



## How to compare educational systems?

In MERIA we have partners from four partnering countries, The Netherlands, Denmark, Slovenia and Croatia, working together with a common goal – better mathematics education. In order to understand existing systems and to find a potential for improvement in secondary school mathematics education, we have chosen to compare partnering countries in the following segments:

1. Students' performance in mathematics at large scale assessment
2. Types of secondary schools and programs
3. Teaching approaches, methods and materials
4. Teachers' initial education and professional development
5. Assessment of knowledge and skills in mathematics in high schools

Furthermore, analysis of teachers' needs is based on **interviews with teachers in associated schools** in all four countries. Methodology and findings of this analysis will be presented together with the evaluation of the quality and impact of MERIA materials as an output of the project called "MERIA Project Impact Analysis". Preliminary findings show that **teachers want changes in education, but they miss time, resources and freedom to implement IBMT** and manage their classrooms differently.

## Students' performance in partnering countries

MERIA especially aims to address underachievement of students in mathematics and thus contributes to the overall aim of the Strategic framework for European cooperation in education and training (ET 2020) to reduce the rate of low achievers from 22% to 15%. According to the **PISA large scale assessment in mathematics literacy**, students from the Netherlands, Denmark and Slovenia perform in Europe's sub-top, whereas Croatian students perform below the OECD average. Of special concern in Croatia is the portion of low achievers of 30.2%, whereas in other countries it is between 13.6% and 16.7%, with OECD average at 23%. If this is considered together with the fact that in Croatia most common teaching approaches can be viewed as traditional with predominant teacher-directed style, one may conclude that it is valuable to investigate the impact of different teaching approaches, e.g. **inquiry based mathematics teaching (IBMT)**, and learn from the differences in educational systems of the partner countries.





Mathematics Education -  
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## Focus on IBMT

There is much more to be gained for all countries involved. Today's needs of society and professions, especially in highly technological environments, call for different understanding and skills than a few decades ago. Moreover, research studies suggest that retention of knowledge and quality of learning are related to teaching styles (Garner, Garner, 2001; Jukić, Dahl, 2010) in favor of active teaching methods. Research on IBMT confirms that the effects of inquiry-based approaches include benefits for **motivation**, for **better understanding** of mathematics, and for the development of beliefs about the **relevance of mathematics** for life and society (Bruder, Prescott, 2013). Evidence of positive impact of IBMT is especially present for low-achieving students' whose improvement of grades is sizable and persistent (Kogan, Laursen, 2013). Similarly, there is a strong positive impact on girls' learning gains, confidence and desire to persist. At the same time, no harm is done to other students. IBMT also increases students' capacity to **think critically** especially of those students who have not been previously encouraged to think in that way (Hattie, 2009).

## Can we implement IBMT?

Curriculum documents in all partnering countries are inclined to promote acquiring of content knowledge through **students' problem solving and exploration**. Having these ideas in mind, MERIA proposes specific approaches for implementing these ideas. However, to get a deeper insight needed for successful implementation of IBMT, the starting point for the project was also to establish the needs analysis of students and teachers. Along with the interviews with teachers in all partnering countries, in Croatia, the analysis was performed on the basis of the questionnaire developed within the Mascil project. It shows that teachers are mostly inclined to implement IBMT in their practices. However, they consider that **neither present curriculum nor the school environment encourages the use of IBMT**. They also feel lack of support in adequate materials and share the concern about the students' attitudes considering that students would maybe feel frustrated by learning through inquiry. Thus, also when Croatia is concerned, teachers support the findings of the Mascil project which suggest that "classroom management, resources and system restriction hinder the implementation of IBMT". Therefore, there is a need for scaled-up professional development for teachers which should address all abovementioned categories of potential restrictions.

The MERIA team has been intensively working on the project's first result: "**MERIA Practical Guide to Inquiry Based Mathematics Teaching**". This booklet is written for mathematics teachers looking for support in understanding what IBMT is and how to implement it. **It will be published in English on 1<sup>st</sup> September 2017 on the project's webpage!** Translation into Dutch, Slovene, Danish and Croatian will follow.

The booklet and ideas in it will be further disseminated through MERIA workshops. Having in mind that the strength of an educational system lies in its teachers, MERIA aims to start a series of workshops and seminars for the teachers of associated and other schools in order to promote specific methods of implementation of IBMT.

