

CONCLUSIONS ON THE POLLEN PROJECT
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Before highlighting briefly some of the main lessons of POLLEN, I would like to return to January 2006, when the project was launched. In 12 EU countries, POLLEN aimed to create *Seed Cities for Science* that would support primary science education through the commitment of the whole community. POLLEN had to deal with 12 different languages, 12 different curricula, 12 different visions of educations, but by chance and despite our differences, all the countries were facing a similar situation:

- the lack of science in primary school
- a majority of primary teachers ill at ease with science
- a decrease of student interest in science in school, especially where direct teaching is encouraged.

Thus, our basic question was: how can we create from this starting point a large scale sustainable project? With respect for the European diversity, we tried to answer this question by emphasizing some basic principles:

- Formal education reform in which the child has more exposure to science
- Inquiry-based science education which gives students a practical idea of the very nature of science
- Teacher support and training with the objective of changing teaching practices in order to have an impact on many generations of students.
- Implementation at the level of the city which is the right scale for effective change
- A coherent systemic approach including material, visits, training, follow up, evaluation...
- Involvement of all the players in science education around the school.

Based on these principles, every country has begun by building a 3 year-strategic plan with common objectives (in terms of quality and quantity) adapted to the local context. Locally, the seed cities have implemented a large set of activities and shared tools and experiences.

After 3 years and half of activities, what conclusions can we draw from this process?

First, we can look at the quantitative outputs of the project with a certain satisfaction: about 36.000 pupils and 2400 teachers have been involved, respectively about 4 and 5 times the figures of 2006.

Local activities, resource centres, teacher training, development of tools for teachers, community boards ...have been implemented at the local level.

But are we sure that we have succeeded in changing the quality of science education in the class, the school and more broadly in the city?

We do not have a definite answer, but some indicators are available:

- First, we have many testimonials and reports of class visits which highlight student interest and motivation as a result of this approach to science.
- Secondly, we have carried out 3 evaluations of student and teacher attitudes toward science and this community approach. It will be too long to present The results of these evaluations will be published in June 2009 on the POLLEN website. There is too much to present here but I would like to mention 3 important and encouraging findings:

- 1 Teacher confidence has increased significantly during the project
- 2; Most pupils like doing experiments in class (and using a computer)
- 3 Sustainability of POLLEN-like projects depends on community participation.

- Thirdly, POLLEN was acknowledged as a reference project in the Rocard Report, Science Education Now! (2007)

Moreover, during this last year, we have gathered the expertise of various players in the project in order to draw up a charter and booklet which summarize the POLLEN experience and allow for a broader dissemination in Europe. You will find these documents in your file. The charter is based on 5 pillars which summarize the structure of the project

Inquiry-based science education (IBSE)

Teacher training

Community involvement

Resources and material

Follow-up and evaluation

I have extracted from this document a few recommendations which reflect the feed back received from the 12 seed cities.

- IBSE takes time to implement. A clear teaching and long-term planning strategy is necessary.
- Teacher training should include classroom simulations during which teachers experiment directly with the inquiry-based approach.
- Teacher training sessions must be followed up by visits to schools.

- The involvement of the scientific community as a stakeholder and to support teachers is a key factor. Outreach activities involving science students provide effective support for teachers.
- Quality resources and material, with ready-to-use experimental kits, should be easily available to teachers.

This charter is available in the 11 languages of the project. We should look to a broader coverage and dissemination of this document to stakeholders, members of the scientific community, educational authorities, and policy makers.. As mentioned in this document, I would like to encourage you to make it yours and make it known.

And now ? Can we expect a European pollinisation ?

The Future will tell but in our opinion, the pollinisation is already in progress.

1. Locally the dissemination is happening in different ways and at different levels : transfer from one city to another, dissemination of material kits and guides, integration into a national training plan, change of national curricula based on POLLEN principles...

2. At a European level, we can now offer a large set of resources, models, and expertise to share with other cities and countries. This transfer has already benefited 4 new countries (Romania, Luxembourg, Slovakia and Serbia) which have joined the network as observer members during the project. But to target a huge expansion of inquiry based scientific education across Europe and reach a significant number of schools, we need a broader collective action.

In order to tackle a more ambitious objective and develop a model for large-scale dissemination, a consortium of 25 partners from 21 countries, including 9 Pollen partners and 4 Pollen observers, as well as members from the SINUS network, submitted last January to the European Commission a project entitled FIBONACCI. The main objective of this project is to design, implement and test in Europe a process of dissemination of inquiry-based teaching methods for mathematics and natural sciences education at primary and secondary schools. This process will rely on Reference Centres that would serve as dissemination agents in Europe. 60 focal points will be involved in the proposed dissemination plan, for a total of about 2500 teachers and 45000 pupils. Fibonacci is one of the ways to fertilize the POLLEN experience and extend it to secondary schools but it is not the only one. I hope that in this conference other ideas have been explored and will be developed and implemented... POLLEN partners are now ready and open to contributing to a collective work to develop a European knowledge society through science education.