

THE USE OF HEURISTIC METHODS FOR TEACHING PRESCHOOL CHILDREN

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ABSTRACT

This article is aimed at revealing the features of the use of heuristic teaching methods in the mathematical education of preschool children. The introduction of useful information about the beginnings of mathematics in the activities of the child is aimed at studying the observation and analysis by the teacher of various situations of interaction of the pupil with the outside world.

Keywords: Mathematical education, personal educational experience, designing ideas, variability of education, preschool children.

INTRODUCTION

The process of mathematical development of the child takes place through activities in which its internal capacity is manifested. Child's semantic knowledge and understanding of mathematic elements as a primary educational area is through the creation and realization of a corresponding inner field – is through reflection.

Therefore, the aim of the heuristic approach to mathematical development of children is to help their child to open up channels of communication with the world of mathematics to understand their characteristics and learn scientific “languages”. At the same time any external offers information on mathematical concepts and relations cannot be transferred to the inner personal contents, if a child is not appropriate preparedness, consisting in its internal educational processes. Unclaimed information will not play the role in developing.

Introduction of useful information about the initial math in a child's life should be based on observation and analysis of the teacher – pupil interaction of different situations with the outside world. Activities and educational products children report teacher about the necessity of mathematical information.

It should be the task of the teacher – is not in the child's educational environment more and more components (simplification development), and the organization of free educational child's interaction with existing and dedicated facilities for training purposes outside world. As a result, the child himself, based on domestic needs, cultural traditions and reflection, can acquire mathematical regularities inherent in the personal importance for him of objective reality.

To make sense of the mathematical development cognitive, creative and organizational activity methods are used.

Materials, results and discussion

Cognitive techniques

Description of the methods

Adaptation (empathy) – “empathy”, “universe” of the child in condition of the studied object, “humanization” of the object by means of sensuously shaped and mental attitudes and knowledge of it from the inside. A teacher helps this process by applying verbal recommendations like: “Imagine that you are – the number 5 (conditional measurement, triangle, cylinder, etc.)”. “Which are you?”. “Why do you exist?” “Whom you can be friends with?” “What is in?” “What do you like to do?” “As a result it receives reliable information about the perception of the object being studied by a certain child can assess the degree of internalization of the children have already studied concepts and dependencies, to identify semantic errors, inaccuracies and gaps in knowledge”.

Symbolic vision – is finding or building connections between the studied object and its symbol by a child. Teacher remind children about the common symbolic clichés (light – a symbol of good, dove – peace, spiral – infinity, etc.), then offers to watch the object under study with a view to the image of his character in the graphic, sign, a verbal form or another.

Heuristic questions (the method devised by the famous Roman orator Quintilian) – to search for information about the object under study asked questions (Who? What? What? Where? What? How? When?), the answers to which, in particular all their possible combinations, leads to unusual vision object.

Comparison – is comparison of children’s intuitions about the object under study with cultural and historical analogies.

Construction of concepts and rules – after pre – updating actualization, existing in children submissions on a particular topic the teacher by the way of comparing and discussion helps them to finish the cultural forms and to formulate the rules associated with the use of received ideas.

Method of errors – it is error constructive use of children for deepening of the educational process. The error is seen as a source of conflict, phenomena, exceptions to the rules, new knowledge, which are born in contrast to the conventional. The method helps to overcome the negative attitude of the teacher to the children's mistakes, kid’s fear of making a mistake, forming understanding of relativity and variability of any knowledge. For example, when a child mistakenly claims that 4 is less than 3, ask: Can 4 really is less than 3? Yes, if the 4 and 3 – are quantitative characteristics of objects of different measure, 4 – the number of days, and 3 – the number of weeks.

Cognitive type tasks

- To solve a real problem that exists in science: to offer a version of the origin of the object under study (land, people, numbers, isolated words, specific cultural traditions).
- To formulate rules for dealing with the object under study (for example, rules of values measurement, adding one – digit numbers).
- To prove or disprove the existence of unexplored object (for example, a negative number, the universal measurements).
- To explain the graphic form of letters, numbers, music, their interplay and consistency.
- To investigate the object – to establish its origin, meaning, structure, features, functions, communication (for example, to explore the numbers problem, usually a phenomenon).

- To conduct an experience experiment (for example, an experiment, that shows an abstract nature of numbers).
- To “Play” historical event or phenomenon (for example, the appearance of letters, numbers, digits, invention of the wheel).
- To isolate the similarities and differences in different systems (e.g., in the languages of facial expressions, gestures, colors, music, numbers, shapes).

Creative methods

Characterization of methods

The method of inventing – is a way of creating a previously unknown product as a result of the following methods of mental modeling:

- substitution as one object as a friend to create a new one;
- the determination of the properties of an object in a different environment;
- change the element of the object being studied and description of the properties of the new, amended.

The method of “If...”: children are given the assertion that changes usual picture of the world, and offers a description of the results of such a change. For example: “If all the volumetric geometric shapes turned in flat ones or plain ones, then ...”.

Exaggeration – is the increase or decrease of the studied object, its parts or qualities in order to identify its nature. For example: “Think of the smallest number, or polygon with the largest number of angles, or the unit of measure that is suitable for the measurement of non – uniform quantities,” etc.

Agglutination – is connection of, unconnected in reality, qualities, characteristics, parts of objects and verbal descriptions and / or images are obtained. For example, the top of the precipice, the volume of the void, the empty set, etc.

Brainstorming (proposed by A.F. Osborn) – involves the accumulation of a large number of ideas and theories as a result of the release of the participants under discussion from the inertia of thinking and stereotypes. It is organized as a division in space and in time the procedures of generation, systematization and criticism of ideas (the children are divided into appropriate groups whose work is subject to the rule: their task to solve the problem only after the actions of the previous group participants, and before and after to listen carefully and do not bother them).

Method of synectics – is brainstorm with the usage of analogy. It involves the following basic steps:

- formulation of the problem by the teacher;
- formulation of the problem by children (how they understand the teacher);
- generation of ideas on the basis of test questions drawn up by the teacher, guiding children to clarify the nature of the problem, and the three types of analogies – a direct, personal, symbolic.

For example, the teacher gives the task to come up with rules of comparing the single digits. Children interpret it: why 5 are more than 3? Progress check question: why do we know the composition of the number of n-units; methods of application overlay, reference pairs. Next, a direct analogy may come across the idea of the suitability or uselessness, obtaining rights for arbitrary pairs of similar numbers; personal analogy reveals the depth of mathematical representations of the single – digit individual children; symbolic analogy may suggest an ordering of the natural numbers.

Method of morphological box (designed by F. Zwicky) – analysis of attributes and relationships of objects obtained by compiling various combinations of known and unknown elements of other objects, devices, and processes with a view to setting new challenges, determined the child’s development.

For example, playing a combination by a child of one and two – digit numbers to actualize the laws of construction multiple numbers, it reveals the essence of the decimal system counting as the positional one, create simple combinatorial problems.

Assignments of creative types

- Ask the children to find, discover, and do that sort of thing that is already known to the educator: to come up with the designation number, sound, characters, concepts, day, week, month; define studied concept, objects, phenomena; formulate a mathematical conformity, a method of making a visual model, etc.
- Compose a story, challenge, saying, proverb, rhyme, poem, fairy tale, role, song, etc.
- Create a crossword puzzle, game, quiz, ancestry, signs, the script of the play, the task for the other children, a collection of own tasks, the concert program.
- Transfer the element from the language of one object to another (for example, to draw music with geometric shapes, “revive” the number, to determine the color of a week days).
- Produce crafts, models, replicas, a newspaper, a magazine, a mask, a mathematical figure, a geometric garden, embroidery.
- Conduct a mini – lesson in the role of the teacher, to develop their own teaching materials (e.g., mathematical recipe, algorithms for solving problems, memo).

Organizational activity methods

Characterization of methods

Targeting Kids – kids choice of objectives of the proposed by a teacher, followed by their classification detail; discussion on realistic and achievable; construction of specified algorithms.

Reviews – developing the ability to critically evaluate offered educational product (answer or story of a peer, reviewed video, etc.) using the following him:

- What do you like in the answer, what is the most successful thing in the story?
- As built performance (possibly highlight the logic structure and presentation)?
- Is subject fully disclosed, give an example?
- What spotted inaccuracies, errors, contradictions?
- Are there any objections?
- Whether are the supplements there?
- Are there any comments and suggestions?
- An overall assessment of performance.

The application of this algorithm to review outstanding children arithmetic problems simplifies its structure:

- About any objects and processes referred to the problem.
- Why it needs to be addressed?
- What methods solved the problem?
- Whether there can be other ways to solve?
- What is the output of the solution?

Baby planning – allocation by baby milestones and kinds of activities for the implementation of its goals for a certain period of time (during class, day, week). The plan can be changed, supplemented or replaced by another. At the end of the work carried out under the guidance of the teacher reflection planning.

Reflection – the organization of awareness of children’s own activities. The purpose of the reflective method is to identify methodological frame substantive work undertaken and on its basis to continue the planned action.

There are two main types of reflection: the current and final.

Current reflection involves organizing thinking activity of child in the following sequence:

- looping substantive activities (e.g.: to solve the group of similar tasks);

- stop purposeful activity;
- activation of reflexive activity (for example: children's attention returned to the structural elements of the considered problems and their relationship);
- resumption of substantive work with the rationalization obtained in the course of reflection.

Total reflection is different from the current one by increased volume of reflection period and a greater degree of certainty the task and by the teacher. The total reflection implies the need for self – esteem of the child, finishes his educational activities.

Methods of self – assessment are divided into quantitative and qualitative. Options of qualitative methods are formulated on the basis of targeting and planning by the child or are given by the teacher. Options of quantitative methods reflect all achievements of a child of set goals and are selected together by a teacher and children. At the same time to children's qualitative and quantitative self – assessment the teacher should be approached as a copyright of educational product and compare with known cultural and historical analogies.

Assignments of organizational activity type

- Identify the purpose of activities in different areas of knowledge for a day, a week, in the long run.
- Develop a plan for homework, class progress.
- Create a review to his work or to the work of their peers.
- Make up and conduct other children demonstration, competitions, concerts, quizzes, crosswords.
- Be aware of their activities (speaking, writing, reading, calculation, reflection) and to formulate its rules, laws or algorithms.

The basis for planning teacher heuristic educational situations in the mathematical development of children can become the **following tasks**.

- “Revive” each shape; draw it in color, to portray its body.
- Draw with residents of the city – fantastic numbers, which perform actions of addition and subtraction, gather in tables, columns, hiding in the surrounding objects.
- Draw (the blind, from designers to model) a geometrical garden.
- Conduct a game – competition “treasure hunt”: children are divided into groups, each of which must draw a “treasure” and a plan for its search; who will find “treasure”, he is declared the winner.
- Give your own definition of concepts such as point, line, segment, angle, triangle, circle, square, rectangle, etc.
- Come up with your games with numbers and figures, puzzles, tasks and make (decide, solve) them in the form of competitions.
- Conduct the mathematical research on preparation of own numerical series, tables of addition, subtraction, defining the connections of numbers and geometric shapes, discovery of mathematical conformity in surrounding phenomena and calendar: to come up with their own measures of measurement.
- Create a task on a given example ($6 - 2 + 3$) or topic (for example, an event on the process of walking: 5 toys were brought, there were 3 of them rested).

It should be noted that the evidence of the professional closing of teacher in heuristic approach to the mathematical development of the child is his ability to go to review, change and development of their plans and ideas about the methodology of work with children. Inclined to heuristics the teacher himself is inevitably the subject and object of education, carries out all activities that involve children, i.e., its heuristic mathematical development happens simultaneously and in parallel with the development of the pupils.

CONCLUSION

In summary, we note that, based on the original foundations of Eastern philosophy, integrating many of the values of humanistic pedagogy, theory of heuristic learning is the most effective tool for mathematical development of the child, the more so that it is adapted to remote forms of interaction.

The heuristic approach is successful connection of individual creative self – realization of all subjects of the pedagogical process with their contemporary collective work. Education, constructed on attributes heuristics gives the child the opportunity to realize one of its main missions – the opening of the inner and outer world, in particular the mathematical laws that from the point of view of psychology is a natural human abilities and needs.

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