



What is Needed to Promote Excellence in the Social Periphery

Anat Lahat and Rona Refaeli-Hirsch

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There is a gap between middle school and high school with respect to the study of mathematics and sciences. In middle school, many students study mathematics in a high-ability grouping but in high school, a significant number of them do not manage to successfully study mathematics at the high, five-unit level. In the sciences, the physics chapter taught in middle school does not function as a springboard into a physics major in high school.

At the request of the Trump Foundation, we had discussions with teachers in these subject areas in order to understand how they explain this disparity and we listened to their insights regarding steps that should and can be taken to reduce the gap. We conducted focus groups and in-depth interviews both with teachers and with other professionals in the school and in the supervision and training departments.

Mathematics

Teachers of middle school mathematics maintain that the age characteristics of the students and the large gaps between them require teaching of a different sort than in high school. The students have anxieties about mathematics and their motivation is low and therefore the teachers must bring them to the same starting point, deal with classroom management and focus on enhancing their study habits. This, in their opinion, is the main emphasis – actual and desired – of middle school teaching and learning.

The teachers note that middle school has no pressure of matriculation exams and therefore they should have more time to dive more deeply into and expand the students' thinking, passion and enthusiasm. However, they stress, that the eighth grade achievement tests, the MEITZAV (Hebrew acronym for Growth and Effectiveness Measures for Schools), make it necessary for them to focus on covering material, technical knowledge and procedural fluency, and they therefore find it difficult to follow through on what they believe should be the focus of learning.

The teachers report that while they identify with the values and content of the new curriculum, which encourages thinking, and the use of the spiral approach and the integrative approach, their teaching tends not to follow along those lines. They prefer to give the students a solid basis of knowledge, which builds their ability, and successful experiences that build their confidence. In addition,

they note that the curriculum is difficult to teach and the MEITZAV tests are not aligned with it.

The middle school teachers further report that they are not familiar with the high school curriculum. They express the reservation that they would not be able to understand it completely, in particular the five-unit track. They say that their professional development is not conducted together with high school teachers and that there is no expectation or structure in the school that would support continuity between middle and high school.

The middle school teachers are aware that their students experience shock when they enter high school. They note that the level of requirements rises sharply, the pace is much faster, and therefore many students drop down to lower level classes. Nonetheless, they are not convinced that it is possible or desirable to change the situation, except for a change that could be made in ninth grade, when students are already more prepared to make an effort.

In their opinion, many students also drop down because there is no correlation between the high-ability grouping in middle school and the five-unit study track in high school. Many students are assigned to the high-ability grouping so as to give them an opportunity, or because their parents' pressure them and the school that they would be placed there. The teachers note that they do not know how to objectively diagnose their students' abilities since the system does not offer an external individual comparison test.

The teachers recommend starting a public initiative that would create momentum for investing and excelling in middle school mathematics, and which would place them on the same footing as teachers of five-units of mathematics. Joint frameworks for professional development for middle and high school mathematics teachers should be developed in order to focus on 9th grade students. In addition, they propose to establish a support system for students in schools, to appoint a "continuity coordinator" in the school, and adapt the MEITZAV exam to the new curriculum.

The Sciences

Science teachers say that they do not work in collaboration with physics teachers in high schools. They do not see the need for continuity between the two areas and note that the curricula were not created on a continuum. The school has no expectation for them to be on a continuum with high school studies. Even the physics teachers do not attribute importance to the content learned in middle school and teach the subject from scratch.

The middle school science teachers do not perceive their role as preparing students for a science major in high school. They view their role as exposing students to scientific and research thinking. They chose to teach owing to the belief that scientific thinking is the basis for world progress. In their opinion, choosing a science major is driven by the student's and his or her parents' practical considerations and not necessarily out of love of science.

The science teachers note that they do not specialize in physics and are not attracted to the subject and report that in any case, the curriculum is overloaded. As a result, the physics chapter in the middle school science curriculum is rather neglected and only a few students choose this major. At the same time, science teachers are not interested in having high school physics teachers step into their shoes and teach the chapter on physics.

In contrast, the physics teachers are divided into two: Those who believe it is preferable if physics weren't taught at all in middle school, and those who point to ninth grade as the year knowledge and skills in physics can be built. In their opinion, physics teachers who are able to teach that age group in an experiential manner are the ones it would be desirable to have teach the physics chapter, but starting only in ninth grade.

This document summarizes the main insights emerging from a qualitative study on the elements required to promote academic excellence in mathematics and science studies in high schools in the social and geographic periphery of Israel. The objective of the study is to examine the conditions needed in order to increase the proportion of students from the social periphery who choose, persevere and excel at the matriculation exams in mathematics and physics at the five-unit level.

The insights are based on 30 interviews with educators in eight schools (principals, school counselors, department heads, and mathematics and physics teachers). Six schools, of which, are in the social periphery and a comparison group of additional two strong schools in the center of the country. Ministry of Education officials were interviewed as well.

1. The perception of “excellence”

Most of the interviewees presented a coherent perception of “academic excellence” that relates to the potential inherent in students to improve their academic performance. Those who see mathematics and science as a central motivator to encourage excellence in schools linked it to practical considerations related to “opening doors” in the future – in the IDF and academia.

Mathematics department heads and teachers believe there is a relationship between excellence in mathematics and science studies and other features that reflect excellence. These are students whose learning motivation is high, who set ambitious goals for themselves and persevere in their studies. In the view of teachers teaching in periphery schools, these characteristics will help students overcome the limitation of their life circumstances and succeed in the future as well.

At the same time, dilemmas and reservations arose, mainly on the part of principals and school counselors. Thus, in the face of the belief that every motivated and determined student can succeed in mathematics and the sciences, there was a deeply-held perception that in fact not all the students possess the relevant abilities to do so, but only a very small segment.

In the face of the claim that mathematics and the sciences are the almost exclusive key to excellence and future success, the question arose of what the implications of such an approach are for those students who cannot succeed in these subjects.

As opposed to the perception that the essence of excellence lies in realizing the potential of every student in any field chosen, there is the perception that the main road to success runs through mathematics and the sciences.

“I suppose that from a certain perspective we’re conveying a double message to students. It’s not exactly the case that they can learn anything they love and wish to because they don’t have the opportunity to choose every subject here in the school... the issue of ability is also called into question.”

They also noted that suitable and talented teachers who are able to teach mathematics and science subjects are lacking in the periphery.

“In the center, the population is larger, and suitable candidates are chosen from a larger pool; our choice is not from among good teachers but from what there is.”

Teachers claimed that elementary and middle schools do not provide suitable emotional support and appropriate knowledge and skills for their students. As a result, significant gaps are created which are very hard to bridge in high school.

2. Five-unit classes

Students who learn at the five-unit level come from relatively established homes (parents are more educated and more involved). There are, however, students that the school succeeds in identifying and retaining in excellence study tracks despite their complicated background. Nevertheless, these students who are considered outstanding are at a lower level than those considered outstanding in strong schools in the center.

3. The role of schools

Success in mathematics and the sciences is highly demanding for the school, since it requires allocation of pedagogical and emotional resources. In the periphery, this kind of effort is of greater complexity.

“Not everyone can work in our school. We help students much beyond teaching itself, we function as counselors, we deal with emotional and behavioral difficulties... I swear, we need support ourselves.”

The most prominent finding is that in contrast to the center, in the periphery the responsibility (at times, exclusive responsibility) for the students' success is placed on the school, and less on the parents.

“I want my students to receive an equal and true opportunity to compete with any other graduate...In the periphery the commitment to provide true equality of opportunities is the most important thing; we're almost alone in this struggle and we're working against all odds.”

4. Pedagogy

Due to economic hardships, students in the periphery do not have complete freedom to study, as they are often called upon to help with their family's income. They tend to be late, absent from classes, not interested and not involved in what is going on in the classes, and even more so, after school hours they do not study and practice.

“They're not free to study. There are children here who can do so many things, they would succeed, but they cannot because at the end of the day, the rent has to be paid.”

Parents are busy with their daily survival and not available to be involved in what goes on in school. Many times, they do not have faith in their own abilities or in that of their children to overcome the cycle of poverty. This stands in contrast to the great involvement of parents in the strong schools in the center, which drives students and schools to maintain high standards.

“More than a few of our population are good people who leave early in the morning for work and earn the minimum wage, the struggle is for existence. The chances for most of them to move out from the cycle of poverty are slim.”

“The periphery supposedly has the same curriculum as in Tel Aviv, but in practice, standards aren’t implemented in a professional way...The reason is that there is no oversight by the authorities, by the state. There is no Ministry supervision anywhere, but in the center the parents stand guard.”

In addition to this, the difficulty of paying for private tutoring arose. Mathematics teachers in strong schools noted on the other hand that their students make much use of private tutors in order to maintain the required level.

Most of the interviewees mentioned that teachers are key to students’ success or failure. They brought up the difficulty in recruiting and maintaining trained teachers with the appropriate pedagogical and educational competencies for teaching mathematics and physics at the five-unit level.

“Strong teachers must be attracted to the periphery, not everyone sees this as a mission... a good teacher is needed who can raise the school level, who will agree to come and not run away and who will also stay with the group studying five-units ... it all begins and ends with the teacher. If there is a desire to create a good group studying at the five-unit level, you have to bring in a good teacher. How do you get him not to leave the school? Remuneration, remuneration, remuneration.”

In practice, the decision of teachers in the center to relocate to the periphery is motivated mainly by ideology, which is insufficient to retain these teachers long term.

“I have really great difficulty with respect to the teaching force vis-à-vis the Ministry – for example, they don’t allow expansion of the scope of positions, so the teachers need to work in many places... I have to provide incentives. I pay the physics teacher for many additional hours so that it will be worth it for him to be here. Otherwise, the teaching-force won’t come here.”

5. Emotional aspects

Many attributed the gaps to the parents’ worldviews and priorities and their lack of emotional support and encouragement. Some said that in the periphery the focus is on the “here and now,” daily survival, and less on aspirations and ambitious goals for the future.

“In the periphery, the most important thing to work on is how to lift students out of the mindset of the circle they grow up in. They are raised in families that speak of today and not of tomorrow, and then you talk to the student about studying today so that in another 10 years he’ll make it to Intel, it’s just not convincing.”

“I don’t agree that it’s a money issue, it’s an issue of the parents’ focus. This is a mistake with reference to the periphery, that sometimes they give up on studying because they have to work, but what is important is the studies and we cannot give up on that.”

This perception trickles down to students as well. They are not exposed to role models and success stories, are not aware of the importance of learning, in general and of mathematics and science in particular, and do not believe in their abilities to attain high achievements and excel.

“The image of the future is very different from the center of the country – very modest, easily-attained goals.”

Students do not take responsibility for learning and tend to give up when they encounter difficulty or lack of success. Parents have a sense of inferiority with respect to themselves and to their children and do not believe in their ability to succeed in these subjects.

Some principals and department heads added that these feelings are also ingrained in the school staff in the periphery who view themselves, the school and the students as possessing low capabilities in relation to the schools in the center.

“Just as the student does not believe in himself, the parents don’t believe in him and likewise, the teachers. This is a system in which there is lack of faith in ourselves. The students are very dependent and have an external locus of control.”

6. Recommendations

The five-unit classrooms are more heterogeneous than ever. Consequently, more investment and a higher professional level is required of teachers. The teachers, therefore, recommend forming regional support and peer-learning groups with an emphasis on teaching practice that stimulates curiosity and learning motivation, emotional support and creation of a personal relationship.

“Beyond knowledge in mathematics, training in psycho-pedagogy is needed, to figure out where each student is stuck and how to work with the spirit of the child so that he will understand that he is capable. We have a very big problem with these things. If the teachers were in a place where they had the tools and skills needed to know where each child is stuck and how to advance that child, we would break the glass ceiling.”

At the school level, it is crucial that mathematics and science studies are placed high on the school’s list of priorities. This will lead to creating supportive organizational structures and the use of data to execute the vision of excellence. Focusing the school principal’s attention and commitment will lead to allowing

the professional staff freedom of action, creating a “school language”, developing a vision shared by all the staff members, mutual support and peer-learning.

The interviewees indicated the importance of a strong, committed and professional subject-matter department head, who fights for five-unit classes. When the department head becomes a role model, it is an inspiration and encouragement for the teachers and students.

Emphasis should be placed on holistic systems of support involving the student, the homeroom teacher, the counselor, the principal, and to the extent possible, the parents. This should include exposure to success stories, empowerment classes and workshops on how to cope with pressure.

At the local level, the teachers recommended workshops for parents and harnessing them to the educational process. They emphasized building a sense of efficacy and a more positive picture of the future; creating a municipal continuum of solutions for students (learning and enrichment centers, subsidized private tutoring, and more); the local authority’s commitment to investing in promoting excellence in mathematics and the sciences through public declarations, monitoring, mapping and inspection.

With respect to the Ministry of Education and other government entities, the teachers indicated that they are significant parties both for creating awareness and discourse of excellence, and in promoting incentives given to students who study at the five-unit level - in admission to preferred roles in the IDF, and to academia.