pollen

Seed Cities for Science

A COMMUNITY APPROACH FOR A SUSTAINABLE GROWTH
OF SCIENCE EDUCATION IN EUROPE

Seed Cities for Science Education Charter

Pollen is a European research and development project supported by the European Commission Directorate-General for Research (FP6).
It has been selected as one of the reference projects to promote scientific education and culture in Europe.

POLLEN CHARTER

European authorities and the international scientific community acknowledge the importance of **inquiry-based science education** (IBSE) to develop an integrated strategy for scientific literacy and awareness at **primary school**. The Pollen approach, implemented in more than 400 schools (36,000 pupils) across Europe, is made up of **5 pillars.** Together, they constitute the Seed Cities for Science Education Charter. The objective of this charter is to promote and disseminate common principles and standards throughout Europe based on the successful experiences of the Pollen project. **Make it yours, and make it known!**

1 INQUIRY-BASED SCIENCE EDUCATION (IBSE)

IBSE is at the core of the pedagogical approach supported by Pollen. By combining global research, scientific learning, experimentation and evidence-based reasoning, language and debating skills, IBSE enables pupils to further their understanding of the objects and phenomena around them, as well as enhance their curiosity, creativity and critical skills.

- Experimental, evidence- and inquiry-based teaching and learning are powerful ways of understanding the very nature of science.
- IBSE takes time to implement. A clear teaching and long-term planning methodology is necessary.
- IBSE allows for a cross-disciplinary approach involving maths, languages and other subjects as part of the process. It also connects the school to its external environment by focusing on relevant issues.

2 TEACHER TRAINING

Research has clearly established that teacher training and tutoring are the main components required for a profound change in practices, especially to combat the reluctance related to science teaching that is common among primary teachers. By providing in-service training sessions and tutoring in the classroom, Pollen has contributed to enhancing IBSE teaching skills and has thus succeeded in achieving lasting changes in practices.

- Teacher training should include classroom simulations, during which teachers experiment directly with the inquiry-based approach.
- Steady, progressive and consistent training sessions are most effective when it comes to changing practices.
- Experienced teachers are effective trainers. Peer-to-peer best practice exchange is an effective method.

3 COMMUNITY INVOLVEMENT

Schools are part of a broader setting, in which interaction with other local stakeholders is also important in order to strengthen educational innovation. Pollen has fostered community participation, involving families, the scientific community, universities, public services, industries, and other entities on a local level to better incorporate science education policy within the city agenda, as well as to provide teachers and pupils with field experience and visits. In a POLLEN Seed City, a community board brings together representatives of the various actors involved in the local project.

- 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.
- Sustainability is obtained through multi-partner agreements, with clear support from major institutions. Public events have a catalyst effect when it comes to achieving consensus.
- Initiatives that are well integrated in local policies enable innovation and effective changes.

4 RESOURCES AND MATERIAL

Equipment is a key factor, although it does not necessarily have to be expensive or based on advanced technology. Pollen has made available for teachers sets of basic scientific material for the classroom, as well as ready-to-use protocols based on this material. Usually provided in the form of kits or boxes containing all the necessary elements for teachers and pupils to start with, it has helped to reduce the practical difficulties teachers are usually afraid of, as well as to structure practices around common frameworks underpinned in the teaching protocols.

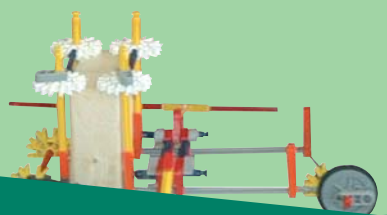
- Quality resources and material, with ready-to-use experimental kits, should be easily available to teachers.
- Experienced teachers can be involved in the design of quality homemade resources and material.
- Resources and material have a structuring effect that contributes to the homogeneity, coherence and dissemination of IBSE.
- Coherence with local curricula and school projects must be sought. The social relevance of the learning content is important.

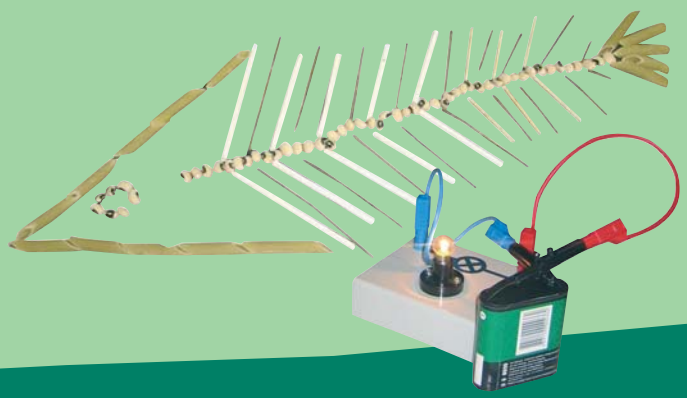
5 FOLLOW-UP AND EVALUATION

A formative assessment of how teachers react and perform in the classroom is essential to educational innovation. It shows the kind of specific difficulties they face when implementing innovation and whether and under which conditions they benefit from changing their teaching practices. An overall evaluation dealing with the global impact of the project is also necessary in order to justify changes based on concrete evidence to policy-makers and education authorities.

Both aspects were taken into account in the Pollen project: first, through close follow-up of teachers in the classroom, and then through a questionnaire filled in by teachers and pupils participating in the project, in order to measure how their attitudes towards science were affected by Pollen. The quality of community participation in each Seed City was also assessed in order to identify the most important factors involved in the successful commitment of local actors.

- Teacher training sessions must be followed up by visits to schools.
- Follow-up of how teachers respond and perform is required, but this should not be seen to be judgemental. A formative approach is needed, where by feedback from teachers is used to work towards improvement.
- Evaluation is necessary for quality-based scaling up.





Pollen was launched in January 2006 and took place over a three-and-a-half-year period. With IBSE as a primary objective, the project focused on the creation of 12 Seed Cities for science throughout the European Union. A Seed City is an educational territory that supports primary science education through the commitment of the whole community. The major goal of Pollen was to provide an empirical illustration of how science teaching can be reformed on a local level within schools whilst involving the whole community, in order to demonstrate the sustainability and efficiency of the Seed City approach to stakeholders and national education authorities, and to seek leverage effects.

In each Seed City, Pollen provided material and methodological and pedagogical support compatible with the framework of the local curriculum.

All of the materials produced as part of Pollen, as well as further information about the project, can be accessed free of charge through the Pollen website:

www.pollen-europa.net

Pollen consortium

École Normale Supérieure – FRANCE (coordination) ⬢ **P.A.U. Education** – SPAIN (coordination), **Université Libre de Bruxelles** – BELGIUM ⬢ **University of Tartu** – ESTONIA ⬢ **Freie Universität Berlin** – GERMANY **Apor Vilmos Catholic College** – HUNGARY ⬢ **Consorzio per l'Innovazione, la Formazione e la Ricerca Educativa** – ITALY **Universiteit van Amsterdam** – NETHERLANDS ⬢ **Ciência Viva / Agencia Nacional para a Cultura Científica e Tecnológica** – PORTUGAL ⬢ **University of Ljubljana / Faculty of Education** – SLOVENIA ⬢ **Royal Swedish Academy of Sciences** – SWEDEN ⬢ **University of Leicester** – UNITED KINGDOM

Pollen observer members

University of Luxembourg – LUXEMBOURG

National Institute for Lasers, Plasma and Radiation Physics, Bucharest – ROMANIA

University of Belgrade – SERBIA

Trnava University – SLOVAKIA

Contact details

La main à la pâte – FRANCE

Telephone: +33.1.58.07.65.97
E-mail: pollen-europa@inrp.fr

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SIXTH FRAMEWORK PROGRAMME

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