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Developmental teaching tool «Madona» - an alternative to complex tasks

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Annotation: The article discusses the multifunctional tool of developmental teaching «Madona». The author relies on L. Vygotsky's constructivist theory, according to which learning should precede the child's cognitive development, and offers a universal table, as well as several examples of classroom activities are discussed using the universal tool of educational development «Madona». The author considers that the tool is universal, because it can be used successfully by the student and the teacher. The instrument is a multifunctional chart that is very easy to use. When starting work, the student uses the tool as a plan to complete tasks. It works on the task offered and simultaneously fills in each column. At the end of the work, the table already represents the student's reflections on the work done. The tool develops critical thinking skills and values in accordance with the educational goals provided by the national curriculum: problem-solving skills, critical thinking, creative thinking, communication skills. One of the advantages of the instrument is also the promotion of the development of metacognitive skills

Keywords: Developmental teaching, constructivism, instrument «madona», transparent skills, metacognition

Education is one of the most priority areas for the development of our country, because the progress of the country is unthinkable without an educated and progressive-minded new generation. The main document in the field of general education - the national curriculum, which is based on a constructivist educational concept focused on personality development - aims to educate such a generation.

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L. Vygotsky, one of the founders of constructivism, believes that learning should precede the child's cognitive development. This is one of the important principles on which Vygotsky's theory is based. Therefore, teaching is the source of development. What does it take for teaching to be formative? In order for a child to develop cognitively, it is necessary for him to learn. The question arises: what should he learn, from whom should he learn, etc. The first question is answered in the document «National Goals of General Education», which can be considered as an order of the state - we must teach everything that is necessary for the formation of a free person carrying national and general human values. Regarding the second question, a child can learn from a teacher, a peer, someone older than him, etc.

The concept of developmental teaching is based on the closest development zone of the student. «The nearest development zone» is a central concept of constructivism theory. It is the difference between the child's current level of development and the potential level. The current level of development is the maximum of the child's abilities, that is, the upper limit of the complexity of the tasks that the child can solve without the help of others, independently, and the potential level of development means the upper limit of the complexity of the tasks that the child can solve with the help of someone else, a more competent peer or a teacher. Basically, the learning taking place in the nearest zone of development is the source of the child's development, and such tasks, which the child can perform independently, contribute less to his development. Based on the above, the modern teacher is faced with a number of challenges: he must correctly define the child's closest development zone and select appropriate tasks for this zone, take into account that the task should be interesting and motivating for the student, fully meet the subject standard, be connected with the child's life experience, at the same time , must thoroughly master the art of scaffolding in order to provide help to the student at the right time and in the right dose, observe the process of the student's performance of the task, evaluate with formative feedback, if necessary, use differentiated teaching

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approaches, remediation, etc. The developmental teaching tool «Madona» can help the teacher in this difficult and important task.

The tool is a six-line table. It is designed to ensure the implementation of all five educational principles defined by the national curriculum. In particular, the student is fully involved in the creative process, that is, his inner powers are activated (Principle I); During work, it is necessary to activate previous knowledge from the stock of knowledge already present in the mind (principle II); It includes all three categories of knowledge (Principle IV) and so on.

«Madona»" (see table)

M	**Macro concept and the main data related to it:** Macro is the first component of complex words and means big, large, and the concepts are defined according to the national curriculum as the basis of systematic and comprehensive knowledge of the subject. In this column, the essential data related to the target concept from the task condition will be recorded**.**
A	**Association** - (Lat.) It means to connect, connection. In psychology, it is a relation between representations, when one representation leads to another according to similarity, contrast or proximity. e.g. For example, in the classroom, it will be the activation of previous knowledge related to the new task from the stock of knowledge that already exists in the student's mind.
D	**Dynamics** - (Gr.) According to one of the definitions, it means the variability of any event, the course of development. In relation to the instrument under consideration, this will be the understanding and argumentation of the sequence of procedures to be performed by the student.
O	**Operate** - (Lat.) any work, physical, mental. In this case, it means the correct execution of each procedure listed in the previous graph.
N	**Novation** (lat. novatio) the student mentions, what was the news for him, what he «discovered» while performing this task.

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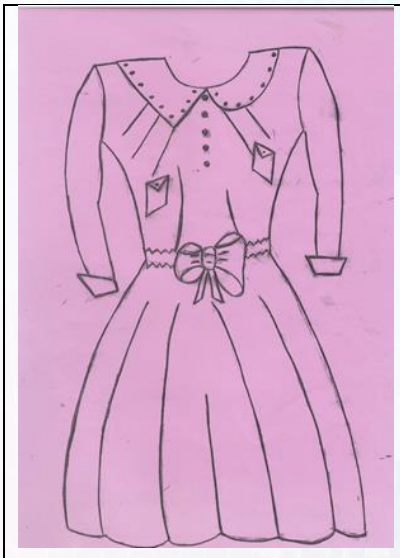
A	**Audience** (lat. -auditorium) - One of the meanings of the term is a report, lecture, etc. A group of listeners. In the instrument under consideration, this column refers to the presentation of the work in front of the class, his answers to the questions asked, the student's emotions during the interaction with the audience. In general, it is a reflection of the student on the work done. In addition, the student himself decides in what form he will present his work to the audience.

By its essence, «Madona» is a universal tool, because it can be used successfully by both students and teachers. In addition, the student can use it in the process of working on the assignment and during the presentation of the work, while the teacher can use it when giving assignments and evaluating work.

Consider several examples of tasks using the tool «Madona».



Pict. 1

Help Snow White!

Macro concept: Geometric transformations-symmetry (VI cl.)

According to the mathematics subject standard, the result to be achieved: The student should be able to demonstrate geometric transformations.

task conditions: «Once Snow White was invited by the prince of the neighboring kingdom to the fancy-ball. Snow White decided to wear a new dress to the party and went to the best tailor in the kingdom, but unfortunately, the tailor fell ill. Snow White was forced to order a dress for the apprentice. The apprentice tried very much to make the dress beautiful, he decorated it with a collar, cuffs, buttons, relief lines, but even so, the dress still did not come out beautiful. Snow White was very worried, she didn't know what to do with the dress». Look at the picture (Pict. 1). In your opinion, what are the flaws/defects of the dress? Advise Snow White how to correct these mistakes; In your mind how

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	will your option of correction the flaws change the dress? Present the model of the dress to the class.

The student's work will probably look like this:

M	Geometric transformations (symmetry) and related essential data, e.g. Decorative details such as collar, pocket, cuffs, relief lines on the hemline on the right and left sides of the dress are not symmetrically arranged.
A	The Condition of symmetry; It is not necessary, previous knowledge is only connected to mathematics. It is completely possible, the student will remember, how to make a doll's dress in art class, how to fold the fabric twice before cutting out, so that both sides are the same on the folding line. Or cut snowflakes from folded paper for the New Year.
D	1. The collar is narrow and rounded on one side, and wide and angular on the other. Since we cannot continue the narrow, rounded part, it is necessary to narrow and round the wider part. 2. Different number of relief lines at the throat. Since it's easier to make a new line without breaking it, a third relief line should be added on the left side. 3. The left relief line coming out of the waist should be extended and equal to the right one. 4. Pockets are located at different heights. It is necessary to raise the right pocket to a higher height, because it is

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	too close to the waistline and is not perceived as a pocket. 5. Cuffs of different shape and different. Since it is not possible to rearrange any of them to get identical to the other, it is necessary to remove both and cut out an identical pair.
O	The student first draws the axis of symmetry, then corrects all the flaws on the same drawing according to the rules of the symmetrical figure of the given figure and prepares the model of the dress to be presented to the class.
N	The news for the student was that he saw with his own eyes how useful and helpful geometric transformations are, in particular the knowledge of symmetry to solve a specific existing problem.
A	The student describes the process of submitting his work, what questions were asked by the teacher and classmates, how he handled these questions, what he was satisfied with, what he struggled with, what would he change if he had a task like this to do again, etc.

The tool can be used during the integrated lesson. in such a case, it is possible to add tables for each subject separately or add columns for the second subject. the task of the mathematical part of the integrated lesson of mathematics and Georgian is discussed below:

Task II

Topic: mathematical models of real processes;

General concept (macro concept): algebraic expressions; Equations and inequalities (quadratic trinomial, quadratic equation)

According to the mathematics subject standard, the result to be achieved: the pupil should be able to write the verbally described situation in the form of an algebraic image (formula); solution of equations; Formulation of equations according to the verbally given task.

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Task condition: if we triple the sum of the squares of two consecutive natural numbers, we will get a number that marks the date of writing of N. Baratashvili's famous poem «The fate of Kartli». Compile an equation, find these numbers and write them down to get an important date from the poet's biography.

M	algebraic images; equations, the main data are: 2 consecutive natural numbers, sorting in the square, sum, triple, date of writing the poem.	
A	Finding the roots of a quadratic equation, introducing the variables needed to compile the equation. the poem «the fate of Kartli» was written in 1839.	
D	first of all, we need to create the image. if the first number is marked with x, its next number will be x+1, and the sum of their squares will be $x^2 + (x+1)^2$. If the getting result will be tripling, we will get **$(x^2 + (x+1)^2) *3$.** received expression will be equal 1839. we get a quadratic equation.	
O	**$(x^2 + (x+1)^2)*3=1839$** **$(2 x^2 + 2 x +1)*3=1839$** **$6 x^2 + 6x - 1836 = 0$** **$x^2 + x - 306 = 0$** **$D=1-4*(-306)=1225=35^2$**	**$x_1 = \frac{-1-35}{2}$ = - 18 .** **X= - 18, X+1= - 17** **$x_2 = \frac{-1+35}{2}$ = 17.** **X= 17, X+1= 18** -18 and -17 are negative numbers and it doesn't work, and if we write 17 and 18 in the given table,we'll get **1 8 1 7** Birth year of poet N. Baratashvili.
N	I «discovered» that two pairs of roots -18; -17 and 17; 18 are numbers located symmetrically with respect to the origin of the coordinates.	
A	During the presentation of the work, my classmates asked me questions: 1.why one of the roots -18 wasn't useful? 2. Why was the sign of -18 removed? Answer: 1. according to the terms of the task, both numbers were natural, therefore -18 does not apply. 2. -18's sign didn't fall off, the second number was obtained taking into account the condition of the task (two next to each other)	

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As mentioned above, the presented tool is designed to help both pupil and teacher. but this alone does not exhaust its universality. It can be used by any subject teacher. the tool is flexible and allows you to use it when performing different types of tasks.

the tool develops the pupil's skills and values in accordance with the teaching-learning goals provided by the national curriculum: problem solving, because when completing tasks, he needs to search for ways to solve the problem, select the most effective of them, critical thinking, because it requires argumentative reasoning, that is, suitable arguments to substantiate his own opinions, example movers; you will create thinking, because it pushes him to accept challenges and take bold steps in school activities; communication, because it makes the student experience something, bring the idea to the audience/reader, and make an impression on them. one of the advantages of the instrument is also the promotion of the development of metacognitive skills, because it includes all the activities necessary for the development of these skills. these activities are: modeling strategies, prior metacognitive pause and subsequent metacognitive pause. each graph of the tool helps the student understand how to perform this activity. in its essence, it is the modeling of strategies; the tool obliges the pupil to determine the way in which he will perform the task, to describe in detail the stages of the task, to think about how to present his work, what questions he will have to answer, to justify the appropriateness of the selected ways or strategies, in other words, this is a preliminary metacognitive pause . and during the subsequent metacognitive pause stage, the pupil remembers and describes the progressed path, realizes how well he performed the task, what he did next, what techniques he used while working, what was difficult or what was easy, what mistakes he found, what he would improve himself. the metacognitive pause does not develop the students' learning skills and increases their learning ability.

Based on the examples discussed, we can conclude that «Madona» is an innovative tool for developmental learning, the use of which allows the teacher to select adequate teaching strategies during the study of each specific topic,

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which makes the learning process diverse, interesting and productive, reduces disciplinary problems, because in such lessons it increases pupils activity, initiative, efficiency and degree of involvement in the learning process; introduce problem-oriented teaching in daily practice; the pedagogic process is conducted with such problematic situations, which does not involve the transfer of advanced knowledge to the pupil, but forces him to solve problems artificially provoked by the teacher (or given in the teaching material). in addition, considering the tool's multi-functionality, use it as a developmental assessment tool to assess the achievements of each pupil and the entire class without wasting time and energy. for the pupil, it represents the sequence of steps necessary to complete the tasks and gives the way, stimulates thinking. verbalization of performed actions contributes to the development of reasoning skills. the pupil has to plan activities/procedures - understanding the requirements and determining the knowledge needed to perform them; determination of the main purpose of tasks/activities; outlining the stages of work; to predict what will be made easier, what will be made difficult, in what matter will he need help? targeted selection of strategies for each stage of work, accordingly, he develops many important skills.

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