

ProCoNet *Education*

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About ProCoNet

The ProCoNet group currently comprises the coordinators of current European FP7 projects in STEM (Science, Technology, Engineering, Mathematics) Education, together with colleagues from similar projects funded from other sources. The group was founded in March 2011 and since has met several times to discuss matters of mutual concern in the widespread dissemination of inquiry-Based Science Teaching (IBST) or IBL (Inquiry Based Learning).

The projects involved in ProCoNet have the common aim of disseminating inquiry-based methods on a wide scale, and of making other enhancements to science and mathematics learning and the place of these subjects in society. The projects involved in ProCoNet are mainly Coordination and Support Actions (CSA) and are therefore drawing on existing research, which is adequate in some respects but not others.

Their methods are varied but usually involve teachers, teacher educators and policymakers. Their overall purpose is to improve levels of pupil engagement with mathematics and science, increasing scientific literacy and the numbers of pupils choosing science-based careers so as to reach the objectives of Europe 2020.

Following discussions with various coordinators and other members of current (and previous) projects working on STEM education within FP7, ProCoNet was formed as an informal group based on a

combination of personal contacts with known projects, together with project contacts provided by DG Research and Innovation of the European Commission.



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Aims of ProCoNet

ProCoNet aims to encourage long-term thinking in relation to mathematics and science education and the need for sustainable structures to maintain results, networks and activities from successful projects. There is room for debate about implementation, but little doubt that all our stakeholders would benefit from better systemic and strategic thinking.

ProCoNet will be active in promoting collaboration

between stakeholders at all levels (teachers, teacher educators, school authorities, industry) in order to support the widespread implementation of inquiry-based learning in schools.

ProCoNet should act as a centre for collating knowledge and exchanging information between projects.

ProCoNet should play an active role in highlighting the com-

mon themes emerging from project activities, especially in documents describing features of national systems or evaluating the results of TPD (Teacher Professional Development) activities.

ProCoNet is active in communicating these emerging themes to the EC and other policy circles.

Cooperation for a sustainable evolution in maths and science education

ProCoNet involves the coordinators of current projects in science and mathematics education, especially those funded by the Seventh Framework Programme of the EU, but also including projects from the Lifelong Learning Programme and other initiatives. The membership of ProCoNet therefore reflects the changing landscape of science and mathematics education, as projects come and go, but is intended to provide a permanent point of contact for anyone interested in the impact of these projects as a whole. Currently there are approximately 20-30 projects in this area, depending on definition and start date. These projects represent over 200 institutions, mainly universities but also including foundations, associations and SMEs. They also have strong connections to school systems,



The need for Cooperation between key actors in different areas

In order to meet the challenges of an uncertain, technology driven future, and in order to remain competitive, Europe needs more highly skilled people, especially in the areas of mathematics, science and technology (MST). Research has shown that pupils generally decide on their career direction between the ages of 14-16, which highlights the importance of school systems in relation to the need for highly skilled people in MST. To recruit more people for MST related careers:

- * Pupils need to develop competencies in lifelong learning.
- * Mathematics and science teaching must raise students' interest in these subjects
- * Education needs to engage pupils in problem solving, enquiry, teamwork and critical reflection so as to support the development of high-level skills and competences.
- * Mathematics and science education should provide realistic contexts that give students insight into how these subjects are used in private and professional life.
- * School should provide infor-

mation and insight into MST careers. Thus, teaching and learning in MST must change from being teacher-centred and abstract to being student-centred and concrete, enabling pupils to explore meaningful and realistic problems and to find their own solutions. The role of the teacher here changes from an instructor to a facilitator of learning processes. However, this evolution of mathematics and science teaching and learning is by no means easy and can take several years:

- * New ways of teaching can be rather difficult for teachers, as their role changes significantly.
- * Systemic factors, e.g. overloaded curriculum or traditional assessment systems may not be supportive of teachers' efforts.
- * There may be a lack of materials for teaching and professional development, especially materials with meaningful contexts from industry. Thus, key actors in policy, teacher education, industry and schools must work together to support the evolu-

tion of mathematics and science education.

- * Teacher educators and researchers in education can support teachers in their professional development and change of role (e.g. by offering professional development courses, networks, materials).
- * Policy can support the professional development of teachers by providing contextual factors which are supportive of innovative ways of teaching.
- * Industry can provide knowledge for meaningful contexts and information on MST careers. Appropriate materials with meaningful contexts can be developed in collaboration with educators.
- * By allowing teachers to work collaboratively, schools can find ways to evolve their teaching practice. The collaboration of networks of key actors would allow important processes to start and would be extremely powerful, uniting all those working on innovation and evolution in school systems, as is needed for a competitive and socially cohesive Europe.