

Science Communication Working Lunch

Linking formal and informal education – curriculum enrichment

Thursday 6 and Friday 7, April, Our Dynamic Earth, Edinburgh

The workshop sought the views of science communicators as part of SEED's (Scottish Executive Education Department) engagement on proposed curriculum changes in Scotland. It also explored how science communicators can work in partnership with teachers to support and enrich the curriculum.

SPEAKERS: Walter Whitelaw, Chair, Science Review Group, Curriculum for Excellence, Scottish Executive Education Department
Kath Crawford, SAPS Biotechnology Project Scotland

The Working Lunch ran twice over two days and was attended by approximately 35 people each day.

Summary

As science communicators we:

- welcome the new direction of travel of the proposed changes in the school curriculum (*a curriculum for excellence*)
- welcome the opportunity to engage in the process and feel that we can add significant value to both pupils and teachers, providing:
 - access to resources, including people
 - relevance, innovation and creativity
 - continuing professional development (CPD) – developing capacity through increased knowledge and confidence in science subjects and in current research
 - the 'wow' factor

The Working Lunch began with presentations from Walter and Kath.

Walter Whitelaw introduced *A Curriculum for Excellence* (ACfE), describing the present stage of this process of reflection, review and improvement.

In particular, he explained that the aim of ACfE was to give teachers more freedom. The curriculum would become less prescriptive and would contain fewer and less specific outcomes. He said that the most important goal for science education was to "stimulate, nurture and sustain the curiosity, wonder and questioning of young people". The role of science education is "to prepare young people for their future lives and careers by developing them as scientifically literate citizens and by preparing them for later more specialised learning".

He also expressed the importance of the 3-18 curriculum in developing

the **four capacities**:

- successful learners
- confident individuals
- responsible citizens
- effective contributors

alongside which are **seven principles** of curriculum design:

- challenges and enjoyment
- breadth
- progression
- depth
- personalisation and choice
- coherence
- relevance

Walter highlighted the following from the published rational:

“There will be freedom to teach in innovative ways and to make the most of the power of digital learning and expertise outwith the school sector.”

He challenged the attendees to think how their skills as science communicators could contribute to these exciting developments and expressed the view that these changes made links between formal and informal education both vital and feasible.

Kath Crawford then described how the “SAPS Scotland” (Science And Plants for Schools) and the “Supporting Scottish Science Education through CPD” projects have been working to enrich the learning and teaching of science. She described their work in developing exciting curriculum-related resources and working with teachers to implement these in the classroom. She expressed the view that ACfE was an exciting opportunity to develop science education from being merely the acquisition of facts, to an opportunity to learn how to think.

There then followed a Q&A session which touched on the following points:

- ACfE is THE agenda for the next 10 years, but it is going to be hard to integrate it into the culture of science education. It requires engagement with Principal Teachers, teachers and Local Authorities. Rather than providing courses and materials, *outcomes* will be prescribed for people to adapt. There won't be reams of materials. Only a few teachers have even read the report!
- The curriculum is moving away from formal assessment at levels S1-S3.
- The aim is to prepare pupils better for S4 onwards i.e. the exams. Need to help pupils to think and to understand the value of evidence, but also “raise the bar” of courses.
- There are issues of CPD costs and time (e.g. cover for those on courses).
- ACfE changes may require using dialogue skills from other subject areas e.g. English, RE
- Development of discursive teaching rather than facts – teachers can think for themselves!
- Kings College, London *Thinking Science* programme produces stand-alone lessons which, although very structured, could be adapted for science lessons.
- RCUK are piloting CPD training and have just published their strategy. They are keen to help their scientists with these kinds of activities.

There then followed **three activities** which addressed the following questions. The responses generated by the participants over the two days are summarised here:

QUESTION 1: In the context of the four capacities and the seven principles of curriculum design, what value can science communicators and the informal (science) education sector add for (a) Pupils and (b) Teachers.

Numerous ideas were generated in response to this question, on each day the small groups of attendees were made to select their top answer, all of which are listed below

(a) PUPILS?

- Real-life science & scientists
- Access to resources including people
- Real-world relevance
- Positive role models

(b) TEACHERS?

- Access to resources
- Increased confidence, by doing new things/skills
- Added relevance and new ideas
- Knowledge and confidence in subject and about current research

QUESTION 2: How might you approach, or refresh, one of the following outcomes, or use a current activity to address the four capacities and the principles?

OUTCOMES at Primary level

- I can carry out research and present ideas on the limitations of my senses
- I can carry out research and present ideas on the conservation of water
- I can carry out research and present ideas on how energy is conserved by good design

OUTCOMES at Secondary level

- I can express an informed view on the use of stem cells
- I can research and present information on the recycling of plastics in my local community
- I can explain the safety features of cars

This question elicited the following comments:

- we could use much of what we do already
- relevance and responsible citizenship are very closely linked but pupils won't necessarily like something even if it's relevant, it also needs to be done creatively
- assessment will be very different; huge culture change is required – a time consuming and difficult process, but rewarding to do
- could even let pupils set the agenda; ask, "How shall we approach stem cells?"; let the pupils deconstruct the topic and ask the questions
- potential for cross-curricular subjects e.g. forensics works at different levels; chemistry, biology and even physics – a great lead into the science
- but with forensics, there is the conflict of desire for relevance (e.g. CSI) *versus* the need to teach chemistry (pure science)
- may always be two opposing views, either being pro cross-discipline subjects or pro specialisms

QUESTION 3: Recognition of achievement is an important aspect of ACfE. All stakeholders are happy to sign up to this as “a good thing”. However, there are issues to resolve relating to:

- reliability
- credibility and currency
- possible bureaucracy/workload issues for classroom teachers

What contributions can the science communication sector make in this important area?

How would you address the three issues listed above?

This question elicited the following comments:

- passport of achievement to link things together e.g. CREST and Nuffield
- another set of qualifications BUT trying to recognise types of learning other than by exams!
- presenting to external people? not sustainable to get people to come and see things
- create some kind of scheme like Duke of Edinburgh Award and Guides – industry like this, also ecsite-uk & Royal Society book prize
- also important to recognise effort
- use CREST & other schemes
- could incorporate the notion of self-assessment?

Useful web links:

ACfE: <http://www.acurriculumforexcellencescotland.gov.uk/index.asp>

Science and Plants for Schools (SAPS): www.saps.org.uk

http://www.scienceeducation3-18.com/projects_saps.htm,

Scottish Schools Equipment Research Centre: www.sserc.org.uk,

Improving Science Education 5-14: www.ise5-14.org.uk