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Changing the Balance in Scottish Schools Computing Education

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Outline

- CS Inside and its outcomes
- Undergraduate Ambassadors Scheme
- Influence on Scottish Curriculum
- Supporting teachers to teach differently

Problem in UK Schools (at least)

- IT training
 - Technology: *how to use it*
 - Saturated with it from the 5-14 curriculum
- Computer Science education
 - Technology: *how it works*
 - the underpinning science
 - cf. other sciences
 - Physics – making electric motor with a cotton reel etc.
 - Biology – dissecting a heart (lamb's?)
 - Chemistry – throwing sodium into water

Original goals

- "to enthuse and inform potential computer science students"
- Series of at least 15 workshops
 - "How does it work?"
 - Using the technologies all around us, bring out key concepts in CS
 - Committed to at least 90 schools visits
- Presenters
 - Academics on school visits
 - Science communicators
 - Teachers, with necessary CPD
- Materials available on a website

Achievements

- Encouraging teachers is the key
- 1300 person hours of CPD delivered
- 500 registered users on website
 - 300 from Scotland, 200 from 15 countries
- Feedback from around 50
 - indicates use with over 2000 pupils
- Late primary through to university level
- Many thousands in all seen at least one workshop

General Feedback

- "Comprehensive [activity] packs were more than adequate for preparation"
- "Very motivational – inspire you to teach in a very interesting manner which improves classroom atmosphere and relationships"
- "Pupils gain greater insight into how computer systems work. At the very least, if they don't quite understand everything in the workshop, they certainly enjoy the challenges inherent in learning proactively"
- "Pupils said if they act out the task, they understand it better"
- "Pupils raise questions beyond basic topics"
- "One very bright girl is now considering doing Computing at University on the strength of your presentation"
- "Very useful publicity for computing as a subject. I expect to have a greater intake next year."
- "One or two of the weaker pupils made unexpected contributions showing insights that they had not managed before"

CPD sessions

- ...it's great to have a chance to discuss different methods for teaching ... with other subject specialists. We don't get an opportunity to do that often!
- Actually taking part in the workshops makes them much more meaningful ... more likely to use these than if I had just printed them off the web site.
- These are the kind of lessons I want to be involved in; Participatory and engaging.

Spin-off: Ambassador course

- Final year undergraduate Honours option
 - Follows *Undergraduate Ambassadors Scheme (UAS)*
- Format
 - Application/interview/Disclosure check
 - Preparatory session(s)
 - 10 ½-days in a local school
 - Activities: classroom assistant, one-to-one, ambassador for HE and CS, teacher
 - Must use at least one, and create one new, workshop in CS Inside style
- Assessment – journal, presentation, workshop, critical evaluation of experience

Typical response from teacher about student Ambassador

- Craig is an exceptionally talented student whose passion for technology and computer science is clearly evident. He is extremely knowledgeable in all aspects of computer Science, was eager to present materials to any year groups and easily adapted the content, style etc of his delivery to suit. He was also able to provide advice to students interested in pursuing a course in Computer Science at university.
- Craig delivered workshops every time he was in school and so far surpassed the minimum requirements. The workshop he developed himself was well received and was easily adapted for different audiences. He captured the imagination of the class and held their interest for the entire time.

Curriculum change

- Curriculum for Excellence
 - Computing Science is named and has a set of outcomes/experiences
 - O/Es are vague enough for real CS to be inserted underneath
 - Specified up to around age 15
- Scottish Qualifications Agency (SQA)
 - Revising Computing qualifications for 16-18 yr olds
 - Specs must be ready by April 2012, first exam 2014
 - Rays of sunshine?
 - Encouraged to adopt a *single* computing qualification...
 - ... concentrating on core/foundational CS concepts
 - Apparently willing to accept significant input from universities
- Similar activities south of the border for GCSE?

Teacher support

- Teachers are being called to work with
 - new material
 - new teaching methods
- Currently exploring this with funding from Google and Microsoft
 - 3-hr evening sessions with ~40 teachers
- No silver bullet – this will take time and effort
 - Simple repositories not enough
 - How *is* good practice shared?
 - How do we significantly improve the CS literacy of those that need it?

What to take away?

- CS concepts can be taught in engaging ways as part of a schools CS curriculum
- UAS-style course excellent on every level
 - Go create one!
- Teachers are the forgotten group
 - Make spaces locally for real sharing and development
- Push for curriculum review
 - Engage with the process when underway
 - Be willing to change *our* courses as/when necessary