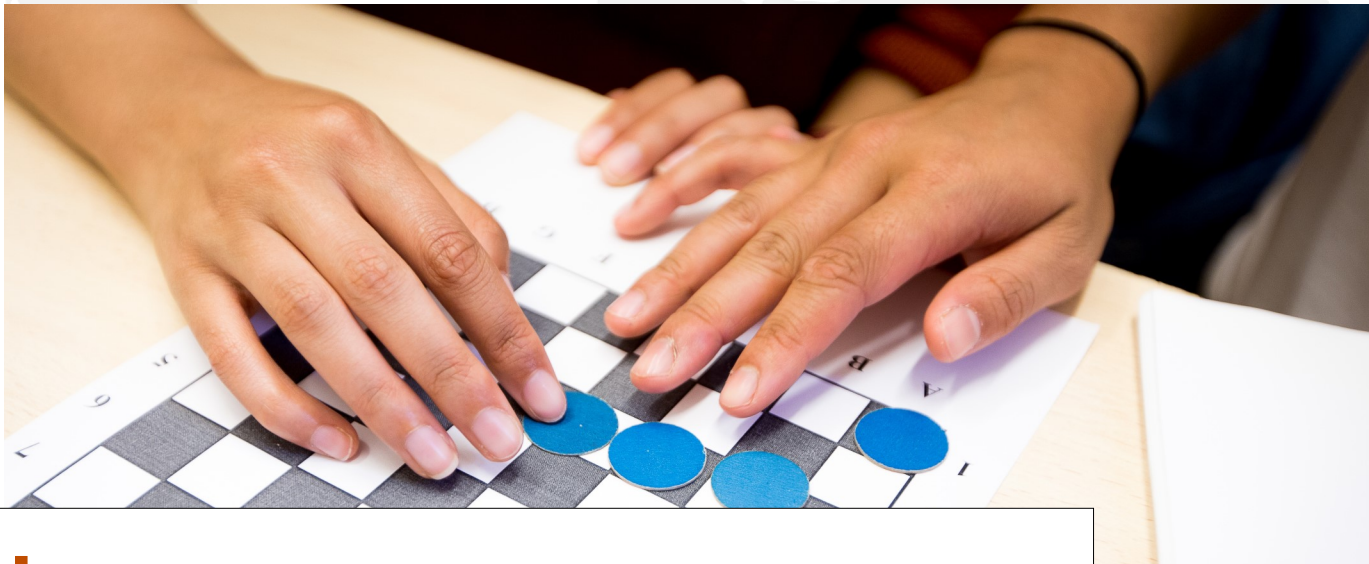


# Hungarian Pedagogy

## The learning and teaching of mathematics



In many Hungarian mathematics classrooms, a strong and explicit emphasis is placed on problem solving, mathematical creativity, and communication. Students learn concepts by working on problems with complexity and structure that promote perseverance and deep reflection. These mathematically meaningful problems emphasize procedural fluency, conceptual understanding, logical thinking, and connections between various topics.

For each lesson, a teacher selects problems that embody the mathematical goals of the lesson and provide students with opportunities to struggle productively towards understanding. The teacher carefully sequences the problems to bring focus and coherence to the lesson. These problems do more than guide students to learn the mathematical topics of a given lesson. Indeed, the teacher sees the problems they pose as vehicles for fostering students' reasoning skills, problem solving, and proof writing. An overarching goal of every lesson is for students to learn what it means to engage in mathematics and to feel the excitement of mathematical discovery.

Another hallmark of the Hungarian pedagogy is the class wide discussion of approaches to problems. After working on problems individually or in small groups, volunteers come to the front of class to share their solutions. Because of the non-trivial nature of these problems, students learn to communicate their thinking with clarity and precision. When a student is stuck, others chime in to offer support and suggestions in a friendly manner. The teacher creates a welcoming environment that is conducive to the sharing of students' mathematical experiences.

*At a certain point students realize the joy of struggle, thinking with their own brains, what it means to look for a road, find it, and reach the goal. What it is like to think freely, with the hazard of getting lost, but with the possibility of the unusual, individual, surprising.*

- Lajos Pósa

In such a classroom, the teacher's role is that of a motivator and facilitator. They provide encouragement and support as students engage with the task at hand. They offer guidance when a student is stuck and probes when clarification is needed. After the student investigation, the teacher highlights important ideas embedded in concrete problems, and summarizes and generalizes their findings. In particular, the teacher's summary makes sense and is meaningful, because students have had the experience of playing around with these ideas on their own before coming together to formalize.



Moreover, the teacher repeatedly asks, “Did anyone get a different answer?” or “Did anyone use a different method?” to elicit multiple solutions strategies. This highlights the connections between different problems, concepts, and areas of mathematics and helps develop students' mathematical creativity. Creativity is further fostered through acknowledging “good mistakes.” Students who make an error are often commended for the progress they made and how their work contributed to the discussion and to the collective understanding of the class.

In such a learning environment, students acquire the mathematical habits of mind that allow them to think like a mathematician. Given the widespread adoption of the Common Core State Standards, as well as the recently published Mathematical Education of Teachers II (MET2) report by CBMS and NCTM's Principles to Actions, our teachers are now expected to provide learning experiences that lead to the acquisition and development of students' mathematical habits of mind. Thus, BSME prepares future teachers to address important national needs in mathematics education.

To learn more about the Hungarian pedagogy, consult the following articles:

- Andrews, P., & Hatch, G. (2001). Hungary and its characteristic pedagogical flow. *Proceedings of the British Congress of Mathematics Education*, 21(2), 26-40.
- Stockton, J. C. (2010). Education of Mathematically Talented Students in Hungary. *Journal of Mathematics Education at Teachers College*, 1(2), 1-6.

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