



Women's under-representation in areas of key economic importance constraining factor for women's contribution to the resolution of critical societal problems, and particularly women's under-representation in sciences and engineering on the one hand, and the recognition for gendered sensitive educational practices in mathematics education on the other, constitute concerns in Western Societies for sometime now.

PREMA's orientation is on girls' performance with school maths, with particular focus on the dynamic and complex relationship between girls' motivation and socio-cultural milieu. The project's overall objective was the deepening of understanding on socio-cultural and pedagogic factors that impede upon girls' equitable to that of boys, performance in mathematics which consequently influence career choices. In the project, this was addressed through a reflective discourse with experts in the area of mathematics and gender, an on-going discussion with practitioners, and seven empirical research studies. The project concluded with the articulation of self-reflective tools for the promotion and support of gender sensitive teaching/learning processes.

PREMA investigated into patrimonial factors; the state of the art; pupils/students performances and their views and perceptions on mathematics; teachers' reflections on teaching and perceptions on gendered educational practices as well as on the position of policy makers on gender sensitive education. Empirical research actions of both qualitative and quantitative nature were carried out in Austria, France, Greece, Poland, Spain and UK.

The empirical evidence from the conduct of multiple studies in the project's six country context suggest that differences in the take-up of STEM can not be attributed to poorer performances by girls in school mathematics in the compulsory phase of education. The results indicate that in some countries, the lower take up of STEM by women is part of a larger problem of the decreasing take up of STEM by all pupils/students. It becomes therefore imperative for educational systems to monitor the attainment and take up of STEM by males and females alike, and in parallel to introduce reforms so as to ensure sexist-free curriculum and teaching practices.

Project findings point to the direction that the socio-cultural construction of mathematics varies a great deal across countries. Construction of mathematics as 'masculine' however is not associated with lower attainment by girls at school, or with lower entry to university courses. While socio-cultural factors are hard to change some may well be amenable to influence from policy makers and practitioners. Information about the take up of STEM by women, and information about successful women practitioners may well have an effect as part of career guidance. Information about successful women mathematicians can be easily included in mathematics lessons.

Noted is that mathematics teaching in some countries follows a common pattern in almost every lesson where teacher exposition is followed by student practice. The research reveals that most students want mathematics to be more interesting, relevant and enjoyable. Student preferences for a range of possible alternative classroom activities (such as group work) were not uniform across the countries the studies were conducted at.

The results also strongly point to the direction that gendered sensitive teaching practices in mathematics must take into account the classroom / discipline related behaviour gender characteristics.

Unquestionably there is a case for making mathematics more attractive to pupils, notable: by a greater focus on creative (as opposed to imitative) activities in mathematics lessons; by showing pupils something of the role of mathematics in shaping society; by emphasizing that mathematics is a human activity that has fascinated creative men and women for millennia; and by showing its relevance to pupils' lives, and its importance in understanding society.

The work undertaken has resulted to nine tangible outcomes (available at: <http://prema.iacm.forth.gr/deliverables.php>) which are in the forms of *Documents* (Review of Literature Report, Report on the Regulatory Frameworks in Selected European countries, and Report on the results of empirical studies), *Resources* (Database of Annotated Bibliographical Resources, Collection of Excellent Practices on Gendered Mathematics Education, and Annotated Collection of Agencies / Institutions / Projects engaged in research and promotion of gender sensitive mathematics education), a *Publication* which combines aspects of theory and praxis, and *Tools* (set of diagnostic self reflective and context oriented tools, and a set of Best Practice Guidelines for promoting and supporting gendered sensitive education).

The first phase of the project (PREMA 1) was implemented from October 2005 to June 2007 with support from the SOCRATES Programme.

The scope of PREMA 1 was the identification of discrepancies between needs and provisions in mathematics education and teaching at the levels of: the system, classroom, and the individual learner, across the 25 Member States. Such an identification aimed at contributing to the design of appropriate social and educational policies for both genders and to foster the dialogue on the improvement of teaching practices so that these are commensurate to the learning needs of girls. The long term impact was, and continuous to be in this second phase of the project, the equitable access of girls to the acquisition of competencies for living and working in the digital age.

PREMA 2 is an attempt to sustain the PREMA results and in such an effort to make these more scalable and more useful (in the form of a model curriculum framework) by the teaching practices actors.

More specifically, PREMA 2 overall aim is at raising awareness on issues of mathematics and gender in order to increase the level of girls' participation in career choices of sciences and technology. This is to be achieved by undertaking a set of activities that lead to the articulation of a teacher training curriculum framework on gender and mathematics that will include a set of reflective tools that will assist teachers to be aware, ask questions and reflect on gender issues in their curriculum. The Curriculum Framework should be flexible enough to be used in different contexts either in-service teacher training or pre-service, in different learning traditions and targeted for the secondary levels of education.

PREMA in short

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Implications for further action identified by PREMA include: Raising political awareness of differences in attainment and career choices between males and females; Curricular reform at the level of textbooks, teacher behaviour, and curriculum; and, Teacher Professional Development Actions (both in service and pre-service levels) including guiding teachers to develop self-observation / reflection skills.

The project was implemented from October 2005 to June 2007 with support from the SOCRATES Programme. Details are provided in other sections of this portal

Barcelona Workshop - Barcelona 25-26.01.2007

An International Workshop: *Gender-Sensitivity and Pluralism in Mathematics Education*

PREMA International Workshop on *Gender-Sensitivity and Pluralism in Mathematics Education* took place at the Parc Científic of the University of Barcelona, during 25-26 of January 2007.

More than 70 participants from 15 European States have taken active part in the workshop and presented state of the art research findings, policy making case studies and educational programs, all related to the promotion of gender-sensitive maths and science education. PREMA Consortium wishes to thank all those who took part in the workshop.

The objectives of the workshop were put in terms of the following key questions:

- In what ways can mathematics education in Europe become gender-sensitive?

Could gender-sensitivity contribute to pluralism in mathematics education?

The departure point for the workshop was a presentation of the research conducted during PREMA project and its results. Then, the workshop discussions focused on the following themes:

1. Contesting Mathematics
2. Math teaching: practice and theory
3. Classroom Processes
4. Methods, applications and tools
5. Policy, regulation and planning.

PREMA Consortium has invited a group of experts to edit the workshop proceedings, which will be published in the coming months.