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Threat to Startup Nation: Israeli engineering grads lack basic skills

Report finds that universities failing to teach critical skills like teamwork

Ruti Levy
 Israel's innovative prowess is under threat by university engineering programs set in the old ways of rote learning that fail to prepare students for working in industry, according to a report released on Monday by the Samuel Neaman Institute for National Policy.

The report confirms what high-tech employers have been saying for years about the disconnect between what students learn in engineering programs and the skills they will need when they start their first jobs in industry.

The report, which was written by Prof. Arnon Bentur, Dr. Avigdor Sonnenstein and Tamar Dayan, said Israel's colleges and universities are failing to teach critical skills like teamwork, time management, and written and oral expression used in making presentations and persuasive arguments.

It cited tech executives who said the graduates they hired lacked knowledge of work-related ethics regulations and financial issues, Universities and colleges tend to look at these skills as things that can be learned after graduation, which has forced companies themselves to develop in-housing training programs.

The Neaman report's conclusions come amid growing

concern about Israel's ability to retain its place as a global high-tech power. Most of the criticism, whoever, has been focused on the schools' failure to provide students with adequate skills.

Israel's institutes of higher education have been faulted mainly for not turning out enough graduates in the fields needed by the industry to meet demand. Last month, the government reported that high-tech employment has stagnated as a percentage of Israel's labor force and the number of new startups fell in 2016.

Karin Mayer Rubinstein, the CEO of the Israel Advanced Technology Industries trade association counting 700 companies, told TheMarker that Israeli industry was desperately seeking an overhaul of academic programs in engineering. Over the last four years IAT has been pushing hard to introduce into course syllabi more relevant content.

"If the universities want to make a real change they have to start inviting programmers from companies like Google, Microsoft and Check Point to give lessons—lessons that will challenge students with real problems based on challenges these companies have really had to cope with," she said.

"There aren't any shortcuts. Practical lessons must



High-tech workers on the job (for illustrative purposes only). *Ofer Vaknin*

involve a real-world simulation in a high-tech company with a complete team – not just programmers," said Mayer Rubinstein.

The report suggested that one of the reasons engineering studies in Israel are so narrow is the limited role decision makers assign to engineers.

"In recent years we have detected a trend that favors economists and lawyers in management positions, and a tendency to see engineers as 'technologists' or 'technicians' who are supposed to help in specific areas but not lead processes," the researchers write.

They warned that the trend threatens the prestige of engineering studies and damages the educational institutions.

One solution the authors propose is to follow a new teaching model called project-based learning that is now widely used in Finland, Singapore and Hong Kong and is starting to be adopted in Israel.

PBL plays down the importance of rote learning and memorization, especially in an age when information is readily available online. Instead, it teaches through experimen-

tation, with students working in groups to tackle problems they are assigned together. They gather information by doing their own research instead of being taught by lecture. Performance is judged not solely on mastery of facts but on a student's teamwork skills and creativity.

Stanford University's Hasso Plattner Institute of Design, popularly known as the d.school, has been using these methods since 2004.

"The problems are complex and ambiguous. The solutions are uncertain and unclear. We give students ample opportunities to experiment, take creative risks, and fail. It's great preparation for real-world problem solving – because it is real-world problem solving," according to the d.school's website.

In Israel, the only program that comes close to that is the Herzilya Interdisciplinary Center's Zell Entrepreneurship Program, which brings together top students across different disciplines to study together and develop a start-up enterprise.

The problem, as the Neaman Institute report concedes, is that PBL programs require lots of faculty and Is-

rael's cash-strapped system of higher education doesn't have the financial resources to pay for them. At Stanford and the Massachusetts Institute of Technology, the student-to-faculty ratio is 8-1; at the Technion-Israel Institute of Technology, the country's top engineering school, the ratio is 25-1.

Another problem the report found was the standards that Israel's colleges, and especially its elite universities, use for accepting students, which rely on scores from the psychometric and bagrut (matriculation) exams. The report said the exams didn't serve as a good barometer for engineering success later in life.

Although employers look at grades, they also assess a job candidate's interpersonal skills and other indications, the researchers said. Universities should be doing the same, they said.

"We want a selection based not only on what the candidate studied in high school but also on the basis of interpersonal skills and potential," Bentur told TheMarker. "The army knows how to do this, and maybe the universities can get inspiration from the army for admission practices."



Bentur, right, Sonnenstein and Dayan *Rami Shillush*