

<hindsight

A short history off-line

as viewed by Richard Millwood
from 29th November 2010



National
Archive of
Educational
Computing



www.naec.org.uk

Your top 3 lessons,
successes or failures –
answers on a postcard...

Some of the audiences responses at the ITTE
Research seminar, Cambridge March 2010:



human creative endeavour & the culture of tools

tools which fulfil an identified need	tools which also open opportunities to engage in new unimagined practices
spanner	telephone
frying pan	internet
bra	computer

www.core-ed.org.uk/tools

Software has been
the clay which permits
the formation of new
resources, processes &
communications in
learning & teaching.

Millwood, A short history offline, Becta web site, September 2010

Before microcomputers

- The teletype
- Graphic displays
- Evaluation

Creativity

Much of the creativity in this era centred on programming and pedagogy. Learners' access to creative tools was limited even in the now familiar worlds of writing and document production. Some enthusiasts constructed DIY and kit computers and applied them creatively to problems as a means to understand the technology. Teachers developed methods of using exploratory simulations, making expensive experiments cheap to run.

Communication

Email was still new and it was rare even for the computer to be used in front of a whole class to present ideas. Communication took place around the computer, rather than through it.

1970-
1979

A rare, early example of
a classroom installed
with microcomputers



Before the office

- Studying the computer and microelectronics
- Creativity and problem solving
- Simulations, games & 'Useful little programs'
- The applications approach

1980-
1989

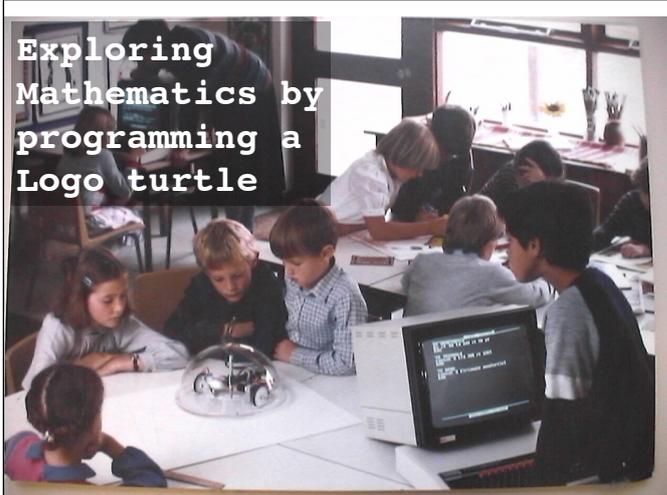
Creativity

More accessible forms of programming allowed young learners to develop their own ideas and express conceptual thinking with aesthetically delightful drawings through the Logo turtle's pen. The first word-processors and painting programs, made widely accessible through microcomputers, encouraged new artistic activity. Computer games brought arcade-style action into the home.

Communication

Email developed rapidly and bulletin boards became popular – islands of online community connected people through 'dial-up'. Publishing through teletext and Prestel seeded ideas of the web to come.

Exploring Mathematics by programming a Logo turtle



Before the internet

- Interactive multimedia
- Digital creativity
- Bulletin boards
- Cross-curricular

1990-
1999

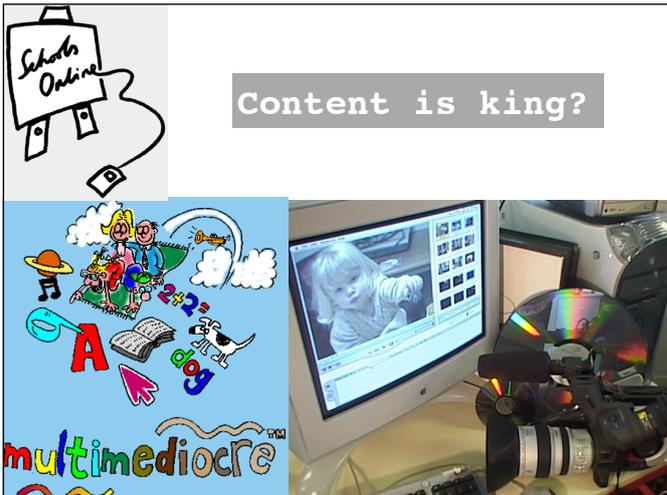
Creativity

Attention shifts from the computer to its applications. Desk-top publishing arrives, digital photography and filming, music production all make an impact as multimedia & hypertext offer new combinations with interactivity to glue them.

Communication

The 'C' in ICT arrives with the internet. Web publishing and content management systems seduce many to believe 'content is king', but the online communities emerging show the way forward at the end of the millenium. Learners have growing access to a wealth of information, people and media.

Content is king?



multimediodre™

Before the cloud

- Content and the dot.com bubble
- The e-institution

2000-2009

Creativity

Online services offer sharing of media, web page development and construction of the personal identity. Teenagers decorate their online spaces like their bedroom, but to a global audience. Digital creativity arrives in the way that desk-top publishing did a decade before to empower diverse learners' expressive preferences.

Communication

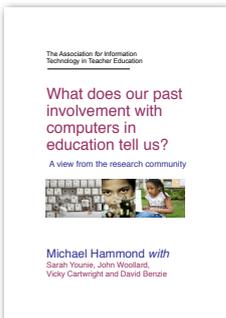
Communication becomes pervasive with ubiquitous mobile telephony and a focus on social networking. Learners can engage with others, able to discover when, where, what and why with the touch of a button, wherever they are. Technology supports learning dialogue distributed yet located in time and space and new forms of presence, in virtual worlds, become possible.

Voices Project

Fifteen participant interviews, coded, placed into categories, themed and sub themed.

Questions raised:

- About technology: **Can we identify what has been gained and lost, particularly in the development of software, during their careers?**
- About application: **Why is the introduction of computers so problematic?**
- About philosophy: **How do beliefs about teaching affect the use of technology?**
- About policy: **How has policy helped develop and helped constrain the use of computers in school?**
- About community: **What are the achievements of the research community and what are the challenges?**



http://www2.warwick.ac.uk/fac/soc/wie/research/centre/centre_projects/current_projects/voices/book/voicesbook.pdf

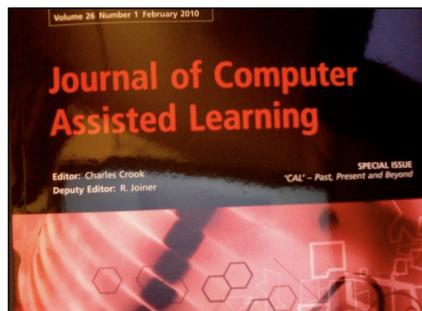
BJET March 2008

Special Issue:

Understanding the past – illuminating the future



A reminder of the commercial sector



"evaluation seems to have been underplayed..."
Hartley

JCAL Feb 2010

Special Issue 'CAL' – Past, Present and beyond

Perspectives

Perspectives

Technology & Environment

Regional & Global

Organisational & Social

Individual & Interpersonal



John Dewey

"In sum, I believe that the individual who is to be educated is a social individual and that society is an organic union of individuals."

"If we eliminate the social factor from the child we are left only with an abstraction; if we eliminate the individual factor from society, we are left only with an inert and lifeless mass."

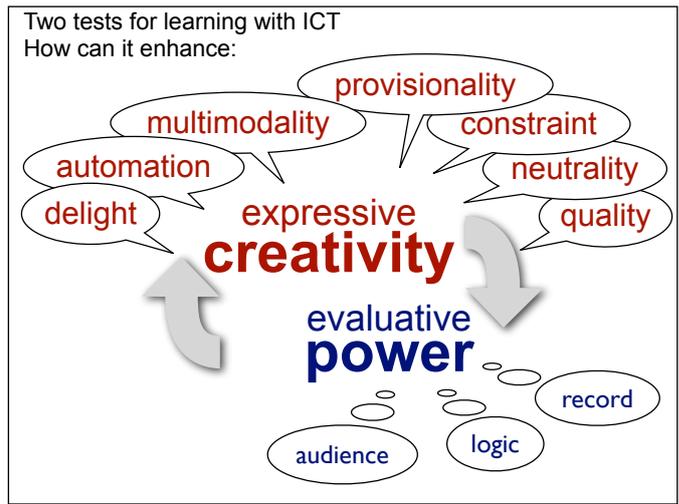
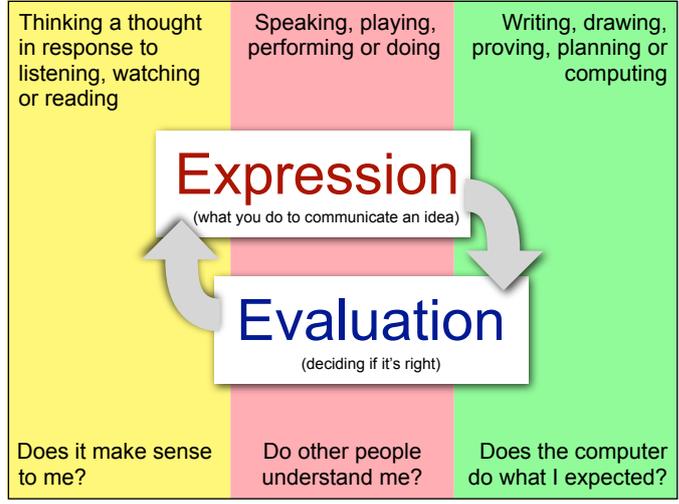
"Education, therefore, must begin with a psychological insight into the child's capacities, interests, and habits."



Individual & Interpersonal

from 'My Pedagogic Creed' School Journal vol. 54, pp. 77-80 (January 1897)





delight

The computer frequently pleases, aesthetically and affectively, in a way that delights the learner. This positive mood is clearly valuable to creativity, as a means of sustaining motivation at the very least.

<http://blog.richardmillwood.net/2008/05/15/an-analysis-of-delight/>

automation

A powerful spur to more complex expressions of ideas is the ability to re-express cheaply and repetitively. The potato print transforms a simple shape into a rich pattern, the 'automation' provided by this simple tool allows a variety of re-arrangements of the shape to be explored at low cost and with reliable quality.

Computers provide this kind of automation and much more, through copy and paste in almost every program, through formulae and 'Fill down' in a spreadsheet and, most important of all, through programming languages.

multimodality

The capacity for learners to use multiple media through ICT increases the opportunity to work in alternate modalities to the predominant reading and writing. ICT simplifies the production of visual and aural media as well as making viewing and listening a more delightful engagement with material. Of even greater consequence is the potential for reconstruction in film, hypermedia (the establishment of networks of knowledge) and linear presentations. These are integrations of multiple media and are perhaps the most demanding of communications, not only anticipating audience viewing but also audience choice of sequence.

provisionality

In order to embark on any piece of work of substance, a start has to be made – for many learners, making this start is difficult because making mistakes has such a disastrous effect on continuation. Many young people in schools use correction fluid to eradicate 'errors' as they perceive them, or resort to ripping pages out of books in order to achieve a 'perfect' copy. Provisionality is that certain knowledge that with a computer, one can begin developing ideas and, at little labour cost, perfect and re-draft those ideas with no evidence of the process. This means that for creativity, one can start recording ideas out of order, in draft form and incomplete. For many, this knowledge unlocks their ideas, which would otherwise not be worth expressing.

constraint

ICT tools can promote the development of ideas, paradoxically, by constraining the universe of possible expressions. In many of the arts, the choice of constraint can lead to greater fertility by focussing on specific aspects of ideas – this kind of limit can offer similar gains in ICT. In graphic programs, limits on the position of the cursor to a grid can lead to the rapid development of diagrams. In geometry programs in Maths, constraints can help learners see important connections and propose new interpretations of figures.

neutrality

After some acquaintance with computers over a period of time, young people see through any pretence of intelligence or life in a computer and thus begin to see it as a neutral tool which although it may offer canned feedback, is clearly incapable of judgement. Computers allow students to 'say things out loud', but without judging those things in an interpersonal manner. The computer is a silent helper in this sense and can be trusted with half-formed ideas and ideas which follow the students creative impulse.

quality

ICT media are unique in that little imprint of the creator's weakness in production are seen – perfect fonts, geometric accuracy and colour faithfulness permit the weakest of learners to produce material which compares, on the level of media quality, with that of the most experienced professional. This means that learners' self-esteem, which is so heavily knocked by poor handwriting, inaccurate drawing or inadequate oral skills, can be raised. This in turn encourages risk-taking and attention to the content of ideas – continuing engagement which can lead to judgements about higher-order issues on a level playing field.

Most work on a computer can be saved for later perusal or saved at intervals to record drafts. In the development of ideas this can help learners see how their ideas have developed, or peers and teachers to understand and judge their value and originality. In the long term, work that has been saved in this way and compiled provides a portfolio of work. This portfolio can be used to represent the learner's capability, but also may be mined for new starting points by that learner in a much more accessible and labour saving way than with a traditional portfolio. New connections can be made between past work and present concerns – often surprising insights can be obtained, because ICT has recorded the work and allowed searching and indexing to take place.

record

Computers offer a powerful tool for certain ideas, which are developed in symbolic, formal languages. These include diagrams, spreadsheet formulae, programming languages and database design. If these formal systems are used to develop ideas, then it is possible for the computer to 'execute' them or analyse them and display their consequences. Often, in order to judge the success of an idea, this output can be compared to that anticipated, and evaluation independent of a peer or teacher can take place. The programming language Logo has provided a powerful example of this effect, in some cases leading learners into extraordinary intellectual and creative endeavour.

logic

Using projectors or large screens in a classroom context, learners share a knowledge context and background, debate together, seek each other's views and respect diversity but also work towards consensus. The projected computer screen is a focus for representing the current state of the ideas being developed by the class and for judging quality and accuracy of expression.

A wider, but identified audience can be found by publishing material on web pages so that the globe can take part in the evaluation of ideas and work. The power of potential audience to support both expression and evaluation is very real in the mind of the learner and can provide powerful motivational force and raise ambition.

audience

- **What are the perspectives to adopt?**
- **What tests of success?**
- **Practical steps?**

- **Industry Education divide**
- **Mis-understanding the human-tool symbiosis – “it’s just another tool”**
- **More of the same – productivity without transformation**

<hindsight >insight< foresight>



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