



S-TEAM (Science - Teacher Education Advanced Methods)
presents its mid-project conference:
Science Fiction: Inquiries into the future of science education

The Barony, Glasgow, 13-15 October, 2010

This conference will bring together policymakers, teachers, researchers and other experts to discuss the future of science education in Europe. The aim of the conference is to create coherent ideas for systemic improvements. These ideas need to be promoted at European level in order to provide an agenda for change within national education systems. We will produce a documentary film of the conference together with a report which will be widely distributed through our networks. This report will suggest imaginative ways of fulfilling the mission of science education in the 21st century, improving scientific literacy and making science careers more attractive.

We are creating innovative materials for use in teacher professional development, and we work with national stakeholders to address the problems faced by teachers in doing investigative science in the classroom. We will collaborate with other projects in order to create a consensus in science education policy and to enable knowledge sharing and cross-dissemination. Finally, we have ideas for further projects, including the creation of a European qualification in inquiry based science teaching.

The conference will be held in the Barony, University of Strathclyde and is free of charge to participants. Refreshments and lunch will be provided. All delegates are welcome to attend the social events on Wednesday and Thursday evenings.

Science Fiction: Inquiries into the future of science education

Outline Programme:

Day one: 13 October: 1000-1700 (inc.breaks)

Marketplace for informal discussion of current European policies and initiatives in MST education, featuring current projects such as S-TEAM, ESTABLISH, SCIENTIX and Fibonacci.

Evening social event: Buffet in the Barony, 1900-2200

Day two: 14 October 0900-1700 (inc. breaks)

The future of science education in Europe.

We open with a presentation from Dr Riel Miller (Xperidox) on futures thinking, followed after coffee by panel discussions and speakers including:

S-TEAM conference flyer <http://www.strath.ac.uk/humanities/conferences/sciencefictions/>

- Professor Robin Millar (University of York)
- Professor Jarl Bengtsson (formerly OECD, now with PASCAL Observatory for Social Capital and Lifelong Learning)
- Professor Doris Jorde (University of Oslo)
- Dr Eilish McLoughlin (ESTABLISH, Dublin City University)
- Dr Agueda Gras-Velazquez (SCIENTIX, EUN Schoolnet)

The emphasis in these sessions will be on group discussion and knowledge sharing using electronic notes and other technologies (including pens, paper and post-its!). Some background material will be circulated to delegates in advance of the conference, and S-TEAM materials will be available for delegates via free USB memory sticks.

The results will be summarised in the plenary discussion on Friday.

Evening event: Civic Reception and buffet, City Chambers, Glasgow, 1930-2200

Day three: 15 October, 0900-1030, coffee, 1100-1230 + Lunch

Summing up: what is the future for science education in Europe and beyond?

Led by Professor Doris Jorde, participants will agree some of the key points from the previous discussions and we will make a start on our collective report. We will discuss key terms in the debate about science education and move towards a shared understanding of what kinds of policies and research are required for the coming decade.

The conference closes after lunch except for the S-TEAM board meeting and general assembly.

Audience

Our target audience comprises education professionals at European and national level, including researchers, policymakers, and politicians as well as teachers and teacher educators.

Background of S-TEAM

The European Union wants, at a political level, to increase the supply of Mathematics, Science and Technology (MST) graduates, and also to enhance young people's scientific literacy and engagement, through projects aimed at promoting inquiry based science teaching (IBST).

S-TEAM, funded under Framework Programme 7, Science-in-Society, is a consortium of fifteen countries and twenty-six institutions, began on May 1st 2009 and ends in April 2012. It is coordinated by the Norwegian University of Science and Technology in Trondheim, and builds on the *Mind the Gap* project which was completed in April 2010.

S-TEAM, in common with several other EU projects, aims to improve science education through the widespread dissemination of inquiry-based science teaching. Inquiry is intuitively a 'good thing', but implementing inquiry in the classroom is not always easy.

Our way of disseminating inquiry is through teacher education and teacher professional development activities, not just by informing teachers about new methods and resources, but also by allowing teachers to inform each other. Teachers operate in local spaces - schools, communities, regions - but have ideas to share across boundaries. S-TEAM will provide coordination and support to make this happen, through professional development

materials and programmes of various kinds. These materials give teachers opportunities to talk and collaborate, a principle already proven effective by the SINUS project in Germany.

We recognise that S-TEAM and related projects need the active support of policymakers and education systems in order to succeed. IBST has been around for a long time. Its success or otherwise has been determined by external factors, and inquiry has sometimes been sidelined by traditional assessment methods. Our message is that curriculum, pedagogy and assessment have to reflect a coherent philosophy in order for inquiry-based methods to be fully effective.

We see the main role of S-TEAM as being a catalyst for change within national systems of teacher education and professional development. It is part of our vision that we should work with other projects in science education to develop genuinely imaginative ideas. IBST in itself is not an idea which can be patented, codified or imposed, but a principle to be upheld.

What we need within science education - building upon the principle of inquiry - is a more 'entrepreneurial climate', a climate in which new ideas are encouraged and supported. The point is not so much whether these ideas work in a narrow sense. The point is that they should inspire other ideas, or promote better student engagement.

We also recognise, however, that doing science professionally is not just about ideas, but also about having the intellectual tools for the job. Inquiry does not seek to dumb down science classes. Genuine inquiry, or 'investigative' science is about gaining a deep understanding of the content and processes of scientific knowledge.

What has S-TEAM done so far?

The first phase of S-TEAM involved workshops in each partner country as the basis for a report on the state of inquiry-based science teaching in each of the partner countries¹. This report will guide us as we enter the second phase of the project, where we gather teacher education and professional development materials from our partners and find ways of bringing these materials into national systems. During this phase we will collaborate with our colleagues in other projects to build up an even more comprehensive picture of how inquiry is being implemented and the related obstacles and opportunities.

S-TEAM topics include:

- ◆ Argumentation for science classrooms
- ◆ Beginning teachers and inquiry
- ◆ Concepts of Scientific literacy
- ◆ Diagnostic tools for teachers in scientific thinking
- ◆ Dialogic teaching and sustainable development
- ◆ Indicators for inquiry-based methods
- ◆ Nature of Science in the media
- ◆ Online resources in science topics
- ◆ Teacher collaboration and diversity in science
- ◆ Video resources for enhancing teacher reflection

¹ Available from www.ntnu.no/s-team

Workshops

We are also running three stand-alone workshops in parallel with the conference. Please note that separate registration is required for individual workshops: contact Peter Gray <graypb@gmail.com>

These workshops are also free and are specifically aimed at teachers.

The venues are a short walk from Queen Street Station and George Square (see map links below). The workshops are free of charge and refreshments including lunch will be provided. Participants will receive an official certificate of attendance from S-TEAM and the University of Strathclyde.

Workshop One

Teachers as researchers: teachers learning in research and development projects

Wednesday 13th October, 1500-1800, The Barony, Glasgow):

Workshop Two

Curriculum for Excellence in the Sciences: developing inquiry-based approaches to teaching scientific literacy

Friday 15th October, 1300-1800, continuing Saturday 16th October 1000-1600, Lord Todd Building, Glasgow

Workshop Three

Wheels on Fire: Using technology as a vehicle for inquiry

Friday 1300-1500, continuing Saturday 1000-1600, The Lord Todd Building

Workshop Descriptions

(1) Teachers as researchers: teachers learning in research and development projects

This workshop will involve teachers, researchers and teacher researchers from Scotland and Norway in a joint session looking at the benefits and constraints of teacher involvement in research. There are various models of teachers-as-researchers, based on variations along the dimensions insider-outsider and interested-disinterested. Not all teacher research is about one's own practice, and the involvement of universities brings an additional layer of complexity. Led by May Britt Postholm (Norwegian University of Science & Technology) with Colin Smith (University of Strathclyde). Although the workshop is focused on teacher researchers in science subjects, it will be of interest to all teachers with an interest in pursuing their own projects.

Aim: To promote practitioner research in all its forms, and specifically to improve teacher-researcher collaborations in science education.

Venue: The Barony, University of Strathclyde: http://www.rescat.strath.ac.uk/barony_direct.html

Time: Wednesday 13th October, 2010, 1500-1800, Tea and coffee provided

(2) Curriculum for Excellence in the Sciences: developing inquiry-based approaches to teaching scientific literacy

This workshop, led by Dr Robert Evans² is for teachers and teacher educators interested in becoming trainers for school-based CPD activities to promote inquiry-based teaching and learning in science subjects. It is designed to be compatible with Curriculum for Excellence at both primary and secondary levels but is based on international work with scientific literacy. Colleagues from Norway and Denmark will be participating in the workshop. (Note: participants should bring their own laptops where possible, together with headphones/ear buds for audio. If you cannot bring your own laptop, tell us in advance and we can arrange to lend you one for the workshop).

Outline

Robert has developed and piloted this two day workshop which provides an opportunity to use statements of Scientific Literacy from across the EU to develop approaches to inquiry based learning in Science. Robert will deliver this workshop to a group of Scottish Science Teachers on the 15th & 16th October 2010 in Glasgow with the intention that these teachers might offer future versions of the workshop to colleagues.

Workshop Objectives

- Demonstrate pre-workshop personal conceptions of scientific literacy and inquiry based science education by:
 - Answering two open ended questions in writing
 - Analyzing a video of a science teacher for evidence of use and non-use of inquiry methods
- Be able to identify important and relevant characteristics of inquiry based scientific literacy through participating in a 30 minute science inquiry lesson.
- Be able to identify themes of scientific literacy from several EU countries in writing and from given concept maps
- Analyze videos of teaching for examples of good and/or deficient use of inquiry teaching methods in teaching for scientific literacy
- Create a short invitation to inquiry which exemplifies teaching at least one goal of scientific literacy from their country using inquiry based methods, and teach it to the group

How does this relate to Curriculum for Excellence?

Sciences Principles and Practice Paper page 3:

*The experiences and outcomes in science provide opportunities for children and young people to develop and practise a range of **inquiry and investigative skills, scientific analytical thinking skills**, and develop attitudes and attributes of a **scientifically literate citizen**; they also support the development of a range of skills for life and skills for work, including literacy, numeracy and skills in information and communications technology (ICT).*
www.ltscotland.org.uk/Images/sciences_principles_practice_tcm4-540396.pdf

Date and time: Friday 15th October 2010 from 1300-1800, continuing on Saturday 16th October from 1000-1600

² Associate Professor, Department of Science Education, University of Copenhagen

S-TEAM conference flyer <http://www.strath.ac.uk/humanities/conferences/sciencefictions/>

Venue: The Lord Todd building, University of Strathclyde (<http://www.strath.ac.uk/maps/thelordtodd/>), Glasgow.

(3) Wheels on Fire: Using technology as a vehicle for inquiry

In this workshop, led by Berit Bungum and Eva Celine Jørgensen, participants will explore how design and technology can be used to engage pupils in inquiry based science learning. Based on work in Norwegian secondary schools, Wheels on Fire (literally) provides a model for designing cross-curricular, collaborative projects based on pupils' own ideas and competitive instincts.

It involves designing and building battery-powered cars using cheap and easily-sourced tools, materials and components. A range of science and maths topics can be addressed including:

- How electric motors and circuits work
- Aerodynamics
- Friction
- Geometry
- mechanics/kinematics

Participants will build their own model cars (all materials etc provided) and will engage in groupwork regarding the advantages and disadvantages of using these methods. Because the original work was done in a different school context, Scottish or other UK participants will be able to gain insights on classroom practice from an international perspective. A DVD is available as an introduction and this will be shown at the workshop.

This workshop will be held in the Lord Todd Building, John Anderson Campus, University of Strathclyde: <http://www.rescat.strath.ac.uk/pdf/village.pdf>

Venue Information

Directions by public transport:

Located in Glasgow city-centre, The Barony is easily accessible by public transport.

Buchanan Bus Station, Queen Street Railway Station and the underground are only a 10 minute walk away. Buses pass very close to The Barony, and it is only a 5 minute taxi ride/ 15 minute walk to Central Railway Station.

Directions by car:

From Edinburgh and the north of England take Exit 15 off the M8 motorway. At the second set of traffic lights turn left, then first right into Collins Street, then left into Rottenrow East. The Barony is the red brick building on the left hand side.

From Glasgow Airport and the west, take Exit 15 off the M8 motorway. Turn right at the first set of traffic lights, then right at the second set of traffic lights. Then first left into Collins Street, then left into Rottenrow East. The Barony is the red brick building on the left hand side.

Glasgow Airport is a 20 minute drive by taxi or car.

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Both the Barony and Lord Todd buildings have disabled access. The language of the conference will be English.



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S-TEAM 
FIRING UP SCIENCE EDUCATION



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Contact details

More information is available from the S-TEAM wiki at:

www.ntnu.no/s-team

Registration is at:

<http://www.strath.ac.uk/humanities/conferences/sciencefictions/>

Project coordinators:

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