

THE ROLE OF EDUCATIONAL PROJECT WORKS IN THE FORMATION OF STUDENTS' RESEARCH SKILLS

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<https://doi.org/10.5281/zenodo.10279455>

Abstract. *This article discusses the importance of developing communicative, critical and creative thinking, collaboration skills in students through project works and psychological-hygienic requirements to organize these educational activities.*

Keywords: *educational and research work, project work, 4C model, pedagogical factor, Bloom's taxonomy.*

Nowadays a special attention is given to education in our country. Transformational global changes requires today's young specialists not only to gain knowledge and skills, but also to acquire such qualities as inquiry-orientedness, invention-focused and entrepreneurship. Therefore, developing students' thinking and inquiry skills (verbal, logical, critical, creative thinking skills) by involving them in educational project activities is one of the urgent pedagogical problems.

The role of educational projects is very important in the formation of students' research skills.

A.V. Leontovich describes the project work as a part of educational research as following: "If scientific research is intended to expose the truth, to acquire new knowledge, then educational research is the acquisition of research skills by students, mastering the research type of thinking, and the formation of an active approach in the educational process"[1].

A research work is similar to a project work. However, research is only one stage of the project work. A project is a work designed to solve a specific problem, to achieve a pre-planned result in a reasonable way. At the same time, it develops students' communicative, critical thinking and cooperation skills, and it is an opportunity to maximize their creativity. The project works include students' portfolio works, research activities, designing or problem solving tasks and any other form of independent educational work.

A project for a student is an opportunity to reveal their creative potential as much as possible. It is an activity that is aimed at self-representation, assessing their knowledge, applying knowledge for real life situations, defending the achieved result in front of the public, and solving a problem. The result of this activity has a practical nature as it is focused on solving a certain problem and arouses interest in students for inventing things. It is an activity focused on solving an interesting problem formulated by the students themselves.

At the same time, the educational project work is an integrated didactic tool for teachers in organizing the teaching and learning process that allows students to develop practical skills, creative skills and abilities to design and research the certain things. Students are taught in problem identification, setting objectives, activity planning, independent thinking, information search, research and creative works, practical application of knowledge, presentation, problem solving, and self-analysis and so on [2].

Another difference of the project is the planning of the work in advance. The entire path of the project goal from the initial problem identification to the realization is divided into separate

stages, each of which has its own intermediate tasks: defining the methods of solving this particular task and finding resources for it. It is no less necessary to divide into separate stages of development of a detailed map of the work with deadlines for the implementation of each stage.

The result of the project – product is obtained by using the existing method of solving the problem. The product of the project should have certain consumer characteristics, that is, it should meet the needs of any person who has faced this problem and provide a solution for this project’s problem.

In its meaning, the project method of education is close to problem-based learning, which involves presenting a problem to students in a consistent and goal-oriented manner, and solving these problems under the guidance of the teacher, and providing the environment for students to actively acquire new knowledge. Problem-based learning ensures solidity of knowledge and their application in practical activities.

It is appropriate to rely on the idea of close development of the Russian scientist L.S. Vygotsky when introducing the project work to a young student [3].

Working on a project involves a very close relationship between the student and the teacher. In this case, two relationships can occur:

- leave the students to work on their own;
- promoting independence through constant intervention, guidance, and advice.

In this case, the teacher should act in such a way that the student should feel it. The project should be his/her own work, creativity, invention, realization of his/her ideas.

The activity of the student’s educational project for today (A1, V1, S1) is explained as a result of cooperation for tomorrow (A2, V2, S2) as follows:

- A1-A2 – if the student completes part of the project work independently, and the remaining (difficult or complicated) part together with adults (or under the guidance of the teacher) (A1), he will be able to complete such work independently tomorrow (A2).

- V1-V2 – if the student completes the whole work by himself, even the complicated part, but he completes the work with mistakes and does not achieve a completely positive result today (V1), the next day he will do the same (or less) part of the work tomorrow (V2), because he loses the motivation for this activity.

- S1-S2 – if the student independently completes the familiar part of the project, but adults (family members) complete the rest, and the work is entirely completed today (S1), the student will perform the familiar part again tomorrow (S2). So, collaborative activities help the student to acquire new knowledge and practical skills.

There are a number of situations that need to be taken into account in the process of organizing project work in cooperation with students. If the student does not have any basic knowledge or skills, the work cannot be given to them as a project work. Because they don’t have any resources to acquire knowledge and skills related to the project work. In other words, in order to work on the project, the student must have certain preliminary stages of preparation (knowing about the problem, mastering observation tools and methods, planning the work, etc.).

Educational results will be effectively achieved if the practical work given to students is performed in the sequence of actions from Bloom's taxonomy. According to Bloom’s Taxonomy, the content of activities is as follows:

№	Categories	Action words
1	Remember	Recalls certain facts with specific features.

		recall, recognize, define, duplicate, list, memorize, repeat, state, name.
2	Understand	Explain ideas or concepts. classify, describe, discuss, explain, identify, locate, recognize, report, select, translate
3	Apply	Use information in new situations. execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch.
4	Analyze	Draw connections among ideas. differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test.
5	Evaluate	Justify a stand or decision. appraise, argue, defend, judge, select, support, value, critique, weigh.
6	Create	Produce new or original work. design, assemble, construct, conjecture, develop, formulate, author, investigate.

It is difficult for young children to extract basic information from a large stream of information. They cannot analyze their work and evaluate their achievements objectively. They have not yet developed the skills to present the results of the project work and demonstrate themselves. All of this has to be done by the teacher with the children, who should regularly support and inspire them during working on the project. However, it is important not to forget that the project is first of all an independent work, in such a work, the student should be able to present his results from a point of view that may not correspond to the views of the teacher.

In the scientific-research works conducted by foreign scientists such as E.L.Chiappetta, T.Koballa, A.T.Collette [4], traditional educational training and educational-research training were compared, the specific aspects of the relationship between these activities were studied, and their differences were presented.

Traditional educational training	Educational-research training
Students often work alone	Students often work in groups
Emphasis on learning facts	Emphasis on understanding concepts
Requires adherence to a well-defined curriculum	Problems set by the teacher allow learning questions
The activity is mainly based on the material given in the textbook.	Activities are based on various sources
Students are treated as “blank papers”.	Students are considered thinkers with their own perspective on the world
Usually, the teacher disseminates information among the students	The teacher creates an interactive learning environment
Teachers tend to look for the right answers	The teacher seeks to understand the students’ ideas or hypotheses
Assessment and learning are separate	Assessment and learning go hand in hand

The process of implementation of educational project or educational-research work ensures the orderly and logical sequence of teacher's and student's interdependence, which is one of the main tasks of the teaching process – educational and developmental functions of education.

Teaching science as a research is not limited to the presentation of scientific evidence and results of the study, students should also express their opinion on the problems related to society and the environment in their daily life; actively participate in the collection and use of evidence based on observations; have skills such as being able to explain based on acquired scientific knowledge.

Research-based education can be characterized by the level of responsibility if we look at the question from the didactic point of view: What are the characteristics of teaching and learning science through research? In this case, the student formulates a research idea by putting a problem in front of him and works on a study-research or an educational project, looks for an answer to the problem, evaluates his knowledge and collects information about his research (student-led research). It is also compared with the level of student involvement in research by the teacher (teacher-led research, educational outcome).

Both the student and the teacher participate in the activities of the project. In this case, the project for the student is an adolescent motivation for learning, self-expression, which is the most powerful incentive for their academic and other activities. Working on a project will be more successful if its goal and outcome are of personal importance.

In conclusion it can be said that in order for students to work on a project, they must have mastered certain initial stages of preparation (such as problem identification, mastering observation tools and methods, work planning). Most students need help from adults to complete projects. Using a collaborative approach in the project activities of students, increasing the resources of the educational process, and forming communicative, critical and creative thinking and collaborative skills should be an objective.

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