



CEDEFOP

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of Vocational Training



Education and Culture DG
Lifelong Learning Programme

Study visit group report

Group No 104

Title of the visit Quality and cohesion in teaching science: collaboration across general education levels

Topic Learning mathematics and science

City, country Silkeborg, Denmark

Type of visit General Education

Dates of visit 26th - 30th September 2011

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I FINDINGS

This section summarises the findings of the group while visiting host institutions, discussing issues with the hosts and within the group. You will be reflecting on what you learnt every day. But to put them together and give an overall picture, you need to devote a special session to prepare the final report on the last day of the visit.

In this section, it is important that you describe not only things you learnt about the host country but also what you learnt about the countries represented by group members.

1. One of the objectives of the study visits programme is to exchange examples of good practice among hosts and participants. Cedefop will select well-described projects/programmes/initiatives and disseminate them to former participants and a wider public, including potential partners for future projects. Therefore it is important that you identify and describe all aspects that, in your view, make these projects/programmes/initiatives successful and worth exploring.

Describe each of the good practices you learnt about during the visit (both from the hosts and from one another) indicating the following:

title of the project/programme /initiative	Country	name of the institution that implements it (if possible, provide a 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
Outdoor learning	Denmark	Voel Skole www.voel-skole.skoleindra.dk	Headteacher	Outdoor learning in science for primary students	Stimulus for discussion Healthy environment Active learning Variety of stimulus Cross curricular Accessibility/cheap Enjoyment Practical skills Collaboration/Cooperation Incidental learning Implementing new initiatives Addresses European community advice
Outdoor learning	Spain	IES Serra Mariola, Muro de Alcoy (Valencia)	Rosa Maria Torro	Outdoor learning in science for secondary students	Mentoring and research using local businesses as a resource Visits to universities to take part in activities
Science festival	Denmark	Silkeborg Gymnasium www.silkeborg-gym.dk	Educational director	Cross phase cohesion for primary and secondary students	Collaboration between primary and secondary schools Interactive experiments and demonstrations Peer teaching Common goals met through collaboration Celebratory scientific atmosphere Enthusing students in science Cross curricular links
Legomindstorm	Denmark	Variety of schools in Denmark	Lars Bo Nielsen	Technological training for students	Cross curricular (building, designing, IT, science)

					<p>Collaboration within groups Gain technical knowledge Stimulating Interesting Results are instant, immediate feedback Teacher is facilitator Incidental learning Encourages perseverance</p>
Energimuseet	Denmark	www.energimuseet.dk	Erik	Suitable for all ages	<p>Interesting Outdoor learning Enquiry based learning Enthusiastic staff motivates students Hands on nature experience Modelling Testing with immediate feedback Unsupervised explorative area with independent learning Cultural experiences that related to science</p>
Naturvidenskaberne's Hus Natural Sciences House	Denmark	www.nvhus.dk	Mai	Teacher training/student access to entrepreneurial projects	<p>Encourages cohesion between different levels of science education Centred mainly on physical sciences A learning resource available to secondary schools Science based business investing in education Students able to investigate entrepreneurial projects Public private partnership Hands on experiments Ability to access activities not available in schools Site for large scale experiments</p>
Silkeborg Museum Aros Museum	Denmark	www.silkeborgmuseum.dk	Various	Suitable for all ages	<p>Outdoor learning Appreciation of history of science</p>

Papirmuseet		www.aros.dk www.papirmuseet.dk			Cross curricular Access to natural science Cultural experiences Contact with field experts Visual stimulus
Silkeborg Gymnasium	Denmark	www.silkeborg-gym.dk	Headteacher	Good practice in science education for educators	Inter-agency cooperation A clear science strategy Use of drama to educate Examples of independent learning Use of space outside of the classroom Group work Peer mentoring Use of ICT as a research tool Good use of ICT within the classroom as a teaching tool Professional and competent staff at all levels Consistency at all levels to achieve a common goal Building relationships with the wider community through project work Increasing enrolment figures indicate an excellent model for Denmark Attracting scientific families to the school to increase the uptake of science subjects Excellent network with primary schools with ICT booking to arrange meetings Establishing clear pathways to enthuse and attract primary students Blended learning (mixing e-learning with face to face learning)
Transition/ cohesion	Ireland	Corran College www.corrancollege.ie	John McGovern	Easing transition of primary students to secondary school	Taster day (day in a life of a secondary school student) with particular emphasis on subjects not experienced at primary level. Regular contact with primary schools

					Year 6 students from primary school do art/science project over 8 weeks Invite sixth class students to a school musical. All of the above establish a clear pathway for potential students and give them a sense of belonging
Transition	Wales	Fitzalan High School http://www.fitzalan.cardiff.sch.uk	Sadie James	Easing transition of primary schools to secondary school	Termly cluster meetings of secondary science teacher with primary feeder school science teachers to moderate work, discuss students and share baseline data Taster days Science projects that are started in year 6 and completed in year 7 to show progress Peer mentoring Secondary science teachers teach lessons in feeder primary schools
Use of Interactive media in the classroom	Ireland	County Sligo VEC schools	John McGovern	All second level students particularly first year students	Ideal teaching and learning tool for literacy and numeracy. Used in all subject areas Students familiar with “Apps” and encouraged to use and review educational “Apps” Can be used for video production
Technology in the classroom	Turkey	Kayseri School District	Bayram Akarsu	All 5 th and 8 th graders	Students are receiving Ipads with several softwares including contents of the textbooks for their classes. This is intended to enhance more conceptual learning experiences of science subjects.
Teaching Technology mixed with other values	Spain	IES Arrabal. Carmona (Sevilla)	J.Miguel Bohórquez	Secondary School and Upper Secondary School	Non-sexual discrimination values are included in all the teaching process.

* You can describe as many good practices as you find necessary. You can add rows to the table.

2. The study visits programme aims to promote and support policy development and cooperation in lifelong learning. That is why it is important to know what you learnt about such policies and their implementation during your visit. You are invited to describe your findings concerning the following:

2.1 APPROACHES TAKEN BY PARTICIPATING COUNTRIES (BOTH HOST AND PARTICIPANTS') REGARDING THE THEME OF THE VISIT. ARE THERE ANY SIMILAR APPROACHES/MEASURES IN PARTICIPATING COUNTRIES? WHAT ASPECTS ARE SIMILAR AND WHY? WHAT ASPECTS ARE DIFFERENT AND WHY?

All countries strive to promote their school to attract students. They all, in one way or another, have initiatives in place to ease the transition of students from primary phase to secondary. All teachers are trained to a certain level but at the primary phase, in particular, not all teachers are skilled in science. This could result in a lack of confidence in the teaching of certain areas and would therefore cause a disinterest and lack of motivation in students.

Similarities

At primary level science is an introductory course to what they would study at secondary level.

Certain aspects of teaching are similar, eg. outdoor learning, peer mentoring, use of ICT, group work, project based learning, cross curricular collaboration.

There is a low participation in science subjects in all countries.

Differences

In Denmark there has not been any example of inclusion of additional learning needs (ALN) or minority students. Every other country represented on the visit has inclusion at all phases.

Each country has a differing level of resources in their schools. The schools visited in Denmark have a very high level of ICT, science and general learning resources.

Denmark students have a minimum level of supervision when learning or during break periods out of the day. Independent learning appears to be a major aspect of learning in Denmark.

Denmark students are trusted to respect the resources in their schools.

The teacher to student ratio in Denmark is much higher than other countries.

The capitation grant per student is much higher in Denmark than other countries.

Genuine attempts of cohesion between educators, politicians and municipality in Denmark school system.

At primary level the science classrooms and well-resourced laboratories. Most other countries teach science in a 'normal' classroom at this phase.

The teacher training course in Denmark is very specialised.

Students in the school we visited on the study visit had their own lap tops which enhanced their level of learning.

2.2 CHALLENGES FACED BY PARTICIPATING COUNTRIES (INCLUDING HOST) IN THEIR EFFORTS TO IMPLEMENT POLICIES RELATED TO THE THEME OF THE VISIT. WHAT ARE THE CHALLENGES? ARE THEY COMMON CHALLENGES? IF SO, WHY? IF NOT, WHY NOT?

Cost of trips to secondary schools causes a problem with collaboration across phases. Primary students would benefit from days in their intended secondary schools to ease transition but cost, health and safety, disruption to timetables and cover issues have a negative impact.

All schools have established links with private companies to enhance the education of their students. However, there are problems in maintaining these links if the costs described above are an issue.

Teachers must be willing to take on new initiatives and change their approach to teaching if required.

Attracting the right type of personality in to the teaching profession is an obstacle.

Resources available to teachers and students vary between countries. Without the money required to update the buildings and resources the motivation of teachers and students will be an issue.

Changing the mind set of students about the status of certain professions will be a major challenge to overcome if the uptake of science subjects is to improve.

The support of parents is a major factor in recruiting and retaining science students and maintaining their enthusiasm for the subject.

2.3 NAME AND DESCRIBE EFFECTIVE AND INNOVATIVE SOLUTIONS YOU HAVE IDENTIFIED THAT PARTICIPATING COUNTRIES (BOTH HOST AND PARTICIPANTS) APPLY TO ADDRESS THE CHALLENGES MENTIONED IN QUESTION 2.2. PLEASE MENTION SPECIFIC COUNTRY EXAMPLES.

- Representatives from companies could make visits to the schools instead of the other way around.
- Valencia, Spain have good links with surrounding businesses that is both beneficial for the business and the students.
- Project work between primary and secondary schools to stimulate cohesion. All countries represented on the study visit indicated that they carry out this practice. Denmark, however, appeared to have more large scale, funded projects.
- Wales, Ireland , Germany and Spain have parent associations that have an input into school policy making. There is also regular contact with parents through reporting and parent evenings.

2.4 ASSESSMENT OF THE TRANSFERABILITY OF POLICIES AND PRACTICES. COULD ANY EXAMPLES OF GOOD PRACTICE PRESENTED IN THIS REPORT BE APPLIED AND TRANSFERRED TO OTHER COUNTRIES? IF SO, WHY? IF NOT, WHY NOT?

Subject specific transition programmes could be implemented into areas that only carry out a general transition to secondary level.

Politicians, ministry officials and teachers collaborating and cooperating as seen in Denmark would be of benefit if implemented in other countries.

A science specific strategy to guide science teaching in the short to medium term as seen in Denmark could be used as an example of good practice.

3. Creating networks of experts, building partnerships for future projects is another important objective of the study visit programme.

Please state whether and which ideas for future cooperation have evolved during meetings and discussions.

Links between schools have been set up for the possibility of using Web 2.0 tools for future cooperation.

All participants in this study visit have agreed to stay in contact to share innovative perspectives in science teaching that have been used in their schools and countries.

Business links from other countries have been shared to use in future science teaching.

Exchange programmes or cross country projects is a possibility to enhance the learning of students.

TO SUM UP

4. What is the most interesting/useful information that the group believes should be communicated to others? To whom, do you think, this information will be of most interest?

- The model of collaboration between politicians, ministry officials and teachers as seen in the Danish education system would be of benefit to all countries involved in this study visit
- Use of funded projects to encourage cohesion
- Student involvement in science at an earlier age to enthuse and motivate
- More scientific content in primary teacher training to increase confidence levels.
- Making better use of external agencies such as science house, museums, etc.
- Science laboratories in primary schools to encourage scientific thinking and learning.
- More independent investigative learning where the teacher is in a facilitator role.

THANK YOU!