

# **The Implementation of Project-Based Learning in Israeli Middle Schools: A Longitudinal Study**

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## **Abstract**

Project-Based Learning (PBL) is a constructivist teaching-learning strategy that guides students to learn the central concepts of selected disciplines while using inquiry skills to develop research products. This strategy, long recognized throughout the world from elementary schools to universities, was the basis for "Project-Based Learning (PBL) in Science and Technology," an innovative approach which was developed for Israelis middle schools (1992-2002). Almost 560 teachers took part in inservice courses which were led by the developers of this approach, which is being implemented in many middle schools.

The study investigated this PBL program, from the perspective of science and technology teachers, focusing on research questions regarding (1) the program's professional development workshops, (2) the difficulties of the program and related solutions, and (3) the long-term development of the program.

The findings are based on questionnaires of middle school teachers who participated in the PBL workshops (N=58); interviews with teachers (novice, intermediate and expert PBL practitioners), a school principal, laboratory assistant and school librarian; and a study of 3 middle schools which implemented the PBL approach from 5-7 years.

Among the main findings were the following:

1. The novice PBL teachers were enthusiastic about the workshops, which succeeded in motivating the teachers to implement the PBL approach.
2. According to the participating teachers, the PBL approach has many benefits on three levels: the student, the teacher and the school system. Perceived benefits include: increased motivation and the self-confidence of the student, the development of critical thinking, improved teacher-student relationships and contact with academic research institutes.
3. The teachers experienced initial difficulties in implementing the approach. In effect, even experienced classroom teachers became novice PBL teachers; they needed to learn, assimilate and implement this new approach. Teacher difficulties included: an egocentric focus, fear of time-consuming tasks, fear of losing control of the class and the lack of ability to assess the projects.

4. The teachers dealt with many of the PBL difficulties by creating their own solutions, which were adapted to the local school environment.

5. Three conditions were responsible for the success of the program, in the schools: the use of a “bargaining” model (a combination of the “top-down” and “bottom-up” models) to implement the program; the enthusiasm of the PBL teachers; and the active involvement of the school administration.

6. The findings show that the approach was a catalyst that promoted the professional development of the participating science and technology teachers as well as a tool for improving science and technology teaching in the schools.

To integrate these findings, the study presents “the dynamic barrier model,” which describes the factors responsible for influencing whether or not a teacher will implement the program. In addition, the study concludes with a list of empirically-based recommendations, designed to assist practitioners in the successful implementation of this PBL approach.