

“Physics & Industry”: Project Based Learning Combined with Systematic Inventive Thinking

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The “Physics and Industry” program is collaboration between schools, the science teaching department at the Weizmann Institute and the electro-optics industry. In this program, high-school physics students in the 11th-12th grade carry out throughout a year, a project concerned with an authentic design problem. They are mentored collaboratively by engineers, teachers and experts of systematic inventive thinking (SIT). The students study electro-optics, use SIT for divergent and convergent reasoning; run experiments; document the process in a portfolio; conclude with a working-model; and present the project in an oral matriculation examination.

We have investigated aspects of students' learning such as the ability to offer alternative solutions; constraint-based decision making; coherence between task, methods and outcomes; knowledge of physics; and reflection about design and investigation processes. The results indicate that students advanced in all these aspects; had high success in the matriculation; and were very satisfied with the program's contribution.