The National Institute for Advanced Teaching of Mathematics and the Sciences

The turnaround over the past few years in the number of high school graduates of the five-unit tracks in mathematics and the sciences has been a result of a special combination of government policy, academic R&D and teaching practice. Many players across the Israeli spectrum have joined hands to ignite momentum and create a supportive ecosystem for teachers in schools in order to collaboratively expand the circle of excellence.

This shift is remarkable and has been inspired by the teachers themselves. The teachers challenged their own approach to teaching and gradually changed it to a more student-centered and clinical approach. As a result, the professional development of teachers has been shifting towards a practice-based approach. In recent years, teachers have been incrementally leading their own professional development by using evidence-based, analytical and data-driven techniques.

At the heart of this effort is a student-centered teaching approach that is focused on each student in the classroom. The teachers began to diagnose and monitor the progress of each student and to adapt their teaching and their feedback to the abilities, difficulties, pace and way of thinking of each student. They also began to document and to share their practice with each other, in order to analyze it together and to improve it collectively.

This professional transformation relies on a cadre of teacher leaders. The teacher leaders tutor new teachers, orchestrate the school-based teaching community and lead evidence-based learning in the new regional communities of practice. These professional leaders emerged from within the teaching corps in order to address a need, but they still have no formal position, nor recognition as such within the educational system.

So far, they have joined ad hoc frameworks, utilizing time-limited government and philanthropic grants, with minimal coordination between them and without shared professional standards. As a result, their professional capacity is idiosyncratic offering only a glimpse into advanced techniques of clinical teaching. There is an imminent risk that their impact will be marginal and short-term and that they themselves might soon seek alternative career paths.

Until now, the scope of activity included a few dozens of teacher leaders of regional communities and a few hundred in city and school-based communities. The potential group of teacher leaders however, is 3,500. They constitute approximately 15% of all mathematics and science teachers of 7^{th}-12^{th} grades. Currently they serve in diverse and scattered leadership roles across the educational system, ranging from community leaders, department heads, instructional coaches and pedagogic instructors.

At the recommendation of the foundation's Advisory Council and in order to address this need in a systematic and systemic manner, we approached the Ministry of Education and the Weizmann Institute of Science. In the past two years, we together formed shared working groups to develop a plan for a joint venture, bringing together government policy, academic research and development and teaching practice, to create a National Institute for Advanced Teaching in Mathematics and the Sciences (the Institute).

The vision for the Institute is for it to serve as a professional home for the teacher leaders of mathematics and the sciences in Israel's secondary schools. The Institute will be a place that will encourage them to grow and sharpen their teaching practices together and spread clinical expertise in classrooms at scale across the country. It will support them in capturing, analyzing and improving their practice.

The Institute's goals will be:

1. To establish an elite cadre of teacher leaders of mathematics and the sciences in secondary schools, to enable them to create advanced professional development tracks and to nurture the skill of evidence-based clinical teaching across the country.
2. To define, formulate, and implement professional standards and specializations, training, and certification courses, as well as in-service routines for teachers in leadership positions, in alignment with government policy.
3. To standardize, mentor and allocate financial resources to operating frameworks for the clinical professional development of teachers. This will include regional and school-based professional learning communities (PLCs), peer-led instructional coaching and mentoring for new teachers nationwide, with academic guidance and inter-university collaboration.
4. To develop tools and methods for clinical teaching, including classroom-based video, diagnostic assessments, simulations, rehearsals, and personalized learning plans. The Institute will also appraise them, and prepare them for wide spread implementation among the mathematics and science teachers across the country.
5. To conduct an ongoing, in-depth dialogue with the teacher leaders, build the programs through learning from their knowhow and collective wisdom, listen to their needs, make knowledge available to them, and serve as their professional voice.

After five years of operation, the Institute will operate 300 teacher communities annually nationwide. It will have trained and certified 1,700 teacher leaders and developed and integrated kits of clinical tools. The Institute will hold an annual conference, as well as professional workshops, organize prizes for excellence and publish periodicals and a website.

These activities will result in:

1. Teacher leaders of mathematics and the sciences will view the Institute as a high quality professional home and report on its positive contribution to improving the quality of their teaching.
2. Teacher communities, whose work will focus on clinical skills and improving the pedagogical responses appropriate for each student, will flourish across the country.
3. Clinical teaching skills will be integrated into teaching practice and become part of the professional specialization and routine classroom work.
4. Improved student learning, reflected in an increased selection of mathematics and science majors in high school, a reduction in dropouts and an increase in the number of successful graduations, will be evident.

The joint team articulated a draft agreement that details the vision, goals, measures, governance and budget of the new Institute. The Institute's formal name will be: "The National Institute for Advanced Teaching of Mathematics and the Sciences, founded by the Ministry of Education, the Weizmann Institute of Science and the Eddie and Jules Trump Family Foundation".

The Weizmann Institute will provide a suitable physical building and infrastructure, and will hire a professional team. Although some of the Institute's activities will be carried out by its own staff, the majority will be outsourced to academic institutions, in order to harness their specialties and to ensure a wide geographic spread.

The establishment of a new and designated building for the Institute will be discussed separately. Since a possible grant from the foundation is recommended on a one-time basis, the Weizmann Institute and the Ministry of Education will discuss their longer-term commitment to funding the Institute, based on results of a comprehensive evaluation report after three years of operation.

The Minister of Education will chair the Institute's Board of Directors, and the President of the Weizmann Institute will serve as vice-chair. Other members will include teacher leaders, highly ranked

officials from the Ministry, academic researchers from the Weizmann Institute and other universities and representation of the Trump Foundation.

The CEO of the Institute will be a veteran teacher of mathematics or the sciences, with a relevant academic degree and management experience. The CEO will be selected in agreement between the three parties. The nomination process is already underway, with many potential candidates that are currently being interviewed.

An International Advisory Council may be established to advise the Institute on pedagogical and professional matters linked to its activity. It will be headed by an internationally renowned persona from the educational research field, who will be appointed by the Board of Directors, in agreement between the three parties.

The National Institute for Advanced Teaching of Mathematics and the Sciences was scheduled to be established in 2018. However, the Ministry of Education decided to suspend its establishment.