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# **IMPLEMENTATION OF MODERN TECHNOLOGIES IN SCIENCE**

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## **FEATURES OF THE IMPLEMENTATION OF PROJECT TECHNOLOGY AS A TEACHING METHOD**

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Project technology as a teaching method is very popular today among teachers involved in theoretical research and practical implementation in various educational institutions.

Project activity as a didactic tool is an integrative type of activity that ensures the coordination of various aspects of the learning process (content, procedural, etc.), synthesizing elements of cognitive, transformative, vocational, research, communicative, educational, theoretical, and practical activities.

About project activities, the allocated A. Leontiev's property of activity to serve as a system-forming factor acts as a particularly important psychological condition for organizing the process of assimilation of educational material, structuring educational material into special patterns around a single goal - the implementation of one's project. This allows us to define the category of "project learning" as a pedagogical technology [1].

However, actual project activities in educational organizations often do not provide a solution to the goal - the formation of the subject of the activity. This situation is primarily because teachers themselves are outside the framework of the project culture;

the organizers of innovation at different levels of education are often guided by their intuitive understanding of the project or call any productive activity of students a project [2].

Many contemporary researchers contend that the concept of project-based learning emerged in America at the start of the 20th century with the publication of W. Kilpatrick's "Method of projects" [3].

W. Kilpatrick developed the idea of learning through the organization of "target acts" (projects) and defended the thesis that schools should prepare students for life in a dynamically changing society, to face the still unknown problems of the future.

M. Knoll refutes this provision, believing that project activity arose in the depths of vocational education at the end of the 16th century in Italy [4], and proposes the following periodization of the development of the idea of project activity in education (Figure 1).

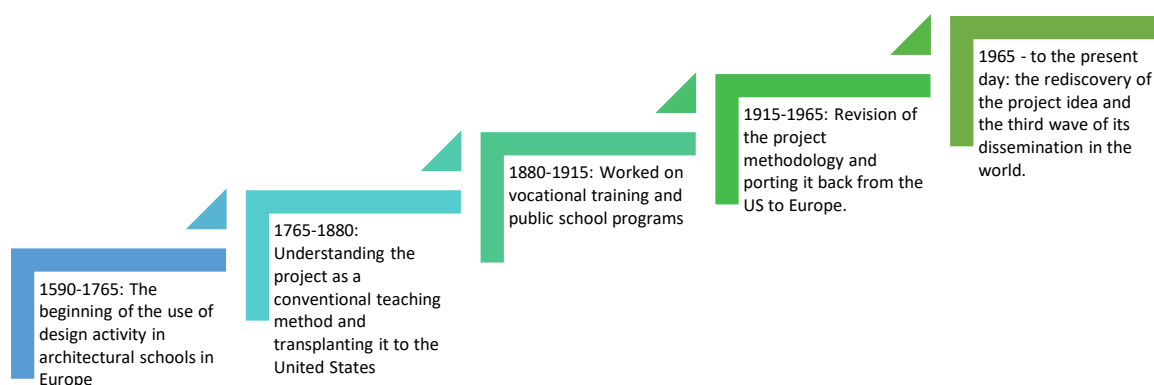


Figure 1. Scheme of periodization of the development of the idea of project activity in education.

J. Dewey proposes to base learning on the initiative, through the student's interest in particular knowledge, through the expedient activity of the student [5].

W. Kilpatrick believed that a project is any activity performed "from the heart," with a high degree of independence by a group of children united at the moment by a common interest.

He identified 4 types of projects:

- creative (productive);
- consumer (manufacturing of items);
- have problems (overcoming intellectual difficulties);
- project-exercise.

According to the American teacher, the use of these projects not only prepares the child for life in the future but also helps to organize life in the present [6].

Furthermore, according to an analysis of the scientific literature, the aforementioned techniques first appeared in American agricultural schools in the second half of the 19th century (Figure 2).



PEDAGOGY  
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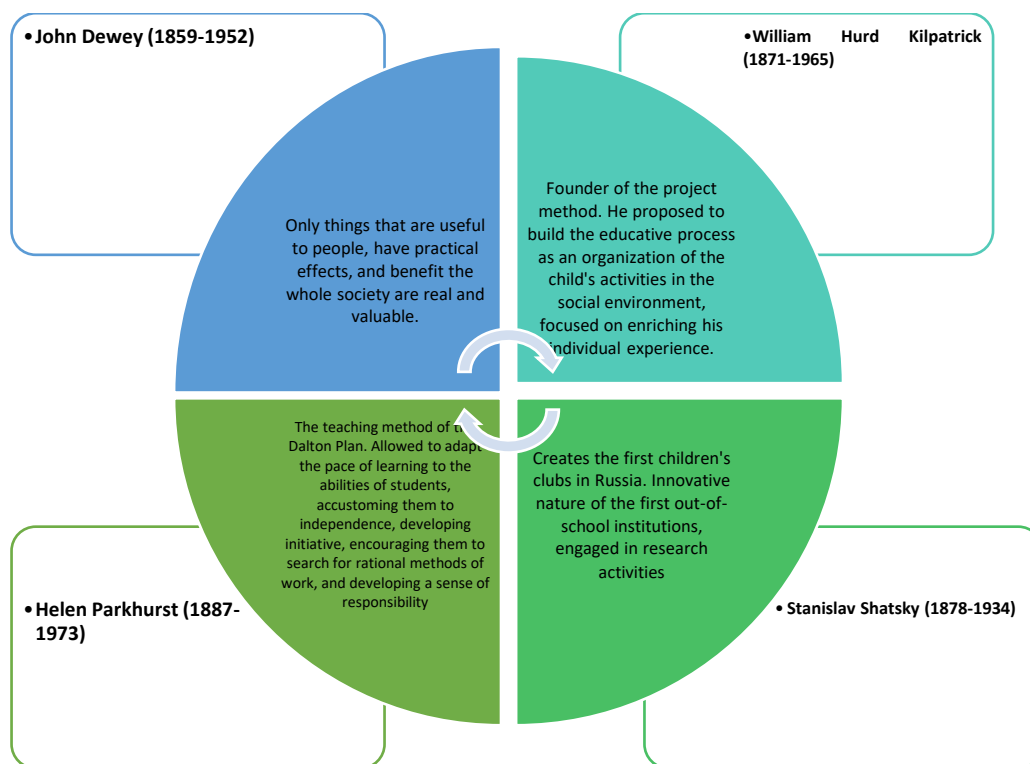


Figure 2. Scheme of the emergence of the idea of project-based learning.

The rise of project-based learning concepts in Russia has almost paralleled the development of American teachers. Under the leadership of S. Shatsky, a small group of employees (B. Ignatiev, M. Krupenina, V. Shulgin) was organized to try to actively use the project method in teaching practice.

According to S. Shatsky, the main components of the project method are:

- 1) The student's experience, which the teacher must identify;
- 2) Organizational experience (organized classes for students based on what the teacher knows about the child's experience);
- 3) Contact with the accumulated human experience (ready knowledge); and
- 4) Exercises that give the child skills.

Under the project, we mean a joint educational, cognitive, research, or creative activity of students, organized based on information and communication technologies, having a common problem, goal, agreed methods, and methods of activity aimed at achieving a joint result of activity, which implies the development of any software tool. In this case, the project implementation technique is the implementation of the computer problem-solving phase, and the project itself allows you to renew the interdisciplinary links of informatics with other courses [7].

Here are some of the problems educators may face when implementing this technology:

- The greatest difficulty for teachers is the formulation of the problem and the ability to lead students to its independent definition;

- Where there is no question or problem to resolve, the flow of thoughts goes randomly;
- A project is a creative work, but not every creative work is a project;
- Projects are often turned into summaries, even downloaded from the web, undermining the idea of this approach.

Hertzog also pointed out the pros and cons of project-based learning techniques in his research:

1) Wide and multilateral interaction of participants in the course of collective work on ongoing projects;

2) Formation of a group style of thinking and diligence at all stages of work on the project;

3) Managing the design process and providing pedagogical support to its participants, the possibility of implementing various types of projects and mastering methods for their further promotion. Although the project approach is promising, its implementation has several limitations. These include:

- Lack of qualified teachers capable of implementing this method;
- The absence of an individualized method of project activities for a particular teacher [8].

Currently, Kazakhstan is developing its plan and national model of education. In this regard, one of the learning techniques for the personal development of students is the project-based learning approach.

Approaches to project-oriented learning techniques include a set of different approaches such as problem-based, search-based, communicative, research-based, reflective, and representational.

We define the following characteristics of design techniques:

1. An important question that is both informative and practical (assuming the question is driven by a specific cause or action);
2. Research is not only an aspect of the project, but also creativity (i.e. creative and research activity);
3. The project must have a clear, practical objective for the student that aims to address the selected issue.

Thanks to the use of project-based learning technologies, students formulate the problem well, put forward hypotheses, and for many it is not difficult to analyze the results and draw conclusions.

The main purpose of using project technology is to develop students' curiosity, improve their knowledge by doing their work, develop information orientation skills, and adapt students to the possibility of self-expression in various situations and various social conditions the environment in the future, increasing their ability to think critically.

In the system of project-based learning, an individual approach to students is important, since in each class there are students with different abilities. When assigning tasks, the individual characteristics of the students should be taken into account. Stronger students can do more in-depth research, come up with more different ideas, and make more complex objects. Less capable students need more support and less



demand from the teacher. Such students can do less research, choose from fewer ideas, and make simpler items. Every student may have an outcome of their program. Teachers should discuss expected outcomes with children at the beginning and during the program. It is important that each student complete what was planned and agreed upon with the teacher. Design classes should take place in a relaxed atmosphere based on the cooperation of the teacher and the student. The success of project-based teaching is based on an understanding of each child's abilities and the ability to prompt and guide students to make their own decisions.

Project activity is attractive to students, but its educational and educational effectiveness depends on the correct understanding of the essence of project learning and the competent use of its capabilities in pedagogical practice.

Through empirical analysis, we can identify several typical mistakes that teachers often make when using this method:

- announce the topic of the project to students or set the task themselves, instead of creating a situation for identifying a problem that is significant for students or offering a bank of projects, providing an opportunity to make an independent choice;
- offer their ideas instead of creating a situation, asking questions that encourage children to find ways to solve the problem;
- give a creative task to consolidate the studied educative material, mistakenly calling this work the implementation of the project;
- students' creativity is used for educational project work, which is also creative. This is associated with an independent solution to the problem of obtaining additional educational information while working on a project.

Therefore, the integration of project activities into the educational process requires appropriate psychological and pedagogical training of teachers, as well as initial training of students in solving applied problems.

In conclusion, we note that being at the stage of modernization, the modern education system places increased demands on the knowledge, skills, and abilities of students. In light of the new conditions, educational design, first introduced over a hundred years ago, has not lost its relevance, having transformed into a project-based learning technology that meets the current requirements for the effective organization of the pedagogical process.

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# **Implementation of modern technologies in science**

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