tasks of different levels of complexity necessary for cognitive development of students. They are developed based on multilevel characteristics of the didactic matrix:

1) characteristics of the taxonomy of learning objectives;
2) essential characteristics of the basic qualities of knowledge of the corresponding level;
3) requirements of V.Bespalko to levels of assimilation.
4) requirements of I.Lerner and Taba to the definition of the hierarchy of educational content.

"It is necessary to select and didactically justify educational content to establish planned learning objectives. This content should be objectively assessed as sufficient, not superfluous and not over-complicated, accessible for mastering to each student at every stage of training," V.Bespalko states [1]. The multi-level tasks developed by the above-mentioned method meet these requirements (see Table 1).

Table-1

Requirements for the Development of Study Assignments

Levels of Mastery	Description of Assignments
Discipular	Simple tasks (in one action) on: - knowing facts, basic concepts, rules and principles, procedures, terms. - Recognition; - reproduction; - identification; - enumeration and description; - comparison and discrimination; - distribution; - solution of typical tasks in a standard situation; - typical calculations; - carrying out the simplest experiments using instructions.
Algorithmic	Simple and compound tasks for: - comparison; - identification of the connection; - selection of the main ideas; - cause and effect explanation; - interpretation of the material (explanation, summary) - interpretation of diagrams, graphs and charts; - transformation of verbal material into mathematical expressions; - solving typical problems in an unusual situation.

Heuristic	Compound tasks for: - use of the studied material in new situations - application of rules, methods, concepts, principles, laws, theories in practice: - use or application of information and ideas for problem-solving; - schematic presentation; - modeling; - sequencing; - providing proof; - drawing analogies; - solving computational and experimental problems containing subtasks with explicit connections between them; - carrying out laboratory works.
Creative	Compound tasks for: - generalization; - modeling; - abstraction, - writing essays; - creative transfer of knowledge; - putting forward and confirming hypotheses; - argumentation; - planning for conducting experiments, drawing analogies in solving real-life problems, - establishing links, mutual influence; - revealing reasons; - non-algorithmic problem-solving; - analysis and interpretation of research results; - evaluation of a written text; - assessing the compliance of findings with available data; - evaluation of the results significance, based on external quality criteria; - forecasting; - solution of atypical tasks, including those related to real-life situations; - solution of computational and experimental problems containing subtasks with implicit constraints.

The requirements presented in Table 1 serve as a basis for the development of measurement tasks for the criteria-based evaluation of students' educational achievements [2].

Use of TTMSL in practice suggests that a system of hierarchical tasks that require an appropriate level of student's independent cognitive activity should be developed for each topic, for each subject, for all classes. Without this, it is impossible to develop student's functional literacy and introduce a criterial evaluation system into practice [2]. Naturally, this requires extensive efforts from teachers, aimed at developing such developmental tasks. Thus, the application of TTMSL transforms the role of teachers from resource and translator into a facilitator of learning, that is, into the leader of student's search activity and educational books author.

Over the past 15 years, such teachers have developed dozens of educational books on various subjects. Unlike the existing textbooks, they do not contain errors, develop students' research and development skills and their functional literacy. Moreover, based on the interconnections levels of pedagogical system components,

we introduced into content assignments an educational materials of different levels forming motives and activity teachings (especially at 1,2 levels of assimilation). Sources of such assignments were cognitive games, entertaining teaching materials, etc. Note that the development of 3rd and 4th levels tasks involves taking into account the principles of intrasubject and intersubject connections of education content. Self-realization of such tasks by students forms their subject and intersubject competencies, laying the foundation for functional literacy.

Experience shows that it is very interesting for students to conduct educational activity precisely for such training assignments, where their activity becomes productive. This way learning process is implemented using a competence-based approach, which involves strengthening student's subjective role and application of educational books with personality-activity content. Therefore, we believe that these developmental educational books should be recognized by the Republican Center "Textbook" and included in the list of teaching materials as "developing educational books" authorized by the Ministry of Education and Science of the Republic of Kazakhstan.

Textbooks development on the basis of technological approach also makes it possible to optimize and improve the use of information technology, creation of electronic textbooks. This is natural, since the conceptual ideas of programmed instruction serve as the basis for the technological development of the learning process. Moreover, in our case, when selecting education content, the didactic capabilities of computer technology are taken into account.

7. Hierarchy of students' knowledge quality.

I.Lerner, Yu.Babanskiy give the following characteristics to quality knowledge types [2]:

1. Correctness of knowledge – a degree of compliance with the standard. Completeness of student's knowledge determined by the amount of knowledge about studied object. A student can: a) list all the leading knowledge elements; b) define each of them; c) characterize their main features.

2. Knowledge effectiveness is characterized by student's ability to apply knowledge in various situations. Student can: a) perform exercises, tasks on the topic with acquired knowledge and skills application; b) apply knowledge to analysis of relevant phenomena of life.

3. Awareness of knowledge - understanding of knowledge importance, internal connections, ability to analyze, compare, prove and generalize, evaluate and explain. The student can: a) show how the concepts and facts studied in the lesson are related to each other, what is subordinated to, what follows from what; b) compare, find common and distinctive features between the phenomena studied; c) reveal the causes of phenomena, events, etc. d) generalize, make summaries, conclusions.

4. Depth of knowledge characterizes a number of conscious significant links of this knowledge with others that are related to them.

5. Knowledge efficiency provides student's willingness and ability to apply them in similar and variable situations. The more types of situations in which a student can apply knowledge, and the more perfect this application, so the more accurately manifested the knowledge efficiency.

6. Knowledge flexibility manifests itself in the speed with which to find variable ways of applying it when the situation changes. The more varied situations that require the search for a new way to use previously learned knowledge, and the faster the student finds this method, the more flexible this knowledge becomes. Flexibility always manifests itself in efficiency, but efficiency does not always indicate the knowledge flexibility.

7. Knowledge systematicity involves understanding the composition of a certain knowledge set, their hierarchy and sequence, i.e. awareness of some knowledge as basic for others. Knowledge consistency is called a knowledge set in their minds, whose structure corresponds to a scientific theory. The scientific theory includes the following elements: concepts, basic provisions (basic laws), an empirical basis (facts underlying these propositions and indirectly included in the theory) and consequences. All this is system knowledge, i.e. knowledge, available according to the scheme: "basic concepts - basic provisions - consequences - applications".

8. Knowledge strength is an availability and sustainability of all these qualities. It is an integral derivative quality.

Analyzing the essence of different types of knowledge quality, we can give the following definition: "Knowledge quality is an integral set of relatively stable knowledge properties that characterize the result of students' educational and cognitive activity."

A group of researchers led by M. Potashnik, on the "quality of knowledge" gives the following definition [4]: "The quality of knowledge is a ratio of diagnostic goal and results of student's independent cognitive activity." For example, if the goal is recognition, then learning result is student's assimilation. Their ratio, showing the knowledge quality, is correct. Schematically it can be represented as follows: Goal (recognition) - Ratio (correctness = quality of knowledge) - Result (student's level of assimilation).

The ratio of the following micro-goals in their hierarchy and their results is characterized by a multitude of knowledge qualities having integral properties that include the knowledge qualities properties of the previous levels.

For example, Micro-goal (understanding) - Ratio [completeness, efficiency, correctness] - Result (algorithmic assimilation level). Further, Micro-goal (application) - Ratio [systematicity, awareness, depth, efficiency, flexibility] - Result (Heuristic assimilation level). Micro-goal (evaluation, generalization, creation) - Ratio [consistency, strength] - Result (creative level of assimilation).

Thus, a hierarchical (diagnostic) representation of goals and their results makes it possible to clearly, critically and objectively assess the quality of knowledge.

Although some scientists consider I. Lerner's research results of knowledge quality to be a group that studies the essence of knowledge quality only according to certain criteria, our study shows that his research covers the second approach. Indeed, noting that the four elements of education content are, respectively, the goals of education, it closely approaches the problem of learning goals taxonomy. If we compare it with the goal of B. Bloom's taxonomy (see. [2]), we can see the following picture. First content element (learning goal) is memorization; second element (learning goal) is understanding, application; and, finally, third content element (learning goal) - analysis, synthesis, evaluation.

Analyzing the above, highlighting the main essence of two approaches, we give the following definition to "quality of knowledge":

Quality of knowledge is the degree of compliance with the goals and results describing the holistic set of relatively stable properties of knowledge, which characterize the result of students' learning and cognitive activity.

8. Criterial evaluation of students' academic success.

Humanization requires that a new school model was not of formal control, percentomania and evaluation. Assessment should have a strong educational and developmental focus, coupled with self-control, self-esteem and self-correction. In traditional school setting, the evaluation of student's activities is focused on the maximum level of mastering learning material. However, such rating system is rather rigid for those who are below the maximum level in accordance with their abilities. With this traditional evaluation method, called the "subtraction" method, the report's point is the maximum score of "5", at which, depending on the shortcomings and mistakes made by the student, its score is reduced. Evaluation in this case is a means of punishment, not encouragement and does not indicate the true level of student's achievements. As a result of this approach student's activity assessment, decreases a level of their motivation for learning, a syndrome of "fear of failure" is formed, characterized by fear of being punished with the wrong answer. In a traditional lesson, teacher usually has time to interview one or more students, during which some students can consider themselves free, without showing activity and initiative.

In the conditions of pedagogical technology application based on the three-dimensional methodological system of learning, the evaluation is carried out by method of "addition", based on which the minimum level of general education is taken. Achieving this level is required from each student on a mandatory basis. Criteria for assessing higher levels of personal training are formed by means of their substantial increment in the depth of assimilation based on the minimum level.

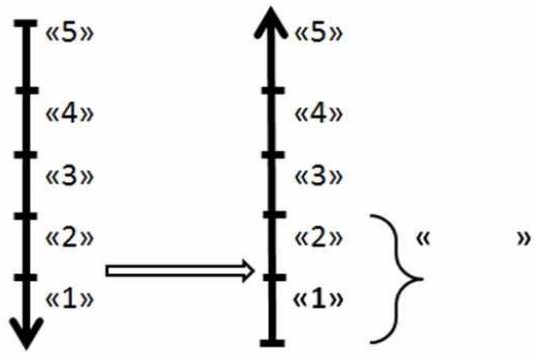

Figure 5. a) evaluation by subtraction method; b) evaluation by addition method

Students' evaluation by method of "addition" returns to school the motivation for academic success, guaranteed reliance on the achieved basic level of learning. The change in the approach to control in this case naturally entails the expediency of changing the assessment system. To assess the activity of students who have reached the level of compulsory preparation, a mark "credit" or "no credit" is entered, but for an elevated level "4" or "5". The difference between "no credit" and "D" is that failure is subject to retake, in the case of a negative result. "Credit" is carried out for each topic, their content is selected in such a way that the required learning outcomes are presented as completely as possible. "Credit" is considered as passed if the student has performed all the obligatory level tasks proposed to him. In case of failure of at least one of the tasks, the score "credit" is not set. In this case, student does not retake the entire topic, but performs only those tasks which he failed. Organization terms of "credit" increase content and objectivity of the final evaluation. It is more focused on the final result, moreover, disappears the situation when "C" for one topic closes "D" for another.

When applying TTMSL "credit" is placed for the performance of student level tasks [2]. After completing level-based tasks at their own pace, each student gets an opportunity to perform sequentially the algorithmic, heuristic and creative tasks, obtaining an appropriate assessment depending on the level of mastering achieved. When performing independent work and a thematic "credit", each student, despite his high abilities, begins his activity with the performance of assignments of a compulsory (student's level). This provides all of knowledge support, and most importantly - guaranteed performance level of compulsory for all students. Our experience shows that due to the "credit" D-students allow themselves to overcome the student's level. As a rule, they overcome the obligatory level for the first time, they strive further, they have a motive for learning, self-confidence.

In our pedagogical technology, based on three-dimensional methodological system of learning, each level of assimilation provides a certain quality of knowledge (see Fig. 2).

From Fig. 2 it can be seen that the student's level ("knowledge") provides only such knowledge quality as correctness and completeness, where "correctness" at

this level is characterized by students' ability to accurately copy teacher's actions, i.e. this is the correct execution of similar tasks that do not require the transformation of knowledge obtained, the retelling of the text, the formulation of rules, theorems, etc. without your own comments, etc. The quality of "completeness" at the first level is ensured by the fact that student can list all the leading elements of knowledge, define each of them, characterize the main features. In traditional education, students often get "4" or "5" for such "correctness" and "completeness," although they cannot perform similar tasks that require some transformation.

Algorithmic level of assimilation provides along with the listed knowledge qualities such knowledge qualities as "effectiveness", "depth" and "efficiency".

Heuristic and creative levels provide, in addition to the listed qualities, the same qualities of knowledge as "flexibility", "awareness", "effectiveness", "consistency", "strength."

Thus, starting with the heuristic level of assimilation, we can make sure that students are provided with all the components of knowledge quality. Naturally, only in this case the student should receive a "5" mark. But then how to be with evaluation on a creative level of assimilation?

This shows a five-point evaluation system mismatch accurate characterization of students' level of knowledge and skills. Even with traditional training, experienced teachers tried to eliminate this "inconvenience" of the five-point assessment system with the marking of such marks as 3 +, 3-, 4 +, 4-, 5-, 5. However, traditional learning does not allow to evaluate the level of "knowledge, skills and abilities" and subject competencies in terms of performance characteristics, i.e. how student has learned the material, "consciously", "strongly", "systemically", "complete", etc. Traditionally, it also does not take into account the factor to what extent the student applies methods of thinking (analysis, synthesis, comparison, separation of the main, reflection, etc.). All this leads to a biased evaluation of students' activities.

The experience of using rating system for assessing academic achievements showed the need to introduce 12-point system proposed by V. Bespalko [1]. It is especially suitable in the conditions of using learning technology based on three-dimensional methodological system of learning. The 12-point scale (q), as V. Bespalko notes, makes it possible to cover all monotonously varying levels of the human mastery possibility, from the student's (al) q = 1,2,3 to the creative (αl v) q = 10, 11, 12 level, equivalent to the work of a scientist - researcher and inventor.

In the 12-point system, the evaluation qi (i = 1.12) is determined on the basis of the coefficient of assimilation Kα = a / p. Here a - number of correctly executed tasks, p - number of tasks. Assimilation coefficient can be normalized to O ≤ Kα ≤ 1. At Kα ≥ 0,7 the learning process is considered complete. Positive estimates are made when 0.7 ≤ Kα ≤ 1. In this case: for Kα 1≤ 0,7, then q = 0; if 0.7 ≤ Kα 1≤ 0.8 then q = l; if 0.8 ≤ Kα 1 ≤ 0.9 then q = 2; if 0,9≤ Kα1≤ 1 then q = 3; etc.

In practice, in order to stimulate students' independent cognitive activity with Kαl <1, the mark q = 0 is replaced by the estimate "not credited", and q = l - the estimate "not credited". Further student in accordance with the level of ability has the opportunity to get higher marks.

When applying the technology of the three-dimensional system of learning, the learning goes from the bottom up, that is, the student, first assimilates the material at the student level, then on algorithmic, etc. Rising up the stairs, he seeks to reach a creative level. At the same time, the student develops general educational skills (organizational, intellectual, practical, etc.) of different levels: reproductive, part-search, creative. Knowledge gained on the student's level, estimated assessment "credit" or "no credit". Overcoming this level of achievement, the student has the right to move on, picking appropriate points. As shown above, our technology involves the introduction of a 12-point rating system. Unfortunately, the current school education "knows" only a five-point assessment system with the "subtraction" approach. Therefore, in school practice, we are still forced to convert the received rating scores and "credit" to traditional estimates. Experience has also shown that even in this case all the positive aspects of the "addition" method remain and a high level of objectivity in assessing the performance of students. At the same time, an addition to the student's journal is required, where the teacher makes notes on the performance of level assignments with the help of the "+" and "- signs in the following sheet, which we called the "transparent journal".

The application of the "transparent journal" creates a positive motivation, it quickly and visually for the entire class fixes the students' learning achievements as they progressively perform their level assignments. In classrooms on the edge of the board, a "transparent journal" is displayed in the form of a specially prepared table. In the process of recording completed assignments by each of the students in this journal, they have the opportunity to observe each other's progress and to receive information about the degree of completion of the performance of the level tasks.

Table - 2

Transparent journal

	Full name of students	Independent work on topic №1			Control work on topic №1		
		Topic			Topic		
		Tasks α 1	Tasks α 2	Tasks α 3	Tasks α 1	Tasks α 2	Tasks α 3
		12345 («credit»)	**1234**	**123**	**1234**	**123**	**12**
1.	Abdildin	+++++	++++	+++	++++	+++	--
2.	Aidarkulova	+++++	+++-	---	++++	++-	--

3.	Kolanova	+++++	+++-	---	++++	+++	--
4.	Orazaliyev	+++++	++++	++-	++++	+++	+-
5.	Chingissova	+++++	++++	---	++++	+--	--
…	……..						

As a result, the spirit of healthy competition is created. Experience has shown that the student, comparing the dynamics of his progress with the dynamics of other more successful students, tries to keep up with them, thereby motivating to success, showing a desire to show oneself from the best side and the lesson acquires a playful character.

We would like to note that the evaluation of students 'performance by the method of "addition", using a "transparent journal" that stimulates cognitive interest and activates cognitive activity of trainees, is the rational grain in this technology that strengthens the motivated side of evaluating students' activity, serves as a truly objective means of assessing their educational achievements, which is one of the features of the technology of the three-dimensional methodological system of learning developed by us that distinguishes it from each other's existing.

In addition, in the schools where the experiment was conducted, various methods of stimulation were used: a) active and interactive teaching methods in the synectical part (in the conditions of using our technology, groups of students were selected in a natural way as they reached certain levels of learning in accordance with their abilities, and not a priority, on the basis of the results of their previous academic achievements or at the request of the student, when he was allowed to choose assignments of this or that complexity); b) each level assignment was assessed in points and the student, moving to higher levels, accumulates the maximum number of points for him, corresponding to his abilities and the nature of the activity.

The most important thing here is that methods and techniques for student's cognitive activity activating do not conflict with the evaluation approaches, as it was before, they operate in an effective tandem. Moreover, the use of pedagogical technology of training allows you to build a schedule for the continuous monitoring of student development, i.e. to monitor training (see [2]). In traditional education, this is not possible, since tracking in the form of achievement level (by the number of "2") and, according to so-called "quality of knowledge", determined by the number of "4" and "5", is incorrect for the above reasons. In schools where our technology is applied, tracking is carried out according to the list of thematic control and independent work on this topic.

During the independent work (IW), mutual assistance is allowed (especially between levels 2, 3 and 4), discussion in groups of 3-4 levels, work with the textbook, communication with teachers, completion of uncompleted tasks at home, etc. With thematic control (TC), each student strictly performs his work

independently, and his level may be slightly lower than that determined at independent work (see Fig. 6), where IW1, TC1, IW2, TC2, etc. - independent and thematic control works, IWf, TCf - final (quarter) independent and control works.

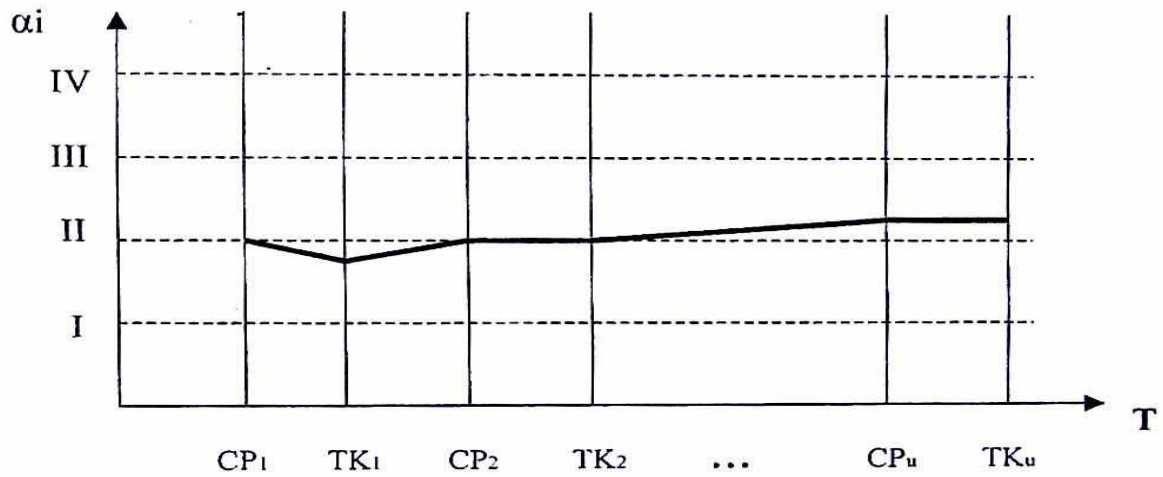

Figure 6. **Levels of student's assimilation at independent and control works**

Different level control tasks are compiled with the help of a meaningful synthesis of all thematic tasks. Fig. 6 shows the trajectory of one student's development in a separate subject. Having built the same charts in all subjects, it will be possible to observe the development of the child, noting on what topic he manifests his abilities, and for what he experiences difficulties. As a result, for example, at the end of an elementary school, it is possible to determine quite clearly its propensity to a particular subject and to present to its conscious choice electives and other elective courses. At present, this student's self-determination is impossible, since an in-depth direction on this or that subject in most cases is at the will of the parents.

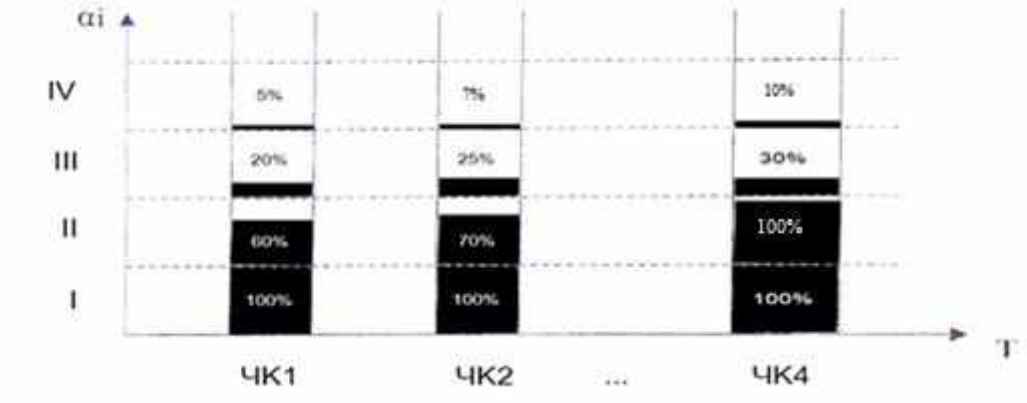

Figure 7. **Learning achievements of the class by academic year quarters**

In assessing student's activity in conditions of applying pedagogical technology based on the three-dimensional methodological system of learning, the

whole class's activity results in a certain subject can be characterized as follows (see Fig. 7). According to Figure 7, it is possible to determine the assimilation level not only as a percentage, but also to compare such indicators by quarters, to see their growth and development. Our long-term practical experience has shown the high developing potential of TTMSL. If students at the end of the first quarter completely perform 1st level tasks, on average a little more than half of them are tasks of the 2nd level, then at the end of the school year, on average, all students perform the tasks of the 1st and 2nd levels, 30% of them are tasks of the third level. This suggests that only by applying TTMSL we can form students' functional literacy. Usually, in order to test the effectiveness of one or another technique, researchers organize control and experimental groups, then, comparing their results, evaluate its effectiveness. In our opinion, this approach for a variety of factors (fuzzy band selection composition according to ability, temperament, crudity of measure instruments etc.) is incorrect. In our case, student is compared with himself in development and the result is visible to the "naked" eye.

9. Education quality management in conditions of TTMSL application

Our research has shown that a diagnostic setting of learning goals allows you to clearly establish the initial state of the controlled process, i.e. to establish those specific knowledge and cognitive actions that are necessary for the formation of a cognitive activity given type. The hierarchy of goals helps to determine the basic parameters of the intermediate state and their sequence. Systematic feedback ensuring presupposes the allocation of a set of controlled characteristics on the basis of training objectives. The main independent characteristics of the learning process are subjected to evaluation, the combined measurement of which leads to the student's transition from one qualitative state to another. The main didactic conditions for education quality management is the availability and application in the student's learning and cognitive activity of the functioning algorithm (AF) of their activity and the control algorithm (AE) [1,2].

The general formula of educational activity, which is decoded in the context of different assimilation theories and provided in the form of exercise system, i.e. on the operational sequence of student's learning and cognitive actions, is called the altorhythm of functioning (AF) in this theory.

One of such assimilation theories is the theory of step-by-step formation of mental actions (TSFMA) by P. Halperin.

In TSFMA for the organization of the stages of control and corrective actions, non-diagnostic parameters of mental performance are proposed, according to which it is proposed to judge the experience course formed by the students. In the paper it is shown that the technology application of three-dimensional methodological system of learning allows us to strengthen this weak link in the theory of assimilation under consideration.

Control algorithm (AC) is a tracking assimilation process system in accordance

with a certain rule, correcting learning and cognitive activity of students and control in order to maintain sufficient stability in the implementation and operation of the algorithm to achieve the learning objectives.

Taking into account the didactic possibilities of the technology of three-dimensional methodological system of learning, we developed an algorithm for controlling the process of assimilation.

In the context of education humanization, the use of educational process and student learning activities management that takes into account the mechanisms of self-organization and self-development is actualized. Such a management is called control through reflection or reflexive control. The essence of reflexive control is that the goal of joint activity of teacher and students is a development of students' ability to self-management and self-realization in the learning process.

In work [2] it is shown that in conditions of pedagogical learning technology application based on the three-dimensional methodological system of learning, dominates an interdependent corporate activity of student and teacher, as well as reflexive control of learning. In the context of reflexive learning, such functional powers in the learning process, such as self-analysis, self-determination, self-planning, self-organization, self-regulation and self-control are transferred to student and learning gradually turns into self-learning.

We have shown that the basis of reflective learning management (quality of education) is the organization of educational process on the basis of the technological approach that allows student to become a subject of independent cognitive activity, teacher – be an active leader of the educational process and author of its own methodical system, and school – be a self-developing, innovative educational organization.

In conditions of decentralization, democratization and humanization of the education system, the school should become an open self-organizing system that provides conditions for self-determination and self-development of students and teachers, interacting with the environment.

It is known that synergetics deals with management of an open-type system (which is the school), a leading principle of existence of which is self-organization, self-development, carried out on the basis of constant and active interaction of these systems with the external environment.

Principles of humanization, decentralization, ideas of personality-activity and reflexive approaches, ideas of creativity, openness of the educational environment and positive feedback serve as the scientific and pedagogical basis of the synergetic approach in education system.

In such conditions it is quite real to replace the established authoritarian style of humanistic style management from the position of a synergetic approach.

In work [2] it is shown, that high-grade management of education quality assumes introduction in school education of pedagogical diagnostics system.

As is known, diagnostics is the process of obtaining information about the state

of an observed or studied object using a combination of methods, practices and techniques.

One of the main tasks of diagnosing is the timely identification, evaluation and analysis of the educational process flow in connection with its effectiveness. Therefore, a wider meaning is attached to diagnostics than to traditional control over the knowledge level, skills and habits of trainees. A routine knowledge-skills-abilities check ascertains learning outcomes without explaining the nature of their origin. Diagnosis, however, considers them in a relationship, i.e. examines the results of learning in conjunction with methods, ways to achieve them, identifies trends, dynamics of learning outcomes formation.

In work [2] it is proposed to put in the basis of diagnostic components the individual's real educational possibilities (Yu. Babansky).

It is shown that the application of technology of the three-dimensional methodical learning system optimizes methods of pedagogical diagnostics and this technology has a health-saving property.

It is also shown that when measuring the level of anxiety and interpersonal relationships quality, the most effective method is sociometry. In the work it is scientifically proved that without diagnostics and monitoring of education it is impossible to manage effectively the educational process, to achieve optimal results under the existing conditions.

7. Student - a subject of the educational process.

From the foregoing it can be seen that technology of three-dimensional methodical learning system is designed to implement the educational process, where participants' activities are characterized by a "subject-subject" attitude. In the synectic part, student is a subject of an interactive environment, an active member of the research group. As far as independent activity is concerned, a self-motivated person, who independently ascends of level tasks steps, independently extracts necessary skills. TTMSL is designed for teacher's creative activity and for student's active independent cognitive activity of the, passing from his zone of actual development to the zone of the nearest development. Here an educational material content is not presented in the form of finished information, but in the form of a means for obtaining qualitative knowledge through student's independent activity. Content feature is the availability (especially in primary classes) of teaching materials aimed at formation and application of thinking activity methods, its multilevel presentation in order to organize learning on the implementation of hierarchically presented learning goals (only in this case it is possible to organize developmental learning).

This technology provides for thematic independent and control works, which are necessary for the full assimilation of educational material topic under study. At the same time, students participate in the process of assessing their academic achievements, as well as the results of activities of their classmates.

In a word, in the training that is conducted for this technology the student is a full-fledged, active participant in the didactic process.

8. Psychosaving effect of TTMSL.

TTMSL can be called "psychosaving", as it provides an opportunity to create comfortable conditions for all participants of the educational process.

"Psychosaving technology of learning" means a set of methods, practices, training tools and approaches to the educational process, in which at least four requirements are performed [4]:

1) taking into account the individual (intellectual, emotional, motivational, etc.) characteristics of child, his temperament, a nature of learning material perception, type of memory, nature of functional asymmetry of brain type, etc .;

2) prohibition of excessive, exhausting intellectual rereadings from an emotions, nervous stress during material assimilation, a desire to achieve optimal learning outcomes at the lowest required investment of student's time and forces;

3) to provide such an approach to the educational process that would guarantee the maintenance of only a favorable moral and psychological climate in the classroom, every possible exclusion of any factors that may adversely affect a child's mental state (authoritarian assimilation, tactlessness, etc.);

4) With the humanist trends development, introduction of a humanistic paradigm and a student-centered approach to the organization and implementation of the educational process to focus not only on the approaches do not bring harm, but also to ensure that teach a child to defend himself from the stress, injuries, insults, teach him the means of psychological self-defense. An essence of our learning technology, based on the three-dimensional methodological learning system and complete assimilation theory, allows satisfying all the listed requirements of "psychosaving" or "healthsaving" technology.

8. Multifunctional innovation potential of TTMSL.

Many years of experience in the use of TTMSL in the schools of the Republic of Kazakhstan showed that the introduction of pedagogical technology of three-dimensional methodical learning system solves the following actual problems of education existing in the traditional school.

1. The application of TTMSL provides a transition from knowledge-centric didactics to personal-activity, developing didactics, the basis of which is the three-dimensional methodological learning system. The TTMSL core - the didactic matrix is a system-forming element of three-dimensional didactics and a "ladder of development" in the educational process of activity subject, i.e. student.

2. TTMSL allows realizing the innovative potential of two world trends in pedagogical technology: research-oriented technology and result-focused technology. Synectic part provides the organization of learning on the basis of interactive methods and critical thinking technology, the second part is a

guaranteed result at the level of the requirements of state compulsory education standards, on the basis of a developing factor of the didactic matrix.

3. The use of TTMSL ensures the introduction of an objective, accurate, scientifically grounded system of pedagogical qualimetry, including a criterial system for assessing students' academic achievements, correct diagnosis, and monitoring the quality of instruction.

4. The use of TTMSL contributes to the formation of a high level of motivation, activity, will, and self-realization skills. The skills of insight and reflection allow us to implement a fairly effective management of the learning process.

5. Using TTMSL provides an effective use of information and communication technologies in learning, identification of talent in children, early professional orientation of students.

6. TTMSL creates a comfortable environment for students – that are subjects of the educational process, relieves overload, stress in learning, and allows the implementation of health-saving didactics in general, in school practice.

7. Allows you to implement the project "Educational textbooks" where as a developer of the textbook becomes teacher himself.

8. Brings teaching-innovation potential of elite and ordinary secondary schools.

9. Increases the efficiency of ungraded school activities, including those with combined classes.

10. The application of TTMSL allows to successfully solve teaching and educational tasks of preschool education organizations, colleges and universities, as well as inclusive education.

P.S. In this article, annotated abstracts presented conceptual ideas of professors Zh.Karayev and Zh.Kobdikova described in detail in the book "The technology of three-dimensional methodological system of learning: the nature and application" (Publishing House Zerde - Almaty, 2018. - 480 pages.).

References

1. V. Bespalko “Components of pedagogical technology”. - Moscow: Pedagogy, 1989, - 192 pages.
2. Zh. Karayev, Zh. Kobdikova “Technology of three-dimensional methodological system of learning: nature and application”. - Almaty, Zerde, 2018, - 480 pages.
3. Zh. Karayev “Activation of cognitive activity of students in the conditions of application of computer learning technology”. // Abstract of the doctoral thesis, Almaty, 1994, 36 pages.
4. M. Potashnik and others “Management of education quality”. - M .: Pedagogical Society of Russia, 2000. – 448 pages.
5. A. Maslow “Motivation and personality”. 3rd ed. - SPb .: Peter, 2011.- 352 pages.
6. L. Vygotsky “Thinking and speaking. - "Labyrinth", Moscow, 1999, - 352 pages.
7. S. Zaire-Bek, I. Mushtavinskaya “Development of critical thinking in the lesson”. - Moscow: Education, 2004, - 174 pages.