Effectiveness of activities and resources for professional development:
a national multiplier event in the frames of STEM PD Net

More than 40 representatives of institutions dealing with the professional development of STEM teachers in Bulgaria got together in the *Home of the scientist* in Sofia to discuss in two consecutive days (March 14-15) the effectiveness of activities and resources offered by IMI- BAS in the frames of STEM PD Net. The participants included policy makers from the Ministry of Education and Science, from regional directions of education in Sofia and Pazarjik. PD centers, Center for innovations of BAS, national laboratories in telematics and in software security, experts in mathematics and information technologies, businessmen, Union of Bulgarian Mathematicians, teacher educators. Prof. Toni Chehlarova welcomed the participants and gave the floor to Acad. Petar Kenderov who is known to this community as one of the main promotors of the inquiry-based education in the contemporary Bulgarian schools based on a relevant teacher's professional development. In his introductory speech Kenderov emphasized on the importance of unifying the efforts of all actors in education for achieving visible positive results.

Then Toni Chehlarova, in her capacity of a STEM PD Net coordinator for IMI-BAS, talked about the role of this institute for the teachers' professional development in the context of the project. She discussed the importance of the intellectual outputs of STEM PD Net and emphasized on how the *Quality criteria for PD*, the *Measurement of the impact of a PD activity* and *Turning the diversity of learners into advantage* were reflected in the PD courses the IMI-BAS has been delivering.

How to evaluate the results from PD courses dealing with the implementation of dynamic geometry software was discussed by Maria Brauchle. She presented some interesting examples from her practice as a multiplier in a small village.

The focus of the presentation of Roumiana Anguelova was on the criteria and outputs in the context of measuring the impact of the so called “binary lessons” (led by two teachers from different fields).

She presented the experience of her involvement in a series of binary lessons showing not only how mathematics could be integrated in an attractive way with the rest of STEAM components but also with some apparently distant subjects such as physical education.

After a coffee break which was very dynamic and rich of sharing of ideas and good practices the session continued with the presentation of Petar Kenderov, this time as a mathematician who dares to take “a step away” from a classical school-math problem and apply the “what-if” strategy. He expressed his firm belief based on experience that “variations on a theme” would raise the interest of the students, especially if they themselves are involved in varying the initial formulation of a problem.

The next session dealt with evaluating the impact of a PD course from view point of *teachers, students, businessmen, school principals and parents.* The participants were split in the corresponding groups of

stake holders, discussed quality criteria for a teachers' PD course and presented their views in public. As the proverb goes: *Beautiful minds think alike*… and there was a lot of common among the views of the groups. Still, a careful analysis shows that each group could learn from the recommendations of the rest.

The schedule of the day ended with a poster session provoking vivid discussions and enthusiasm to try the good practices presented.

The participants had not forgotten that 14th of March is celebrated as a pi-day and enjoyed a student's presentation dedicated on the fest.

The second day was held in the “Acad. Stefan Dodunekov” hall of IMI-BAS. Based on the long-term experience of IMI-BAS in educating educators and young mentors to guide research projects, Evgenia Sendova delivered a talk on some specific forms of supporting the inquiry-based learning at its higher levels (*guided inquiry* and *open inquiry*).

After this Ivaylo Kortezov shared his experience from his latest PD course on *Combinatorial problems in the contest’s mathematical themes for 8-10th class.* Reformulation of a classical problems and theorems in a form close to the world and interests of the students convinced the audience that these problems could find their deserved place in the school curriculum.

His talk was followed by joint presentation of Toni Chehlarova, Georgi Gachev and Monka Kotseva on a novel *Platform for distance education* being developed by the authors.

The importance of blending physical and computational media was well demonstrated by the final workshop, delivered in the Mathematical Classroom of IMI-BAS, in which fragments of various PD courses were carried out by the participants.






The schedule of the event (in Bulgarian) could be found at the following address: http://www.math.bas.bg/omi/docs/stempd/programa_STEM_PD_Net.pdf

The first impressions shared by the participating stake holders make us optimist about the outputs of STEM-PD-Net project.

As one of the teachers expressed it:

The seminar was a workshop of ideas – some ideas come from you, the IMI-BAS team, sharing and generalizing the best practices of the national and international experience. Other ideas come from us, the teachers, based on the implementation of previous ideas being shared among this community.

The principle behind events like this one reminds me of a boomerang - an idea generated by someone and refracted through the eyes of another, comes back to the first one even reinforced! During this event I got several ideas I am going to implement in my school.

Evgenia Sendova