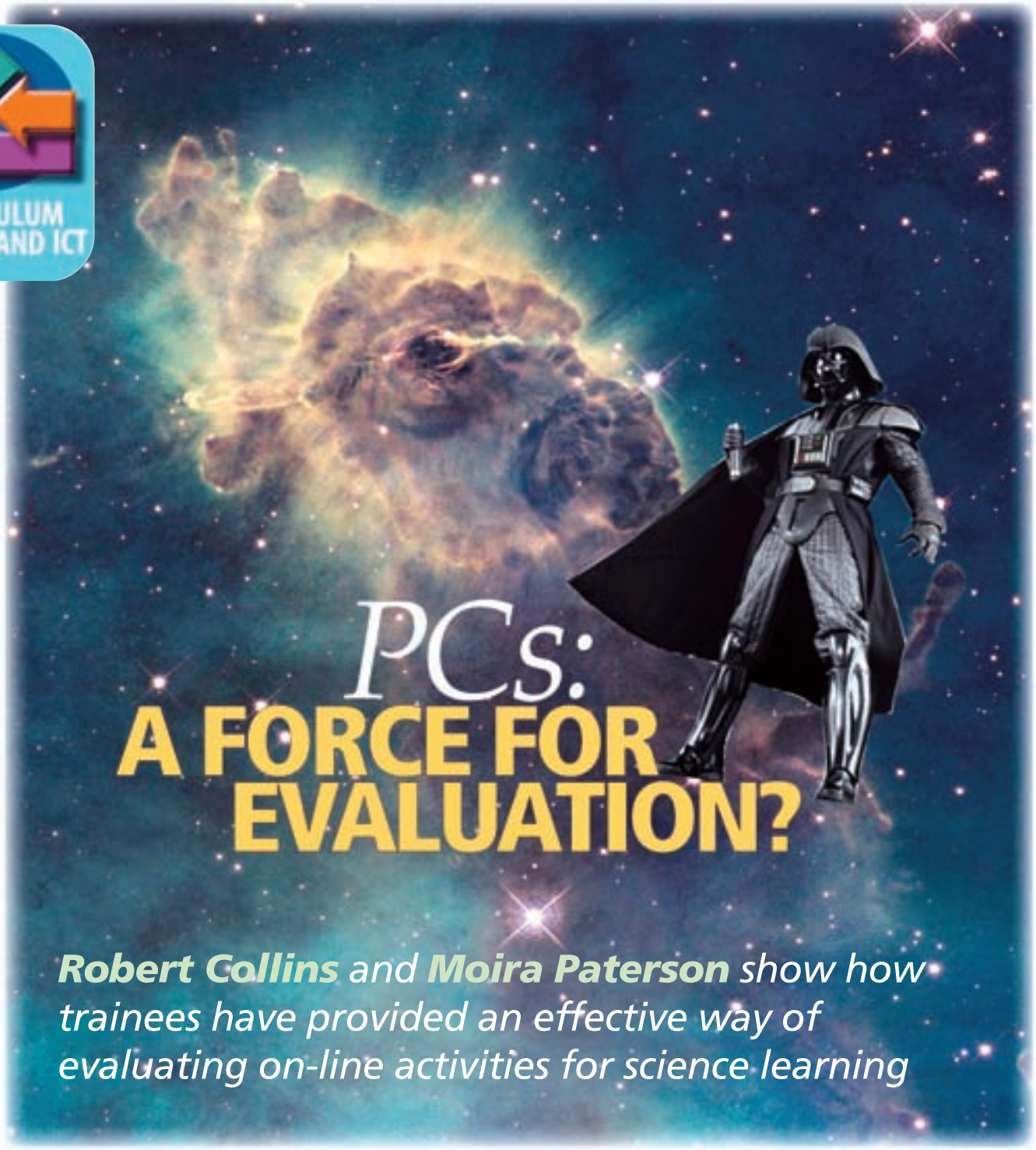
CURRICULUM CHANGE AND ICT



PCs: A FORCE FOR EVALUATION?

Robert Collins and Moira Paterson show how trainees have provided an effective way of evaluating on-line activities for science learning

Past expectations

Long, long ago, back in the early 1990s, I (Robert) was preparing to buy my first computer. At the time my elder brother, who had been a programmer since the late 1970s, was an executive in a very successful multinational computer company. As I was still a bit of a techno-novice I approached him for help and asked the definitive ICT question, '*What is the best PC?*'

I can still remember his weird reply. While breathing heavily into his empty teacup he retorted in his best Darth Vader impersonation, '*I do not know, young Jedi. The choice is vast. But you must buy-in somewhere. If you stand still you will get left behind.*' He had always had a tendency towards this nerdy type of 70s-programmer humour. Seeing the 'perturbed practitioner' look on my face, as though I had just been pestered by some petulant pupil, he put the cup down and continued, '*Look, just get something that matches your immediate working style and build from there. Everyone upgrades or changes eventually.*' Executive wisdom indeed.

Although shocked at the time, I have found from experience that his advice was very true. In fact when asked the same question now by students and colleagues I give similar advice, albeit with greater verbosity, a drier wit and less 'nerdiness'. I have got to keep academic standards up, you understand.

The same is true now, I guess,

of the World Wide Web. This much-hyped public face of the Internet offers primary practitioners a daunting and almost immeasurable wealth of potential teaching resources. From enhancing our generalist background knowledge in all things science and otherwise, to providing us with superb ideas and formats for interactive activities (with accompanying worksheets, images, curricular plans, assessment materials and easy access for pupils), it is all there – a few clicks away, in a galaxy very, very near.

Mission control: advice to students

But where do you start? Well, as with all great journeys, you start with a single step young Skywalker. Just not necessarily in cyberspace.

The advice given to current students on the Post Graduate Diploma in Education course here at Strathclyde University is to think firstly in terms of pedagogy. Those primary trainees participating in Strathclyde University's 'Laptop Initiative' within the Faculty of Education were asked to generate evaluations for websites for use on their school placement, using Environmental Studies course content. This was based on the belief that the use of Web materials should match the same acceptable pedagogical standards as any other good classroom activity.

In terms of science coverage it was not enough that they discovered just any old content-related site and jammed it onto their existing forward plan, however. Justification for the inclusion of the website was firmly based on the idea that chosen sites should primarily be of use in *teaching* science. Those that would enhance skills, promote creative thinking through problem solving, and perhaps even encourage metacognition, were to be highly prized. Web pages that contained modelling as opposed to simulation were to be seen as the ideal. Although, it has to be said, sites that allowed children to play creatively with their own ideas, as opposed to merely watching without being able to tamper with the 'model proper', seemed somewhat elusive.

The students responded well, with the vast majority of submissions being judged as high enough quality to be included in the student resource materials. As a body, they were then asked to evaluate the usefulness of such an exercise. Very few were negative – and even those who were, blamed good old-fashioned hardware gremlins rather than the concept. The meaningful, not the time-burning flashy and trashy, had triumphed. Yoda would be proud.

Future pedagogy?

So what of the real world then? What do cyber-kids need anyway? What should practitioners be looking for when encouraging pupils to get the best out of their standard-issue classroom PC? No one knows exactly. What is suspected though, is that they have got to engage with the ethereal information collective sometime – or get left behind.

Engagement is a function of getting as engrossed as possible in what they have to learn. The passive process of learning is obsolete. ICT-wise, extending this consideration to the mode in which it is implemented within the science activity is key. Success in the future, and in the here-and-now, depends on engaging with the 'machine', thus avoiding obsolescence.

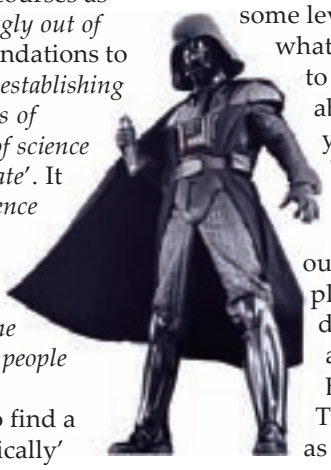
A news release on science provision in primary and secondary schools (SEED, 2005) reiterates this message on engagement. It describes a number of science courses as becoming *'increasingly out of date'*. Key recommendations to avoid this include '*establishing more responsive ways of keeping the content of science courses fully up to date*'. It recognises that '*science itself is constantly growing and evolving*' and that '*more needs to be done to enthuse all young people about science*'.

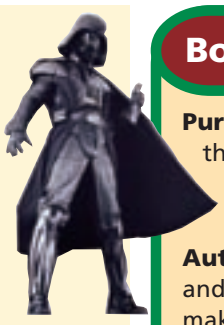
So we have got to find a force that 'automatically' updates its own science content constantly, responds and grows in an almost organic way, while appealing to the wide range of children from primary to secondary. I am no Jedi Master, but integrating some Web provision here would seem wise. It is never that straightforward, however; there is always the human element to be considered.

A report to SOEID (Williams *et al*., 1998), talks more about the practitioner aspect. It explains that most primary teachers' use of ICT is restricted to word processing, followed closely by use of externally produced educational software. It should not be assumed, however, that in using newer models, experienced teachers fare any better. The report suggests that newly qualified teachers are neither more or less likely to engage in ICT-related activity than established practitioners. Indeed, the same report explains that studies of final-year students showed that, although going into teaching with a good level of ICT know-how, many felt they lacked competence and confidence in utilising this in the classroom.

So what do we currently have that we could use to interact with the Web environment while maintaining pedagogical integrity? Practitioner know-how in abundance, that is what. When talking of use of ICT, some underpinning truths, as class teachers will tell you, remain unalterable.

It is part of the human condition to prefer purpose to drudgery, to enjoy active creativity and expression, to feel some level of competence in what you are doing and to chat with others about things in which you are interested. You do not have to pay a researcher to prove this: just look out at children in the playground and define their activities as listed above. Believe what you see. They are not always as alien as they seem.





Box 1 Checklist for evaluating websites

Purpose – Does it serve a meaningful purpose when integrated into your pupils' needs? If so, then does it share that purpose with the learner or will you have to accommodate this step yourself? Does the site augment or reinforce target concepts? How can it be used best to promote science learning?

Authenticity and situation – Does it give scope for tasks to be carried out in a meaningful and immediately relevant context? What steps, if any, will have to be taken so the children make this important link to the situation? (Avoid doing 'schooly' things just for the sake of doing them.)

Creativity – Does it encourage creative thought? Is the interface exciting for children? If its only function is having the children interact passively then the good advice is to leave immediately. The website you need will encourage conjecture.

Competence – Does it accommodate the prior learning of the children and does it have enough challenging content to keep them motivated? Does it have an ease of navigation for children that enables independent learning and is it written in a way that matches the children's age/stage? Does it make them feel competent in using it?

Collaboration – Does it encourage a collaborative approach to learning? Is there anything you could do outside the boundaries of the site to encourage this? Does it generate spontaneous discussion amongst participants? (This is usually a good sign – if the discussion is meaningful.)

Bias – Have you checked it for bias? Can this be balanced by other activities or is it best to find another site? Is content factual or opinion-based? Is it commercial? How will you deal with this?

Good old-fashioned sense – Is content current and correct, updated regularly, valid, reliable, presented in a grammatically correct way, void of encouraging misconception?

Modern sense – Have you checked any/all integrated links? Have you checked for copyright issues? Have you thought of a way of restricting the initial surf? Are all external user policies and internal software security programmes up to date?

Implementation sense – Have you tried to carry out the tasks you intend for the children yourself? Does it all tie in well with what you want them to learn? Will you have to augment tasks with any external prompts?

Present effective: using the Web in science

So, what is the definitive formula for integrating the Web into your current science provision? Beware easy answers, good Jedi – they are often part of the Dark Side. There are no automaton pre-programmed rule sets. Professionals do not do robot anyway. It is far better to think freely and creatively in terms of good guiding principles.

The Web grows in response to its own universe, not yours or mine. Sites that are useful today may well be changed, updated, upgraded or simply disappear tomorrow. The complacency of thinking that what you employ today will remain forever in cyberspace is not the best approach. Experiment and investigate. Update yourself regularly. Evaluate for yourself. You might find the advice listed in Box 1, mainly adapted from Potter (2002) and Pritchard (2004), useful when surfing to find that elusive support website. The list is not intended to be exhaustive, just a quick guide to getting started. The students responded very favourably to this initial advice and the quality of their work, and subsequent year-resource was superb. Everyone upgrades or changes eventually. Even Darth!

References

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Pritchard, A. (2004) *Learning on the Net*. London: Fulton.

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Editor's note: If you would like to try out this checklist on some science websites and report back then we would be pleased to hear from you and learn from your experiences. Any suggestions for positive constructive changes to the format would be welcome. If the current list matches most people's present working style we can build on this together.

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