

Encouraging Girls to Excel in Science, Technology, Engineering and Math

<http://ejewishphilanthropy.com/encouraging-girls-to-excel-in-science-technology-engineering-and-math/>

January 9, 2013

In general, Israeli women are grossly underrepresented in the higher echelons of industry and business: only five per cent of CEOs, 15 percent of company directors and 18 percent of executives are female, according to Catalyst, an NGO dedicated to creating more inclusive workplaces.

by Nechama Kenig

Science and technology are fundamental factors in the growth and development of every society. And, as Elizabeth Marincola, President of the Washington DC-based Society for Science and the Public, put it recently, strong STEM (science, technology, engineering and math) education is vital to students' success in an increasingly technological and global economy. It is a critical building block for exploration, innovation, and the economy, and the catalyst to attack problems affecting the world... and it is a catalyst for jobs.



So, it should go without saying that the under-representation of women in STEM fields is a potentially massive loss economically – as well as a black mark against those societies which fail to nurture girls' abilities.

In general, Israeli women are grossly underrepresented in the higher echelons of industry and business: only five per cent of CEOs, 15 percent of company directors and 18 percent of executives are female, according to Catalyst, an NGO dedicated to creating more inclusive workplaces.

Likewise, the more technological the occupation, the fewer women are working in it: only eight percent of hardware engineers are women, for example, in a country where 49 percent of the overall workforce is female.

About 55 percent of PhD graduates are women, most of them in Education and Humanities, but only 12 percent in Engineering and 25 percent in Science. Meanwhile, 48 percent of lecturers are women but only 19 percent of professors are – and that figure shrinks to 15 per cent in STEM subjects.

Israel is not the only country with a problem: new research funded by the UK's Economic and Social Research Council shows that girls in particular are put off science careers because it is 'geeky' and male dominated. This may explain the findings of an earlier study, by the Institute of Physics, which revealed that nearly half of England's state schools did not have any girls studying physics at an advanced level.

In the former Soviet Union and Argentina, World ORT-affiliated educators have been working to overcome the cultural influences which inhibit girls from pursuing science and technology.

However, while some of the factors behind the under-representation of women in STEM appear to be common to many countries, there are some aspects which are unique to the Jewish State.

Israel is a country of stark contrasts – a liberal democratic secular state with an enviably innovative, high-tech industrial sector second only to the United States, many of its citizens have an overarching commitment to ethnic and religious identities and beliefs which can be as conservative as they are enriching.

Motherhood and family are still key social values in Israeli society and, as in other countries, it is usually the women whose careers falter as they become the primary care-givers. In addition, the traditional expectations placed on women in various Israeli communities mean that girls can be deterred from pursuing an education in the first place.

Uprooting a family to pursue post-doctoral research abroad would be a challenge for any family but in Israel, where overseas post-doc is particularly favored, the difficulties can be greatly intensified.

As the British research quoted above shows, girls can be put off science careers by the prospect of being part of a minority in a male-dominated sphere. That feeling is compounded for Arab women who are already part of a minority within Israeli society.

The quintessential Israeli factor is the IDF – most of us cannot think of Israel without an image of a friend, relative or anonymous twinkle-eyed hero shouldering unbelievable responsibilities for their tender age. But it is much more than a “people’s army” – it is arguably the country’s single most influential shaper of social values and economic prospects. Indeed, many a high-tech career effectively started during service in an elite IDF unit. But, until Alice Miller’s landmark petition to the Israeli Supreme Court in 1993, such units were a no-go zone for women. And while gender equality has improved in the years since, women are still underrepresented among their rank.

The education system could – and should – be part of the solution. So far, however, it has been part of the problem.

In the classroom, boys tend to receive more of their teachers’ time than girls, according to research by Anat Zohar, associate professor at the school of education of the Hebrew University of Jerusalem. Not only that, they receive more elaborate answers.

There is every reason to suspect that, in Math, teachers unconsciously transfer fear of the subject and undermine girls’ performance, as described in research by Sian Beilock, professor in the Department of Psychology at The University of Chicago. Indeed, girls tend to internalize failure, blaming what they perceive to be their poor abilities, while boys tend to blame a test as unfair if they score poorly. Just the existence of tired stereotypes which portray STEM subjects as “not girly” create a vicious cycle in which female students’ anxiety undermines their performance.

However, that is not to say that gender does not play a role in the classroom – boys and girls do, for example, have different learning styles. Researchers in Israel found that the 3:1 ratio of boys to girls in a physics class could be put down to two major factors: an over-competitive learning environment and the algorithmic teaching method, both of which favor boys’ learning style.

There is hope, however. Israel has developed many programs over the years, both governmental and non-governmental, which work towards the advancement of women in science and technology, and encourage the education of girls in these fields.

Mind the Gap was established by a group of female engineers from Google Israel in collaboration with the Israeli National Center of Computer Science Teachers. Groups of female high school students are brought into the Google office each month and told about computer science and its applications; they also meet female engineers in informal environment and experience their

working environment. After these visits, 40 percent of the girls choose to study computer science.

The Technion, meanwhile, has Electricity in the Palm of Your Hand, in which girls listen to lectures, watch demonstrations, visit laboratories, and meet with female graduate and undergraduate students; they experience the interdisciplinary, multifaceted nature of electrical engineering and the variety of topics it encompasses.

World ORT, as part of its general mission to raise the attractiveness, availability and quality of science and technology teaching in Israel's peripheral communities, has introduced girls and boys to the joys of robotics and computer programming through its Mabat program. And the Bloomfield Science Museum in Jerusalem has TWIST (Towards Women in Science and Technology), an after-school program featuring Twisty the virtual puppet, inspired by the comments of the many science professionals who say that it was an informal experience that piqued their interest in science and fueled their decision to pursue a science career.

But it is teachers who can have the biggest impact simply in the way they handle the mundane task of class. They can encourage their female students by teaching them that academic abilities are expandable and improvable, by adjusting the learning environment to meet their, as well as boys', needs; to distance girls from negative stereotypes; and to expose them to female role models.

The changes have to be on the social level by increasing the awareness of the under-representation of women in science, encouraging and supporting mothers in the workforce and in academics, and judging women by the quality of their work and not by the number of hours they spend in the office. We have to help men and women to identify their passion in life.

Nechama Kenig is Pedagogical Coordinator, World ORT Kadima Mada.

[Pin It](#)