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## IMPROVE TEACHING PROCESS IN LEARNING GEOMETRIC KNOWLEDGE IN THIRD GRADE WITH THE ASSISTANCE OF PROJECT ACTIVITIES

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**Abstract:** Improving the mathematics learning process is a constant that invariably follows the scientific development of society. One of the main goals of the math education process is to form non-confessional, productive and creative thinkers. This requires improvement of the organization and management of the educational activity, applying all the pedagogical innovations. Innovations in the process of learning are the project activities that allow, through its content and organizational form, the maximum and effective absorption of mathematical knowledge. One of the modern innovations that gain popularity in the learning process is project-based activity. With the help of learning projects, students make the most of their knowledge in a creative and innovative environment.

**Keywords:** project, learning project, mathematical education

### 1. INTRODUCTION

One of the main functions of the learning process is the developing function. According to Y. Stoimenova, "viewed from the positions of the developing education, the learning activity has a specific character in its direction - it ensures the acquisition of knowledge, skills and habits in a certain system. The most important source of learning activity is the cognitive interest centered on the social importance of learning "[2; 14]. The optimization of the cognitive interest can be accomplished through a number of activities, one of which is the project activity.

In the late 1950s and early 1960s, practically all developed countries have begun experimenting to improve mathematical education, including mathematics in primary schools. The reasons for this improvement in mathematical education in elementary classes can be reduced to two main factors - the achievements of mathematics science and the acceleration in the development of modern children. The guidelines for improving mathematical education are linked to the need to translate the language of mathematics into the language of real-life tasks. According to I. Stamenova, "the project activity allows the teacher to organize the training of the learners, taking into account their interests and abilities" [1; 70]

Since the early 1960s, research teams have been working in Russia to define common guidelines and specific ways to improve math education. The collective led by Menchinskaya believes that the modernization of mathematical training should cover both learning and content. For this purpose, account should be taken of the available knowledge of the pupils, of the educational objectives, of the whole set of mathematical knowledge that pupils will receive. This team believes that it is necessary to preserve the classical learning content by eliminating repetitions; to increase the theoretical level of the material studied; to introduce the algebraic propaedeutics in the first class in appropriate dimensions; to increase the volume of the geometric material.

For a long time, another team worked under L.Zankov. In terms of the learning process, the team proposes to emphasize the teacher-student relationship; in the lesson to create a creative atmosphere; to develop the cognitive and heuristic activity of children, the training to go on with a fast pace and an increased level of difficulty.

The team, led by V. Davidov, enjoys a prominence with its original views. With regard to the learning process, the team suggests that the learning content is not stacked in any concentration; the main path for reaching new knowledge must be deductive. All authors who work in the direction of improving the learning activity in the lesson of mathematics offer innovative ideas for their time. These ideas keep their up-to-date, looking for newer means to get them done.

### 2. PROJECT-BASED LEARNING

Along with problematic training, programmed training, self-employment and algorithm, a well-deserved place is also the project-based training. Project activity is a heuristic type of activity that places the student in an active position. In addition to activating the cognitive abilities of each student, the project-based learning of mathematical knowledge allows this knowledge to be perceived in teamwork. Teamwork, on its part, provides the conditions for collegiality and mutual assistance, which further aids the understanding of certain mathematical knowledge.

The project method was first proposed by J. Dewey and W. Kilpatrick in 1918. It is based on the idea of learning by doing. The method is defined as training that is based on development.

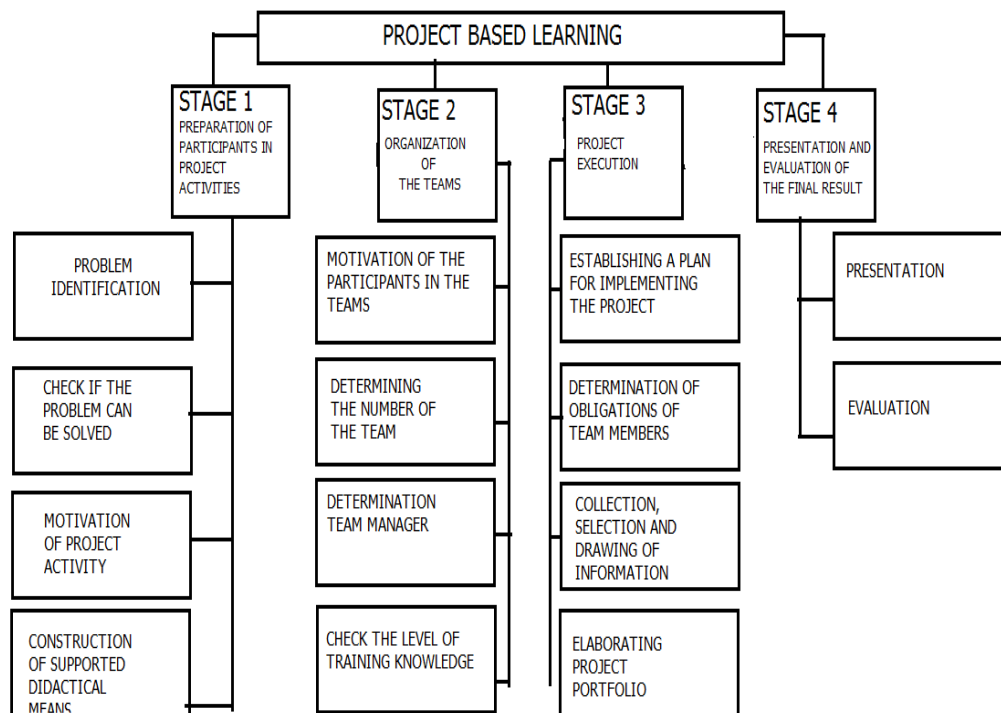
Today the project method is perceived as:

- pedagogical technology aimed at using acquired knowledge and acquiring new knowledge;
- a way of achieving the didactic objectives of the lesson through a completed development on a given problem;
- a form of training organization that is based on teamwork;
- a training model based on carefully planned interdisciplinary training to integrate the learner better into real-life situations.

The focus of the method is on the acquisition of knowledge, the formation and development of skills and competences needed to solve real problems. There are studies on the possibilities of applying the method of projects in learning and learning in different areas of knowledge. The results of many studies on the application of the project method lead to the summary that learning and learning by developing and presenting joint and autonomous projects is characterized by several key qualities such as: developing internal motivation for learning; developing constructive critical thinking; fostering collaboration, teamwork, making group decisions; developing skills for planning work on projects, presenting and protecting the finished product; practical application of the surveyed information. In pedagogical practice, project work is increasingly being used as an educational technology that is important for quality training as it includes a system of activities where learners acquire knowledge, skills and competences in the planning and implementation process of certain activities.

To carry out project activity according to Iv. Marasheva requires students to have a set of basic skills. These skills include: discovering and evaluating the required information; working with specialized literature; self study of selected material; the optimal order of the upcoming tasks, their distribution over time. Some of the basic conditions needed for successful project-based training are set by D. Mitova. These conditions are related to a defined conceptual idea for developing a project with a guaranteed end result. They require a system of successful strategies that will lead the trainees to the desired results. The conditions necessary for the successful project activity include the theoretical and practical training of the trainer for project activities as well as the self-organization of the participants in the project. Designing a learning activity is a complete process that involves a number of stages. The stages of the project-based training are described by D. Mitova and M. Manova, united in a model for carrying out project activities (Fig. 1)

**Fig.1 Project-based Learning Model**



The first stage of project-based learning is related to the preparation of students for project activities. At this stage identification of the problem is carried out. This is one of the most difficult tasks to be solved by the students. Identifying the problem requires its understanding of the problem itself by penetrating its condition, an internal idea of the problem is created. This first stage is also related to motivating learners. at this stage the students learn about the essence, the advantages and the stages of creation and presentation of the project.

Projects are shown to them. A project implementation plan is created as students develop a list of specific actions, timelines, ways to find appropriate information sources, description of possible materials for use, further training, etc. The plan also sets out the priorities to which the efforts to develop the project are directed.

The second stage of the project-based training is related to the organization of the teams. Preparing the upcoming activities is carried out by collecting and storing information - operation with the information sources. Preliminary results of the project are determined as a goal of the students' activity.

During the third stage, the responsibilities of each member of the team are allocated. And the whole team produces a project portfolio that contains all of the project's work materials, the trainer systematically tracks the progress of the learner over time, reflecting the accumulated knowledge and developed skills. The fourth final stage of project-based training involves presenting and evaluating the results. At this stage, reflection and outlining future perspectives for the development of the topic are carried out.

### 3. MODEL OF A MATHEMATICAL STUDY PROJECT

In third grade, the curriculum devoted to the acquisition of geometric knowledge focuses on introducing pupils to beams, types of angles and triangles according to angles, perpendicular and parallel lines, right angle, rectangular triangle and rectangle, face of rectangle. Simultaneously with the new knowledge the knowledge about the basic geometric figures and their properties is consolidated.

Once the framework of the project activity has been outlined and the geometric content in mathematics for the third grade is presented, the following technological model of a mathematical project can be proposed.

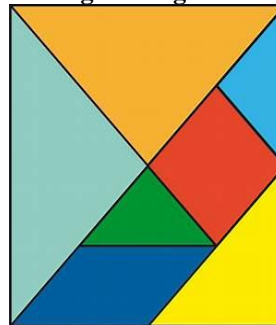
**TOPIC OF THE PROJECT:** Tangram

**OBJECTIVES:** To strengthen students' knowledge and skills for basic properties of geometrical figures - square, triangle, rectangle

**FINISHED PRODUCT:** Geometric Composition Boards.

**DESCRIPTION:** Tangram is a very ancient Chinese logic game, a kind of puzzle for arranging. It consists of 7 tiles, called tanks, which, when properly arranged, form a square (Fig. 2).

Fig. 2 Tangram



The class is divided into 3 teams, each team consisting of the same number of students. Each team collects tangle information. The students themselves produce a tangle of cardboard. As a final product of the project activity, teams must produce and present a dashboard with geometric compositions made from all parts of the tangle. For Team 1 - Letters and Numbers; team 2 - animal figures; team 3 - figures of inanimate objects and geometric figures (Figure 3).

*Expected results are that students:*

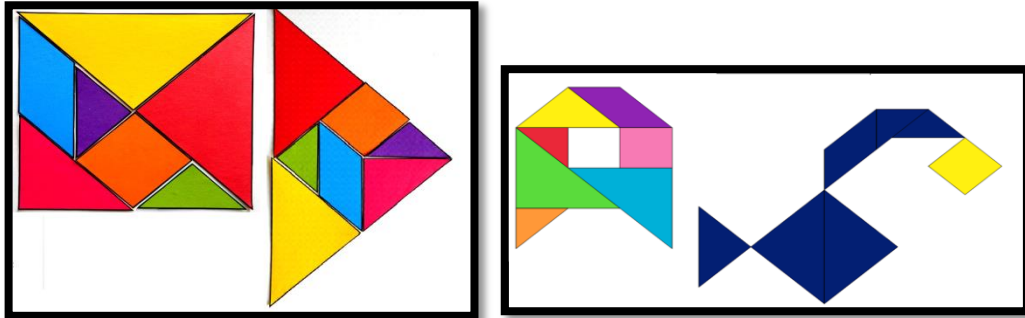
- recognize the triangle, rectangle and square shapes;
- know their elements;
- be able to draw them;
- to form geometrical figures made up of the studied figures;
- seek and systematize information on a topic;
- acquire skills for teamwork and adherence to deadlines;
- acquire skills for planning and organizing different activities;
- acquire skills for aesthetic shaping and presentation of information.

#### ACTIVITIES:

1. Set the topic and split teams.
2. Collect and systematize information on the subject.
3. Drawing a tangle of specified dimensions over a square mesh. Name the individual parts. Find the circumference of each part. Find the tour of the whole figure.
4. Tile and cut individual tiles.
5. Coloring the different tanks in different colors.

6. Design of various geometrical compositions formed by all the elements of the tangle.
7. Dashboard with different geometrical compositions.
8. Presentation and discussion of different posters.
9. Overall assessment of project work.

**Fig. 3 Posters with tangrams**



#### **4. CONCLUSION**

The application of the Project Method has a strong influence on the development of interest in mathematics, the trainees' personal qualities such as honesty, courage, kindness, diligence, insistence, joy, sense of responsibility. From the above it can be concluded that the application of the Project Method in Mathematics Education and Learning affects the subject-entity relationship and is the basis for the formation and development of mathematical, informational, social and personal competences.

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