

Application of the project method in physics education in classes with intensive studying of English

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The article is dedicated to project-based learning as a way to create an interactive educational environment that stimulates students' cognitive activity. It dwells on the essence of the project method and the preliminary stages the preparation of a training project goes through. Emphasis is placed on the application of this method in physics education. The article also presents an option, a feasible one in common pedagogical practice, of including project-based physics education in the school curriculum of 9th graders with intensive study of English in junior high.

Keywords: physics education, project method, English language, information technology, interdisciplinary relations

INTRODUCTION

Contemporary pedagogical reality has made physics education a real challenge bearing in mind the diminished interest on the part of students in this academic subject. The latter often consider physics hard to learn because it requires much greater effort and logical thinking to understand the various processes and phenomena that are studied at school. However, in the course of achieving a goal even the hardest obstacles can easily be overcome at a certain point provided the right approach has been found. In this particular case this means selecting and combining different methods and means aiming at boosting students' cognitive capabilities and motivation to study. In and out of school, ways should be found to inspire students to become explorers and obtain knowledge on their own through various activities. There is no doubt, far more efficient a form of education is for students not just to study and re-produce what they have learned but to think, come up with ideas, discuss issues, review and summarize solutions to pressing problems of science, technics, nature, outer space. The analytical perception of the physical matter is definitely a way to bring science closer to students so that they can understand it better. That is why contemporary teachers should not just teach and make students learn what they have been taught, they need to trigger students' thinking through intellectual interaction. Such interactive ambience relying on a multitude of methods and the application of various approaches can be founded on project-based education. Pedagogical practice has shown that using projects in physics education has universal appeal among students. Project work makes students braver and more confident in their studies. Besides, they come

up with creative ideas and ways of implementing them. Thus they come to realize physics is not that hard a subject to master.

THE ESSENCE OF THE PROJECT METHOD

The project method is not entirely new – it first appeared at the beginning of the 20th century in the USA. It is also known as 'the problem method' and was initiated by John Dewey and his student William Killpatrick who made use of the ideas of the humanistic stream of philosophy and pedagogy. The method was pretty successful and was introduced to American schools due to its rational combination of theoretical knowledge and its practical application for the solution of particular everyday problems. During the first decade of the last century it got the attention of some Russian pedagogues but it was not until the 30s that it became common practice in the ex-USSR [1].

"All that I learn I know what I need for and where and how I will be using it" – this somehow summarizes what the project is all about in contemporary context.

The term 'project' is what project-based education is really based on. Translated literally from Latin it means 'thrown forward'. It is often used in different fields of human life denoting a plan, an intention. Didactics views it as a "topic for research (survey) in the context of the didactic tasks (without opposing it to or eliminating the subject curriculum requirements), the successful development of which presupposes both theoretical background and practical implementation" [2]. An activity the content of which is document-certified leading to the accomplishment of set goals over a certain period of time' is yet another definition in terms of the activity approach.

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Fig. 2. The participants in the project and their teacher of physics before and during the open-door lesson.



Fig. 3. Presentation in front of the class and some visiting teachers.

Combining physics with English and IT is definitely a working mechanism for establishing inter-subject relations. The project was carried out successfully because the students' learning of physics was supported by their linguistic and IT skills. This triple collaboration made them feel worthier, they viewed the project in highly positive terms and participated eagerly in all activities. Besides, they put a great deal of effort into their

work demonstrating great responsibility, creativity and knack for research and exploration.

Over the last couple of years, project-based learning has triggered greater interest among students and teachers. One of the reasons is the contemporary trend of establishing a connection between theory and practice, education and production/scientific research. Another reason for the appeal of the method is the opportunity it gives

for the appointed tasks and activities to be performed online. This was of crucial importance last year considering the distant education schools had to switch to as a result of the global COVID-pandemic.

In general, project-based learning shows students the subject of physics in an entirely different light. Assuming the part of young researchers, they soon realize it is not just a theory but something accessible once they have reached the scientific truth through hard and active learning. This way they perceive more deeply and thoroughly the fundamental scientific explanation of the processes and phenomena in the whole material world. And that, as we all know, is the ultimate mission of every teacher of physics.

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