



Study visit group report

Group	454
Title	Bridging the gap between research and science education
Theme	Making science education more attractive
City, Country	Vienna, Austria
Type of visit	Mixed
Group reporter	Raymond Whiteford

I. Findings

1. The 3 most important things learned during the study visit.

1.1. Research Education Cooperation (REC) initiatives are projects and activities which allow researchers, students, pupils and teachers to work collaboratively on real research problems.

During the study visit we realised the complexity of different approaches to research education cooperation (REC). We decided that it would be helpful to classify the different approaches (Table 1).

Table 1. A classification of RECs.

<i>Classification</i>	<i>Principal Participants</i>	<i>Target</i>	<i>Goals</i>	<i>Actions</i>
REC Type I	Research Institutes; School and University Teachers; students; in some countries Business and Industry	Students Teachers Researchers	<ul style="list-style-type: none"> • Increase motivation of students • Improve the quality of education • Quality of Initial training and in service upgrading for teachers • Educational research based on a parity role between schools and universities 	<p><i>Includes both formal and non formal education:</i></p> <ul style="list-style-type: none"> • All Projects involving schools, university, research institutes, Science centres, address the goals of column 4. <p>e.g. Stages, Master classes, Research projects involving pupils, games of Mathematics, Physics, Astronomy etc</p>
REC Type II	Research Institutes; University and school	Students of high school	<ul style="list-style-type: none"> • Promote interest of pupils in Science • Increase interest 	<p><i>In general non formal education.</i></p> <ul style="list-style-type: none"> • Orientation activities

	teachers		<p>in and awareness of professional scientific vocations</p> <ul style="list-style-type: none"> • Increase enrolments in Science in Further and Higher Education. 	<p>and dissemination of information</p> <ul style="list-style-type: none"> • Teacher training, particularly in-service training • Open door events at university • Laboratories • Master Classes • Summer Schools (many contained also in REC-Type I)
Communication of Science	Research Institutes; Universities; Museums; Science Centres; Media ; Cultural Associations	General Public and students	<ul style="list-style-type: none"> • Show the importance of Science in Society • Present results of scientific research • Justify financial support 	<p><i><u>In general informal education</u></i></p> <ul style="list-style-type: none"> • Science centres and Museums, • exhibitions • Conferences • Festivals of Sciences • Theatre performances • Movies, TV, multimedia communication • newspapers, books , popular publications

1.2. We were convinced of the high potential of Research Education Cooperation (REC), as demonstrated by the results of the EU-Form-it project. The Catalogue of Good Practice Examples produced in the Form-it project (<http://www.form-it.eu/download.php>) is a very useful tool that can be used as a practical guide to implementing REC principles.

1.3. We found that crossing borders and particularly crossing boundaries in educational research is extremely important; getting together from different backgrounds and different professions means there are benefits of exchange of experience

In the REC initiatives we discussed coming together as equals is very important: Every group (researchers, teachers, pupils/students) has important contributions that make the results more valuable.

2 Examples of good practice shared by participants

title of the project/programme/initiative /...	name of the institution that implements it (website)	contact person (if possible), who presented the programme to the group	whom the project/programme/initiative addresses	what features of the project/programme/initiative make it an example of good practice
Knowledge transfer partnership (KTP)	Belfast Metropolitan College www.belfastmet.ac.uk	Dr R Whiteford rwhiteford@belfastmet.ac.uk	Small and Medium Sized Enterprises (SMEs) Recent Graduate students Lecturers	<ul style="list-style-type: none"> • Enables SMEs to develop their businesses. • SMEs have access to expert help, advice and mentoring. • Provides real work experience for recent graduates. • Lecturers refresh industrial knowledge and expertise by engaging with companies, and mentoring the graduate working on a company project..
Project based Learning	Belfast Metropolitan College www.belfastmet.ac.uk	Dr R Whiteford rwhiteford@belfastmet.ac.uk	Businesses of all sizes Higher education students Lecturers	<ul style="list-style-type: none"> • Students work on real problems for industry. • Company identifies a project with a student team and has access to agreed outcomes. • Students gain credits towards their final qualifications. • Lecturers enable and moderate the process. • Lecturers build up strong industry knowledge and links • Funding now available for a specially equipped, dedicated centre to facilitate enterprise, economic engagement and entrepreneurship
The SWH Project	Ataturk University, Turkey www.atauni.edu.tr	Dr. Murat Gunel mrgunel@yahoo.com mgunel@atauni.edu.tr	Middle school students, university students, and Science teachers	<ul style="list-style-type: none"> • Improving Science literacy of pupils and students through implementation of a Science Writing Heuristic* • Promoting students understanding of Science concepts • Developing fundamental Science literacy skills • Creating meaningful connection between

				<p>language and Science using the construction of logical argument.</p> <ul style="list-style-type: none"> • Education for sustainable development • Providing in-service professional development for Science teachers
Serre-Expo	<p>Inra, research centre of Versailles-Grignon (France)</p> <p>http://www.versailles-grignon.inra.fr/</p>	<p>Dr Catherine Foucaud-Scheunemann</p> <p>Catherine.foucaud@versailles.inra.fr</p>	Science teachers and students	<ul style="list-style-type: none"> • Special place devoted to Science education (exhibitions, workshops and in-service training for Science teachers) • State of the art equipment and security rules • Promoting inquiry-based methods of Science education • Training in and through research • Up-dating Science knowledge through direct contact with scientific excellence • Developing REC actions co-operatively with Science education partners
<p>Antarctica and Mediterranean research with schools in Catalonia and the Balearic Islands</p> <p>The CSIC at schools</p>	<p>Marine Sciences Institute (ICM)</p> <p>www.icm.csic.es/icm/divulga</p> <p>Catalonian Government Department of Innovation, Universities and Enterprises, Research and Universities Commission, Department of Education</p> <p>www.recercaenaccio.org</p> <p>Centre of Mediterranean Advanced Studies (IMEDEA)</p> <p>University of Balearic Islands (UIB)</p> <p>www.uib.es/depart/dfs/aac/aa/Antartida</p>	<p>Begoña Oquiñena Smith</p> <p>begoks@educacio.caib.es</p>	Science teachers and students from infant to secondary and vocational school Researchers	<ul style="list-style-type: none"> • Active participation of pupils, making them feel involved in research • Collaboration of teachers, pupils and scientists, learning together • Project was a real scientific research resource • To make Science more attractive and increase its relevance for society • Higher level students gain credits for their qualification. • Science training for Primary School teachers.
The Garden Project	<p>BG & BRG Wien</p> <p>http://www.hib-wien.at/</p>	<p>Ulrike Weitzl</p> <p>schule@hib-wien.at</p>	School pupils and teachers from a wide range of disciplines; Medical University students; University Lecturers.	<ul style="list-style-type: none"> • Active participation of pupils • Participation of the Medical Faculty with research on human and environmental interaction • Influence on healthy life style at school • Pilot project leading to new recommendations on the provision of school grounds and space planning

Outreach activities at the Physics Faculty of the University of Vienna	University of Vienna www.univie.ac.at	Prof. Viktor Groeger	Students, teachers, physicists, general public, faculty members	<ul style="list-style-type: none"> • Enthusiasm, fun, humour • Communicating Science to a very wide audience • Informal learning • Policy forming in the faculty • Improvement of teaching activities • Encourage self reflection • Increased interest for pupils in following university Science
Form it	www.form-it.eu Austrian Ecology Institute	DI Markus Meissner	Policy makers, educational administration, teachers and researchers, NGOs	<ul style="list-style-type: none"> • Compilation of Good Practice Examples • Recommendations for Policy-makers • Practical guidelines for Teachers and Researchers • Networking and Dissemination www.form-it.eu/examples
Sparkling Science	The Austrian Ministry of Science and Research www.sparklingScience.at	Dr. Céline Loibl	Teachers, researchers and students,	<ul style="list-style-type: none"> • Cooperation of partners and official support. • New dimensions in teaching and learning. • Teachers, university lectures and students as equal partners • Dealing with real problems in learning instead of school book examples
Progetto Lauree Scientifiche	The Italian Ministry of Education and Research- Conference of Deans Italian Science Faculties National Industrial Association www.progettolauree scientifiche.it	Prof Aldo Altamore	Teachers and students	<ul style="list-style-type: none"> • National Project • Devised to increase the interest of pupils in Chemistry, Mathematics, Physics, and Material Science. • 40 Universities and 1735 schools involved • New dimensions in teaching and learning. • Sharing expertise between school and university • Increasing attractiveness of Science education for students
Science Teaching Festival – “Science on Stage”	Romanian Education, Research and Youth Ministry www.iscj.ro	Luminita Chicinas	Teachers, Pupils, students, researchers, education experts	<ul style="list-style-type: none"> • Cooperation of partners and official support. • New dimensions in teaching and learning. • Teachers, university lecturers equal partners • Sharing expertise between school and university • Critical thinking skills and responsibility

				<ul style="list-style-type: none"> • Increasing attractiveness of Science education for students
<p>“Following the steps of Edison” Innovation and creativity scientific contest</p>	<p>Cluj County School Inspectorate www.iscj.ro</p>	<p>Luminita Chicinas luminita_chicinas@yahoo.com luminita@iscj.ro</p>	<p>Teachers, Pupils from upper secondary schools, students, researchers, university teachers</p>	<ul style="list-style-type: none"> • Cooperation of partners and official support. • New dimensions in teaching and learning. • Sharing expertise between school and university • Critical thinking skills and responsibility • Increasing attractiveness of Science education for students
<p>CO2nnect Climate Campaign</p>	<p>EU-COMENIUS 3 Network project “Partnership and Participation for a Sustainable Tomorrow” SUPPORT http://support-edu.org http://sustain.no</p>	<p>Faye Benedict, Åsa Renman</p>	<p>Teachers, Pupils, students, researchers,</p>	<ul style="list-style-type: none"> • Cooperation of partners and official support. • New dimensions in teaching and learning. • Teachers, university lectures and students as equal partners • Real problems in learning instead of school book examples

*A Heuristic is a method of teaching which allows students to learn things for themselves by applying simple common sense rules.

3 Common approaches regarding the theme: Research Education Co-operation.

3.1 Common approaches that are met in all or some countries (both host and participants’) regarding the theme of the visit:

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| <ul style="list-style-type: none"> • All countries represented already have some examples of Research and Education Cooperation initiatives (RECs). • There are common features and principles in the examples discussed by participants, e.g. participation of students, inquiry based learning, parity between teachers and researchers, focusing on solving real research issues and problems. • In-service training is left to individual and volunteer decision in most countries represented. In some countries in service training is an obligatory part of teachers’ contracts. • There was a shared awareness in all countries, of reluctance among school pupils to pursue careers in Science and Technology. • All countries are trying to increase attractiveness of Science and Technology. • There was general agreement that activities to promote Science and Technology, and Research and Education Cooperation initiatives, must be connected to real life issues, if they are to be really effective. |
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3.2 Common challenges that are faced by all or some countries (both host and participants’) in their effort to implement policies related to the theme of the visit:

Need for

- a continuous in-service training system to positively affect Science teaching
- integration of Education for Sustainable Development (ESD) in curricula
- teachers’ training in ESD
- support and recognition of Research and Education Cooperation (REC), especially regarding finance, time and visibility
- improvement in the training of primary school teachers to teach Science.
- improvement in training of Science teaching methodologies (both initial and in service) for secondary school teachers
- more young people considering higher education to choose Science and Technology, to meet the demands of the knowledge society.

3.3 Effective and innovative solutions you have identified that the countries (both host and participants’) apply to meet the challenges you mentioned in question 3.2:

A range of such innovative solutions are summarised in Table 2. These include

- **Initiatives to support Research Education Co-operation which have both official support and educational institution involvement.** These include:
 - “Sparkling Science” – Austrian Ministry of Science and Research working in partnership with Schools and Universities;
 - “Progetto Lauree Scientifiche” – Italian Ministry of Education and Research working in partnership with Schools, Science faculties and the National Industrial Association.
 - “Antarctic and Mediterranean Research” - Catalonian Government Department of Innovation, Marine Sciences Institute, Department of Education, Centre of Mediterranean Advanced Studies, University of the Balearic Islands, and schools.
 - “Knowledge Transfer Partnership” – Department for Employment and Learning (Northern Ireland) working in partnership with Universities, Colleges, and Small Businesses.
 - “Science on Stage” teaching festival – Romanian Education Research and Youth Ministry in partnership with schools and universities.
- **Outreach and Science promotion and training activities by Schools Colleges, Universities, and Research Institutes.** These include
 - Outreach activities at the Physics Faculty of the University of Vienna
 - The Science Writing Heuristic (SWH) Project at Ataturk University Turkey
 - Serre – Expo exhibition, workshop and in service training space at Inra Research Centre, Versailles-Grignon, France
 - “Following in the steps of Edison” scientific contest – Cluj County School Inspectorate

- **Individual examples of Research Education Co-operation (REC) initiatives** such as:
 - The Garden Project at BG & BRG Wien
 - Project based learning at Belfast Metropolitan College
 - Range of REC initiatives summarised in the Form-It “Catalogue of Good Practice Examples”. Available at www.form-it.eu

3.4 Policies and practices that can be further explored and possibly transferred to other countries:

- Establish a continuous in-service training system for teachers and researchers to positively affect Science teaching
- Integrate Education for Sustainable Development in curricula
- Offer teachers training in Education for Sustainable Development
- Provide support and recognition of Research and Education Cooperation (REC), especially regarding finance, time and visibility
- Raise the scientific background of primary school teachers during initial teacher training and during in service training.
- Improve both initial and in service training in Science teaching methodologies for secondary school teachers.
- Involve businesses, particularly Small and Medium Sized Enterprises (SMEs), in project based learning
- Explore and adopt existing or new methods, for monitoring and evaluating in-service training, to show the impact on delivery and outcomes.

4. Ideas for future cooperation that have evolved during meetings and discussions.

- In-service training on international basis, locally or via ICT.
- Potential for developing Science in-service training and RECs in Northern Ireland in the frame of EU project.
- Agreed cooperation with EU Comenius Network Support
- Agreed cooperation with the ENSI network www.ensi.org

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