

Promoting studies of technology through the Israeli national contest "I can also do it!"

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Abstract.

The teaching of technology in the intermediate school in Israel is seeking after new and effective ways to promote the subject. The national contest of practical projects "I can also do it!" became an important part of this search and is in the core of last steps in this field. The focus of this article is on interdisciplinary approach of these projects and on impact of them in the terms of humanitarian values.

A first introduction: studies of technology in Israeli intermediate school.

The technological studies in Israeli schools are going step by step from a part of a subject called "Science and technology" in primary and intermediate schools till a wide and deep studies in framework of one of the technological trends in secondary schools. In the past the technological studies used to be an independent subject in the primary and intermediate schools as well [6]. Last 20 years the situation was changed and technological studies in both these parts of the Israeli system of education became just a topic in so called "Science and technology" as a part of implementation of the approach of STS ("Science, Technology, Society") [2,8]. In the light of this approach nowadays 111 different programs of this topic are taught all around the world [9]. In Israeli program the topic of technology is taught beside the topics of science (biology, physics and chemistry), ecology, astronomy etc. The program is renewed from time to time, last time in 2012 [5]. The Israeli program suggests an amount of 8 lessons a week for all this multi-disciplinary studies, and most of the primary and intermediate schools invest at least 6 lessons a week indeed. But the part of lessons of technology itself is too small to be able to deal with projects of students. The main part of technology studies is concentrated in the secondary schools. In these comprehensive schools in the technological trends are studying about 40% of students, aging 16-18 in framework of 20 different trends, divided into about 50 specializations [3]. In every one of it, a student receives during three years the same amount of 18 lessons of technological studies every week. A part of students in academic trends also learn technological studies as facultative subjects, mainly choosing computers, electronics, art design etc. Such huge investment into technological studies in the secondary school makes it necessary to give the leavers of the intermediate school a better understanding of the variety of technological professions in the field of industry and in the technological schools of educational system. The project, described in the second introduction, has also a goal to improve their abilities to learn about existing technologies.

A second introduction: the Israeli national contest "I can also do it!"

This contest exists already 5 years and is carried out by a chain of so called Centers for Science and Technology Studies. These centers of laboratories serve usually more than one intermediate school and are situated actually in almost every town. They were built by investment of Israeli Authority for Lottery and are acting in behalf of Ministry of Education. The main goal of this competition is to enable students to plan and build products for populations with special needs.

The competition is based on a unique idea of submitting research papers of intermediate school-children (age 13-15) dealing with technologies for building products. The slogan "I can also do it!" has a dual meaning: it is about giving the ability to people with special needs to widen their field of activities and on other hand it reflects the ability of authors of these projects to construct and design a sophisticated and useful product by themselves.

The Israeli national contest "I can also do it!" – 2013.

The last competition took place in the Center for Science and Technology Studies of Kfar Saba – a town in the central part of the country (about 98,580 citizens – 2013). In the framework of nationally spread 45 Centers 2000 students prepared for this competition their projects. 125 of them went to the final stage of the competition [4].

The variety of topics of projects was huge: a device, making a wheelchair unable to slide back on a rump; a device, preparing a walker of a disable person to carry a tray and so on. One of the projects was dedicated to an officer, wounded through the fighting, who lost his fingers. Before this wound he was a lover of playing an electric piano. So in framework of this project he received a special electric piano which was convenient for this man partially amputated arms.

The pedagogical benefits of the competition "I can also do it!" and their contribution to the studies of technology in the intermediate school.

This competition give the thousands of students the opportunity to prepare their own practical project. It bears some clear benefits:

1. The student - may be for the first time in her/his life - has to invent something absolutely new.
2. This experience has a positive impact on her/his self-image and self-estimate.
3. It also made them proud being representatives of their classes, schools and towns.
4. Preparing the project has usually forced the student(s) to act in an interdisciplinary approach: to gain some knowledge not only in design of a product, but also in technology of materials, electricity and electronics, measurement and technical drawing.
5. Usually, preparing the project force the student to learn how to choose and to use different instruments and devices for measurements.
6. Trying to make the project (product) in an art and esthetic form, the student had to acquire knowledge and skills in this field as well.
7. Every one of the projects was accompanied by a leaflet with detailed explanation of the product. This forced her/him to widen and improve the skills in language and in printing using word processor.
8. Usually, the product was accompanied by a computerized presentation and forced the author to prepare it, widening her/his knowledge in computers.
9. A part of projects was too sophisticated to be carried out by one student, and, in such a cases, it was done by two-three partners. So the partners have to acquire and develop their abilities to cooperate and to carry out a common project.
10. Some of the best project received suggestions from investors to be sold. In such a case the authors have to make the economic assessment of their product.
11. In some cases the product was a real innovation and the authors have a possibility to receive a patent on it. So, they learnt this side of technological activities as well.
12. Some of products were too sophisticated to be carried out without an advice of adults. Such an advice - when it was received - just improved the in-family cooperation between generations.
13. In some cases the authors of projects were in need of special devices and tools to implement their ideas. In such cases, they usually were sponsored by different enterprises and organizations. It also was an important lesson for their future activities.
14. The prize-winners of the contest gained relatively expensive prizes and all 125 members of the final stage received certificates of honor. They were welcomed warmly by representatives of Ministry of Education, local authorities and public institutions. By this way they made a step toward socialization into society, which supposed to be a meritocracy.

The educational benefits of the competition "I can also do it!" and their contribution to the development of human values of the students.

During last twenty years students with special needs are more and more integrated into ordinary normative classes in Israel and all over the world [1, 7]. This is an important step toward deepening and improving relations between these two communities. The competition "I can also do it!" forces both sides of the process to move some steps further:

1. Thousands of students in intermediate schools, taking part in the competition, have to learn closer about the problems of their classmates with special needs and to look for technological solutions of these problems. They supposed to be after this process more listening and supportive persons. Suddenly, their classmates with special needs became closer to them.
2. A similar change undergo the children with special needs as well: they discover suddenly, that their classmates, having in their eyes "a more lucky destiny", are learning about them, speaking with them and became their real friends.
3. In some cases the both sides became partners in preparing the final products - it is hard to overestimate the human value of such change.
4. During the closing ceremony of the competition some of the "customers" of the technological improvements have the opportunity to express themselves publicly. A girl with special needs casted a glamour over those present by singing beautifully and touching - one step more out of being "transparent" among other classmates.

Conclusions and recommendations.

Conclusions and plans:

1. **The competition "I can also do it!" gives a prominent addition to the ordinary program of technological studies** in the framework of intermediate schools in Israel.
2. **This competition brings benefits** both in the means of their contribution to the studies of technology in the intermediate school and in the means of their contribution to the development of human values of the students.
3. The Authority for Science and Technology of Israeli Ministry of Education is already **planning expending similar competitions into the field of the final projects in framework of different technological trends in secondary school** [3]. The level of such final projects is very high and promise more sophisticated and effective technological solutions.

Recommendations:

- There is a need **to establish an edition of all projects in framework of "I can also do it!" in all the years.** Such edition will give respect to the participants of the competitions and – on other hand – will help the future participants of these competitions to choose the optimal topic for their projects.
- It can be useful to recommend to **the students of academic trends in secondary schools to choose as a topic for their final research paper in field of sociology or psychology to study the impacts of this competition.**

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