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# THE POSSIBILITY OF CREATING LEARNING SITUATIONS AND LEARNING TASKS IN LEARNING MATHEMATICS AT SCHOOL

**Abstract.** The article outlines the problem of methodological tools to assist the growing human mastery of them a frame of reference of knowledge. It is shown that one of these landmarks when learning mathematical activity can become a so-called "hidden", or rather "transformed" form, the original sense and meaning of which were lost for the student. For their awareness of students benefits such methodological tool, as a learning situation analysis pupils which leads to the generation of learning tasks. Target the intent of the article is an invitation to collaborate in the creation of a set of learning situations and tasks for the development of the students. The main purpose of this collection is to contribute to the training and education of mathematics

**Key words:**educational mathematical activity, functional literacy activities, learning situation, learning task,methodical tools.

**Abstract.** The article outlines the problem of methodological tools to assist the growing man in mastering them a system of reference points. It is shown that one of these guidelines in the mastery of educational mathematical activity can be the so-called "hidden", or rather "transformed" forms, the original meaning and meaning of which were lost for the student. For their awareness of students benefits from such a methodological tool as the learning situation, the analysis of which with students leads to a series of learning tasks. The purpose of the article is an invitation to cooperation in the creation of a set of educational situations and tasks for the development of students. The main purpose of this collection is to promote learning and education in mathematics.

**Key words:** educational math activities, functional literacy activities, learning situation, learning task, methodological tools

The name of the project requires a little explanation…

I remember the popular in the 80-ies of the now last century humorous scene performed by Gennady Khazanov – a funny case with a student of the culinary school in the exam:

- (Examiner.) Determine what is missing in Your borsch.
- H-h-l-e-e-BA….

Laughter in the hall ... What and why did people laugh so contagiously?

One version: over the image of a careless student, skillfully represented by a talented artist: sometimes-such a student!! And do nothing…

Version two: as it is taught in this College... we Have not, we are better: even the careless will answer correctly such a simple question…

You can find other explanations. But they all come down to one thing: training has not reached the planned result. This-whether we want to admit it or not – has happened before, and now it occurs quite often. What are the reasons? The authors of the article adhere to another version. Its essence is that in the

vast majority of cases, training (in school or University) is perceived by the student (and teaching) as imposed from somewhere above. The teacher (teacher) most often takes this for granted and explains (for himself and others): it is defined by the Program, in the end – the Ministry, it can only be changed within the specified framework and adhering to the established techniques... so required!!

And student? Most often he hears the phrase: "let's Solve the problem!"

Dear reader, at least for a moment imagine yourself as a student and first whisper, then louder and "in a stretch" say: for-da-cha. We assume that carefully, several times in a row uttered and sincerely and carefully tracked this word in many of you (except, perhaps, professionals from mathematics) will cause, if not unpleasant, then at least, a sense of obsession. And situation?

In a number of works of one of authors of this article, including [3,14,14,15,16], it is proved that the educational situation (MOUSTACHE) on the pedagogical role represents educational analog of so-called vital for the subject of a situation. The latter, in turn, is always a situation of choice, containing some difficulty, overcoming or not overcoming which leads to the formation of his worldview (as a holistic quality of personality – unity of emotion-attitude, representation-knowledge, "program" of actions in their relationships) micromechanism of activity of resolving difficulties. This is often manifested in the form of motivations to knowledge, attitudes, positions in relation to something, someone and-most importantly-activities to resolve the situation. And when the subject is involved in the activity begin to "work" all its components: there is a motive, aware of the goal, outlined the means and actions to achieve it, formulated a number of tasks as a plan for further work.

Thus, our position is that learning objectives (KM) originate within the framework of the HS or give rise to it as its organizing core. This was the motive and the basis for the creation of the project: a set of KM and KM.

In the educational process it is advisable to specifically create and purposefully use educational situations (US) as a pedagogical tool to assist cognitive activity and the emerging system of reference points of knowledge of a growing person.

According to [5], one of the most important results of teaching mathematics and mathematics education should be the ability of students to learn about the world and themselves in it [3,4,7,19,20]. But it requires support, first, of previously acquired experience of cognitive activity, secondly, on the achievements of such experience, the components of which, of course, are mastered earlier by man and proven benchmarks such activities and their results in the form of actions to achieve result of acquired knowledge, methods and means of knowledge. The set of such guidelines and actions assigned to a particular person, we call it functional literacy. It follows that the most important result of education, especially at the initial stage of training, should be the mastery of functional literacy of cognitive activity. But in terms of training it is possible only when the student resolves analogues of vital situations for him, that is, educational situations (S) [3, 4]. Therefore, in terms of teaching any academic disciplines, it is important not only to consider the possibility of the emergence of the MOUSTACHE, but need a special work of the teacher to create them and on their basis, preferably together with students, to identify within them and the formulation on this basis of a variety of TIES, primarily as "tasks for themselves". It is assumed that the created methodical project will help the teacher (especially the beginner) in the organization of cognitive activity of students or students in the study with them of certain fragments of educational mathematical disciplines. In this regard, our further task is to acquaint the reader with the examples of SS created by us or "peeped" in the experience of the best teachers and, as an intermediate result, to set possible grounds for their development.

Case study (CS) is created in the interaction of teacher (St), student (UK) and linking them to some of the works of culture (PC). Note that these designations are quite suitable in terms of both school and University education.

PC contains (or should contain) in itself "fragile confrontation", "the darkness as absence of light, painfully we razbiralsya" [5, p. 198] and acts like a materialized media (methodological tool) create the appropriate BONDS. So the structure of the SS can be represented as: SS = Ul; PC; UK □ ≈ ≈ Ul; UZ; UK□. At the same time, the UZ will be understood as the unity of two components: a certain array of content (subject) data and a set of tasks for students, coordinated with the PC and carrying in themselves and setting any functions-educational, developmental or educational. In connection with this, the types of KM are consistent with the types of KM and based on them educational and educational "super-tasks".

In accordance with the accepted understanding of the MOUSTACHE, among the educational tasks of its core (UZ) should be available such that direct the student to develop in themselves or contribute to the formation of his or her various orientations of activity and personal qualities. The latter may include those given, for example, in [4, CC. 61, 113, 157], or those which the teacher or teacher considers it necessary to form in schoolchildren or students. We will explain what was said in this regard on the examples of some educational situations, conditionally correlated with the period of training.

**Situation 1 (grades 5-6).** Mom for the preservation of mushrooms needed 8% solution of acetic acid. There is 70% acetic acid in the household. What advice to give mom to dilute the concentrated acid solution to the desired 8%? Is it possible to make General recommendations on how to lower (increase) the percentage of the solution of a given substance? Can you and how do you do it using math?

**Situation 2 (grades 5-9).** In the nearest fishery was built a pond for breeding mirror carp. Launched a fry, and after a while before the workers of the economy faced the question: what income should be expected from the sale of fish to the population? How to assign work for catching fish? How to help in solving these issues, will we be able to give reasonable recommendations, how to do it with the help of our knowledge?

**Situation 3 (5-10 classes).** Imagine that we are together-the inhabitants of Ancient Egypt, and we have land in the floodplain of the Nile river. Me and one of you (who is willing?!?) we have plots with a common boundary along the AN line, and together our plots have the shape of an ABCD quadrilateral. Our sites before the flooding of the river had the same area. Suppose that before the flood of the river so well managed to secure the poles in all the peaks that after the decline of the water they were found. And only the pole N disappeared without a trace. Is it possible to restore the border to AN AREA so that our plots are still the same size?

**Scenario 4 (5– 9 classes).** (We will help the head teacher or The choice of an effective method of counting options). Let the head teacher addressed us and asked to help in drawing up a schedule of after-hours work. It is known that in our Lyceum after classes fifth graders are engaged in three circles:

theater, natural science, dance. There is a situation-a problem: how many ways it is possible to make the schedule of extracurricular occupations?

Ul: Remember the problem we solved when calculating the three-digit number. How did we find options? What mathematical problem was solved, and what method (method) was used?

Ul: Come up with a few more similar situations…

**Situation 5 (5-9 classes).** 1. For four new students need to create passwords to enter the electronic journal, using the numbers 4,5,9. Is it possible? What technique is better to use? Formulate mathematical problems that you will solve at the same time?

2. In the school dining room at first cooked soup and hodgepodge, the second – cutlets, casserole and fish, the third – tea and juice. How many menu options can you advise to make the head of the dining room?

Offer your options and make the necessary math problems for your friends, classmates. Solve these problems. Explain what technique and how best to use. What knowledge of mathematics did you need?

Note that the examples given are situations, not mathematical problems – the problem still "see", to formulate, and this situation is really with the "student" person, that is addressed directly to the student. As a rule, even "weak" students (according to the teachers ' observations) "suddenly" begin to feel like participants (!) this kind of situations and begin to offer their versions of their resolution. This is the beginning of their movement to comprehend functional literacy (FGUMD) of their own educational activities, to understand their actions and the means used (including such as definitions, theorems), etc., that is – to comprehend the basics of scientific knowledge.

Concretized tasks of such types of SS and UZ are made according to the following scheme: (1) the system of the interconnected qualities which formation plans to form on a series of occupations or throughout all course of training is defined (they, as a rule, set type of SS); (2) these qualities are transferred to the form of the General questions: what needs to be made for formation of the necessary qualities? (3) Using the planned study program material, selecting the necessary array of meaningful data, taken from experience, from the media or school textbooks, and it will result in the previously mentioned series or other issues. All of this leads to a series of BONDS being singled out from this type of

MOUSTACHE as "tasks for me". Highlight next some proven experience in the types of WHISKER and respective BONDS. Next, in brackets in italics is given the main meaning of the type of MUSTACHE.

UZ type 1 (UZ-1 – reproduction of knowledge).

Given: different characteristics of real-life, occurring in nature, in the human experience, or ideal objects or phenomena (characteristics may not be related either in content or in the subject area).

TASKS: 1. Analyze the existing characteristics: name them, compare with each other; say that they mark (allocate) in these objects (phenomena). If possible, refer them to one or different groups (types, classes); describe the characteristics of words, symbols. 2. Find the mathematical relationships between some characteristics, Express the dependence found in symbolic or other form. 3. Tell and explain the relationship (connection) between the characteristics reflecting the dependence to which mathematical knowledge (arithmetic, geometry, algebra) it belongs to, tell someone or get in writing. 4. Find in textbooks or give your other examples of the dependence found.

UZ type 2 (UZ-2 – reproduction of mathematical activity).

Given: 1) a set of mathematical symbols (symbols of numbers, letters, names of figures, etc.); 2) a set of signs of mathematical actions on the corresponding mathematical objects or the relationship between them.

TASKS: 1. Using the characters from both sets, make known to you: a) formula (with the sign =); b) other expressions that do not contain signs <; =; >; d) inequality. 2. Make expressions or formulas that you have not met (violate the rules of the use of signs is prohibited!); compile using the same characters having the meaning of the statement. 3. Explain the new dependencies or statements you have received as you understand them (for example, using previously known dependencies, examples, including from life, etc.).); select a new expression or assertion. 4. If possible, find examples from familiar areas of knowledge (natural science, chemistry, etc.), from the natural world around you or come up with your own to use a new dependence, select such examples from the messages of the teacher, students or from books, including in other areas of knowledge. 5. Explain your steps that led to a new addiction or statement that you formulated. 6. Make a conclusion about the order of obtaining dependencies and found their prototypes.

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## МЕКТЕПТЕ ОҚУШЫЛАРДЫ МАТЕМАТИКАҒА ОҚЫТУ БАРЫСЫНДА ОҚУ ЖАҒДАЙЛАРЫ МЕН ОҚУ МІНДЕТТЕРІН ҚҰРУ МҮМКІНДІКТЕРІ

**Аннотация:** Мақалада әдістемелік құралдар мәселесі бойынша өніп келе жатқан адамға танымал бағдарламалық жүйесін меңгеру белгіленеді. Көрсетілгендей, бұл осындай бағдарларды кезінде меңгеруде оқу математикалық қызметпен болуы мүмкін деп аталатын "жасырын", дәлірек айтқанда "айналым" нысандары, бастапқы мағынасы және оның мәні тап оқушы үшін жойылған. Оларды түсіну оқушыларымен пайдасы осындай әдістемелік құрал, оқу жағдайы, оны талдау, оқушылармен жеңіліс сериясына әкеледі, оқу тапсырмаларын.Мақсатты ойды – шақыру ынтымақтастық құру жинағын оқу жағдайларды және міндеттерді оқушыларды дамыту үшін. Басты мақсаты осындай жинақ – ықпал оқыту және тәрбиелеу математикамен.

**Түйін сөздер:** оқу математикалық қызметі, функционалдық сауаттылық қызметі, оқу жағдайы, оқу міндеті, әдістік жабдықтар.

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# ВОЗМОЖНОСТИ СОЗДАНИЯ УЧЕБНЫХ СИТУАЦИЙ И УЧЕБНЫХ ЗАДАЧ В ОБУЧЕНИИ УЧАЩИХСЯ МАТЕМАТИКЕ В ШКОЛЕ

**Аннотация.** В статье намечается проблема методического инструментария по оказанию помощи растущему человеку в овладении им системой ориентиров познания. Показано, что одним из таких ориентиров при овладении учебной математической деятельностью могут стать так называемые «скрытые», точнее «превращённые» формы, первоначальный смысл и значение которых оказались для ученика утерянными. Для их осознания учениками приносит пользу такой методический инструмент, как учебная ситуация, анализ которой с учащимися приводит к порождению серии учебных задач. Целевой замысел статьи – приглашение к сотрудничеству в создании *комплекта* учебных ситуаций и задач для развития учащихся. Главное назначение такого сборника – способствовать **обучению и воспитанию математикой**.

**Ключевые слова:** учебная математическая деятельность, функциональная грамотность деятельности, учебная ситуация, учебная задача, методический инструментарий.

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