

Ms. Chips and her battle against the cyborgs.

Embedding ICT in professional praxis.

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Abstract

This chapter is written for practising teachers, and examines the institutional and individual factors that inhibit the implementation of Information and Communication Technology (ICT) as a tool for teaching and learning. The affordances of ICT are identified, together with their contribution to attainment, creativity and learning. The author argues that many of the obstacles to meaningful uses of ICT are embedded in the assumptions inherent in many institutional frameworks that are predicated on an outmoded industrial model that drives many school timetables that process learners through the school machine. Individual change is easier to effect than institutional: the author provides some suggestions to liberate creative teachers from constraints of the system.

Keywords

School internet access, learning communities, active learning, classroom instruction, classroom technology, e-learning, equality of access, pedagogy, teaching strategies, technology-enhanced learning

Preamble

In the book ‘Goodbye, Mr. Chips’ by James Hilton, a shy British teacher (Mr. Chipping – hence ‘Chips’) devotes his life to teaching after the death of his beautiful American wife. The film (1939) of the book features Robert Donat as Mr. Chips, who looks back on his long career and the people in it. And there you have it: the quintessential image of the devoted teacher, interacting with pupils and students, enabling them to excel and achieve their goals. The reality, of course, is often slightly different. Teachers are caught between the Scylla of an increasingly prescriptive curriculum and the Charybdis of public accountability; schools are expected to pick up the shortfall of parenting and social responsibility, abandoned as parents rush out to work increasingly long hours to service mortgage and consumer debt.

And yet ... and yet.

The teacher still sees herself as someone who can shape and nurture a young life, foster a love of learning and a sense of self-worth that will help create a rounded individual: someone for whom education is more about kindling fires than filling empty vessels.

And then the door opens, large boxes are brought in, their contents fill the rooms and the pupils spend all their time staring at the screens – or not, because the computers aren’t as good as the ones they have at home, aren’t as much fun, can’t be customized – but the ecology of the classroom has changed, and Ms. Chips has begun her relentless battle against the Cyborgs.

Teaching, The Existential Reality

The singer Sting once reflected on his previous career as a teacher, and commented that there wasn't too much difference between teaching and singing in a band: it was a question of standing in front of a crowd of screaming teenagers and trying to keep them entertained. That may well be unfair to one or more of the stakeholders in that relationship. Some teenagers have the ability to entertain themselves. Many of those I taught seemed to find endless hours of pleasure in staring through the window. From time to time they would hear their name, realise that they were being asked a question and offer up an attempt at an answer. They had to be there. I had to be there. We tried hard to be polite to one another and do what we all had to do.

What did we have to do? Simple. I had to teach. They had to learn. That was how the system worked. Then they would be tested to see how well they had learned. Ah yes: simple.

“Teachers shout at you. I don't shout at myself.”

(Boy, Year 7.)

“When I'm taught people tell me the things I am learning, but when I am learning I do it myself.” *(Girl, Year 7.)*

“They talk, we listen.”

(Boy, Year 9.)

“Learning is something you do for yourself. Being taught is something the teacher does for you.” *(Girl, Year 9.)* (Cuthell, 2002)

Something must be better than this – and ICT is often seen as the answer (Cuthell, 1998): teachers can be liberated from routine drudgery; learners set free to work autonomously and, in the words of Clynes and Kline (1960), routine checks and monitoring would be undertaken automatically, so that the human would be free to create, think, feel and explore. Cyborg promises are not all they seem, however ...

Consider The Mise-En-Scèneⁱ ...

The French critic and philosopher Andre Bazin commentedⁱⁱ that characters only exist within the mise-en-scene – the framing context and surrounding within which we view them. It is worth considering the mise-en-scene of schools, and the ways in which it shapes the characters who act out their existence within it. Never forget that this mise-en-scene is created from a series of a series of acts and decisions, all of which have consequences for us – and nothing is immutable. Foucault (1977) reminds us that power exists because we accept it. When we no longer accede to it we free ourselves. So, what is the mise-en-scene of schools? What are the framing contexts and surroundings? What acts and decisions have created it – and, more importantly, how does this hand over power from ourselves, as education professionals, and young people, as potential autonomous learners? (Cuthell, 2001)

The Physical Environment

Schools and classrooms represent the physical manifestation of what is considered to be ‘Education’, from the phantasmagoria of Hogwarts, the boarding school for neophyte wizards in the Harry Potter stories, through the red-brick Victorian municipal schools found in towns and cities across the United Kingdom, to the featureless neo-modernist concrete and plate-glass structures thrown up across Europe

in the second half of the twentieth century: all have their roots in what each generation perceives Education to be. If we visit schools built since the start of this Millennium we see that, although the surface features appear to be different, underlying structures are still the same.

Schools consist of a series of spaces: spaces along which people move, and spaces in which people are contained. These are called classrooms. Some classrooms, built for groups of up to forty, still function in a similar way today, although smaller classes sometimes mean that there is more space. The windows are often down one side of the room; there are rows of rows of desks or tables; the teacher and board are usually at the front of the room.

Why am I describing the obvious? Because we accept it as the obvious – and there is no reason for it to be so. Why should we assume that this is how the environment for learning should be? If we accept that this is our *mise-en-scene* then it means that the existential reality must be that $E=(T+K)$ – education is equal to one room containing one teacher and a group of kids. At appointed times the room opens and its occupants transfer to other rooms, in which the process is repeated. The times are determined, not by whether the young people have learned anything, but rather by the timetable, that temporal resource manager of the curriculum.

Some primary and elementary schools manage to present the environment of a ‘home room’, in which the décor and fixtures approximate some sense of normality, and where in the best of schools there is a sense of shared purpose, responsibility and belonging.

In many secondary schools, however, classes ebb and flow with the changes of the timetables, and a stable learning environment is much more difficult to maintain.

Teachers lead a peripatetic existence, moving from room to room, class to class, clutching the tools of their trade: pens, papers, books, files – what is regarded as a stable learning environment becomes reduced to the ability to impose relative order on a restless group of young people.

The Working Environment

Schools present a working environment (for both teachers and pupils) unlike most others. Possessions, materials and personnel are all housed together in one room; there is limited personal workspace for educators or learners; where there is ICT equipment it is set up for learner use, rather than educator use. What this means is that the systems are predicated on managing disruption, deviant behaviour or external influences (Bronach et al, 2004ⁱⁱⁱ).

The reality for many teachers and their pupils (Cuthell, 2002), therefore, is that the working environment of school is where only some of the work – the interactions with learners and (maybe) colleagues, for teachers, and with one's peers, for the pupils - occurs. The rest takes place at home. Contrast this with other sectors of education, in which staff have offices and their own computers, student computer clusters are both plentiful and available for long hours and in which access to, and regular use of, email web communities and online services is accepted as an integral part of teaching, administration and learning.

In this context it is not difficult to understand why ICT is not an integral element of either teacher praxis or the learning process for many schools (Cuthell, 1997).

Curriculum Fragmentation

A constant element of all phases of education is that the curriculum is specified by departments of education and examination boards and then handed to the school to implement. This all too often results in timetables that segment the working day into appropriate units of work; testing is at regular intervals, with only limited feedback (usually of a summative nature) to learners.

What effect does this have on the ways in which ICT is used in the classroom? It creates the expectation that ICT should be used in specific, curriculum-contextualised ways, so that it supports (and records) what is being taught (and learned). Computer use by pupils is seen as part of the production process. The industrial paradigm of the production line still applies to many schools.

Consider the ways in which ICT is used in the wider world: in industry; in commerce; in people's lives. ICT is a pervasive thread that binds together everything that is done and made possible: cell phones, digital images; digital video entertainment; computer games; advertising; text messaging and instant communication; online working, trading and entertaining: all of these are part of the vocabulary and acts of most sectors of the population. Not everybody may have access to it, yet almost everybody is aware of it. In many schools, however, ICT is seen as a series of discrete activities (some of which, such as the use of cell phones for SMS or video, is proscribed) that do not recognise the centrality of the digital environment for most young people (Cuthell, 1999). We still tend to talk about the *integration* of ICT into the curriculum, rather than the *diffusion* of technology into the ways in which we learn and work.

Ways Of Working

Work by learners is geared to producing outcomes to validate the curriculum; with educators working to fulfil their targets and statistical norms; learners are viewed as other-than-Kantian^{iv} means to an end. The young people, however, use ICT as a way to achieve outcomes that would otherwise be restricted or limited. In simple terms, if a learner can submit an assignment that is flawlessly laid out, proofed and printed, then it does not proclaim ‘this is the work of a child’ in the same way as something hand-written on lined paper. Instead of reaching for the red pen and identifying surface errors, the teacher has to engage with the ideas.^v

What ways of working could there be? The use of collaborative online working environments offers one route: the ability of teachers to undertake formative assessment of learners’ work allows for a feedback mechanism vastly superior to traditional methods. When learners are enabled to create digital artefacts in the form of digital video, audio, websites or blogs they can demonstrate their understanding of whatever information or concepts the curriculum demands. These are the young people who return to their homes to create and consume the digital content from which all of their non-school learning is taken – and there’s no government-set pass rate here.

Ways Of Learning

It goes without saying that only a restricted range of learning occurs within schools. The problem is that all too often it is only the learning legitimated and assessed by educational institutions that is regarded as valid – and that learning is predicated on two assumptions: that it must involve failure (if everyone is successful, schools must

be dumbing down) and that some types of learning and knowledge are privileged above others (hence regular questioning of the legitimacy of vocational courses or university subjects containing the word ‘studies’). As John Holt (Holt, 1964) once observed, if schools had to teach people how to speak we’d have a lot of dumb kids.

“Teachers shout at you. I don’t shout at myself.”

(Boy, Year 7.)

This young man is commenting on the difference between learning in school and out of school. He recognises that compulsory education may not necessarily be the same as autonomous learning – and yet, every time he switches on his computer at home, he is engaged in learning: how to do things; how to solve problems; how to be creative; how to imagine and visualise. Comments from other learners reinforce this feeling that school learning is mono-directional, not interactive.

“When I’m taught people tell me the things I am learning, but when I am learning I do it myself.” *(Girl, Year 7.)*

“They talk, we listen.”

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“Learning is something you do for yourself. Being taught is something the teacher does for you.” *(Girl, Year 9.)* (Cuthell, 2002)

How can we build a pedagogy that incorporates everything we know about learning styles and learning theory? If we look at computers simply as artefacts (not even as tools) we find that a number of affordances are built into the system that not only

support. but actively encourage, the learning process. The concept of multiple intelligences (Gardner, 1983) is supported through ICT use.

Verbal/Linguistic aspects of learning are strengthened through text input and output: the reading of information screens, error messages, instructions, documents and web texts. The ability of the learner to create text documents further supports this. When this is combined with the range of support tools built into the programs – spell- and style-checkers, wizards, style sheets and templates – learners find a deeper level of individual support than is possible in most classes.

The intelligences Gardner refers to as Logical/Mathematical are supported in similar ways, particularly when data can be transformed into graphical representations to facilitate understanding. The ability to manipulate numbers in a spreadsheet and observe the global changes effected by this – the ‘What If?’ function – enables an understanding of number that, for many learners, would otherwise remain an imperfect concept.

Visual/Spatial intelligences can be supported and developed in a number of ways though a range of programs and utilities designed to provide tools for creativity. CAD software is one such example, as are art packages, image manipulation and video editing software. All provide young learners with opportunities to learn and do things that their schools do not provide. However, beneficial though these are, the most fundamental impact that computer use can make is that of visualisation: using the transition from one screen to another (and the ability to replay it) as a means of recalling, contextualizing and reinforcing the learning that has gone on.

Piaget (1953) refers to the ways in which young children point at objects to link them, through language, to concepts. This ostensiveness is an important aspect of

Bodily/Kinaesthetic learning: when a learner moves the mouse cursor across a screen to reveal its contents, or when a drop-down menu is activated, this ostensive link between hand, eye and brain enables the transition from object to concept.

One recurrent media stereotype of a computer user is that of a solitary figure with a limited range of social contacts. This may not necessarily be the case – the interpersonal intelligence identified by Gardner may be developed through a range of online forums but, within a school context, is more often used as a coin of exchange in social contexts, where young learners come together to discuss their use of computers, whether it be for homework, to fix faults, to go online or to play games. In these contexts young people discuss a shared, abstract, virtual environment – a level of intellectual activity rarely utilised within their curriculum. Collaborative work in a classroom often involves a number of learners sharing a computer to complete a specified task.

The computer environment, then, supports a Constructivist approach to learning (Vygotsky, 1962). The way in which an ICT-rich environment moves the learner from parts to whole ideas and concepts, and in which learning is seen as a process, with feedback as integral to that process, involves the learner in the act of learning.

Reconceptualization

Something must be better than what often passes for education – and the utopian framing of ICT is often seen as the answer: teachers can be liberated from routine drudgery; learners set free to work autonomously and, in the words of Clynes and Kline (1960), routine checks and monitoring would be undertaken automatically, so

that the human would be free to create, think, feel and explore. Are Cyborg promises an updated form of the Delphic Oracle ...?

Young people use their computers as vehicles for the combination of motor skills, language and symbolic manipulation through practical activities. The software that they use predicates a greater range of possibilities as the activities for which it is used become more complex. Their relationship with their computers is dynamic. They are in a process of continual learning that they control. By contrast, their relationship with school systems that they may use is often restricted and static.

The Graphical User Interface (GUI) of the computer desktop environment and the plasticity of software present learners with the ability to innovate, and encourage them to experiment. The point-and-click environment that the learners utilise reinforces the power of ostensiveness, the operation of pointing, which in turn reinforces learning, through representation by imagery and perceptual organisation. The images are the translation into visual form of prior linguistic and mathematical rendering: learners use the icon as an entity in its own right – the ‘virtual reality’ of the semiotics of the screen.

ICT and Learning

From an institutional perspective, however, learning must be correlated with outcomes. For a number of years the Department for Education and Skills (DfES) in England and Wales has worked with the British Education Communications and Technology Agency (Becta) to assess the impact of ICT on attainment in schools. In general terms its findings were that ICT can make a significant contribution to teaching and learning across all subjects and ages, inside and outside the curriculum;

that ICT can provide opportunities to engage and motivate children and young people and meet their individual learning needs; ICT can help link school and home by providing access to teaching and learning materials, and to assessment and attendance data, from home and finally, that ICT can enable schools to share information and good practice in networked learning communities.

In specific terms the studies have shown that:

ICT can have a direct positive relationship to pupil performance – equivalent in some subjects to half a GCSE grade; shown that (*at Key Stage 2 – National Curriculum tests that are taken by all children in England at the age of 11 to determine attainment levels across a range of subjects*) schools with good ICT resources have better achievement than schools with poor ICT resources – even when compared with schools of a similar type, irrespective of socio-economic circumstance and irrespective of quality of management. (Becta, 2004)^{vi}

The Interactive Whiteboard Initiative.

Since 2002 the DfES has supported schools in the installation of interactive whiteboards as part of a series of projects designed to evaluate the most effective ICT tools for learning. The IWB initiative has been accompanied by a number of qualitative research projects that focus on the ways in which classroom teachers use the technology to greatest effect (Cuthell, 2004).^{vii}

Interactive whiteboards support a range of learning styles: those identified by Gardner (op cit) are embedded within the affordances of the technology: multiple intelligences of the learners can easily be built on and extended.

Interactive whiteboards, therefore, support learning that is essentially Constructivist in its process. Parts of the lesson build into wholes, and the progression from one page to another in the IWB software provides learners with visual scaffolding: they can see where they have come from, and where they are going. The ability to review previous stages of the learning experience grounds learners, who are then able to perceive learning as a process. Feedback is integral to this process.

A Social Constructivist interpretation of IWB affordances can focus on the shared problem-solving experiences when learners and teachers work through materials collaboratively. This is the true meaning of ‘interactive’ – it’s not simply the number of learners who move from their seat and physically interact with the IWB during the course of the lesson, but rather the process of interactions between learners, and with their teachers.

The visualised processes become the scaffolding of classroom learning, where the board itself serves as the background proximal zone of learning. A Communal Constructivist approach (Holmes et al, 2001) to learning, where new knowledge is constructed by the students and the teacher, becomes possible when the curriculum materials are enriched by spontaneous learning activities that draw in other resources to the lesson as a response to learners’ comments, suggestions or questions. When interactive whiteboards support learning in this way, the classroom becomes a Community of Practice in which learning is seen as a social phenomenon; knowledge is inseparable from practice and the ability to contribute to a community creates the potential for learning.

In summary, then, interactive whiteboards are tools that support a range of learning styles, whether learners are concrete or abstract perceivers. They are particularly

powerful in reinforcing visualization or observational learning. Attention is improved and retention is increased. Learners are more motivated and productive and learning becomes inclusive and participatory. The use of ostensiveness, in which pointing reinforces learning, enhances visualization, enabling learners to recall the stages of learning. The use of ludic elements – playful, fun devices - means that learning becomes fun.^{viii}

What Can Teachers Do?

All of the foregoing has identified both institutional problems and ICT solutions. For Ms Chips, who wants to deploy ICT within her teaching and has to do daily battle with unforgiving systems and logistical constraints, an obvious solution is to forge strategic alliances with like-minded colleagues and develop collaborative working practices. One of the most significant steps can be taken if a group of colleagues can share rooms and facilities. They can then begin to construct the kind of environment that they want to work in, and which they feel will optimise learning. Once this has been achieved it is a smaller step to develop digital resources and lesson frames, and the benefits vastly outweigh the time costs. Teachers can reclaim their creativity and create materials that meet the learning needs of their pupils, rather than simply the curriculum objectives of the system. They can become digital auteurs.

Teachers' Toolboxes

What can Ms Chips and her colleagues do, however, if ICT resources and access are still not sufficient? If they are totally determined to use ICT for their own teaching and administration, and provide as many opportunities for pupil learning as possible, then they should consider buying their own digital toolkit. For a relatively modest

sum one can purchase a laptop, wireless keyboard and mouse and a digital projector^{ix}. This means that, projecting onto a conventional whiteboard (or wall) and using a wireless mouse, Ms Chips can move around the classroom and present her pupils with whatever interactive materials she chooses. She has her own tools and resources for her own classes and learners.

The Teacher as Learning Consultant

In schools where there is a shared vision of the ways in which ICT is diffused and deployed to create effective environments and learning opportunities for all, colleagues can collaborate to create programmes and materials that will support all of their learners, so that the concept of ICT providing individualised learning for all can be realised. ICT management strategies will be geared to this end; purchasing decisions will be on the basis of effective use, rather than restricted budget demands and teachers and other education professionals will match resources to learner needs.

In the less-than-perfect worlds in which Ms Chips has to live and work, however, the ability to work as an independent professional is dependent on immediate access to whatever materials, programmes and display techniques are available. If she and her colleagues have their own classrooms then their equipment becomes a fixture in their learning workshops; if every classroom shifts with the vagaries of the timetable, then she will use her technology tools in whatever way is most effective. But they will be her choices: access will not be blocked by firewalls; data will not be slow to download from a server because of limited bandwidth and inadequate routers and, most importantly, her choice of these applications will be based on the needs of the learners, rather than the resources of the institution.

So How Could It Work?

Interactive content can be created through a range of functions in office productivity programs from Microsoft, Apple, and others. Presentation software can be used for far more than a linear delivery of content, and free software to create interactive content, such as Hot Potatoes (from Half-Baked Software: <http://web.uvic.ca/hrd/halfbaked/>) can be found on the web. In the UK a range of resources are available online:

TeacherNet (www.teachernet.gov.uk) is a useful source of information and case studies; Curriculum Online (www.curriculumonline.gov.uk) provides information about, and links to, a wealth of curriculum materials, many of which are free.

Curriculum and schemes of work can be downloaded from relevant sites – this means teachers can be up to date in terms of what they have to do, and they are independent: if details are needed they are there, on the laptop, rather than being ‘somewhere’ in a departmental file.

The latest research evidence can be found to provide professional legitimacy in the face of pedagogical challenges. Sites such as Becta provide access to the latest research finding; email lists such as the ICT Research Network (research@lists.becta.org.uk) and online communities such as MirandaNet (www.mirandanet.ac.uk) enable practitioners to share best practice and develop teaching into an evidence-based profession – rather than one relying on anecdote and stereotype.

Ms. Chips, with her laptop full of digital content for her classes, has materials to support a range of learning needs, from whole-class activities through to individualised work and reinforcement activities to consolidate learning.

Indeed, Ms. Chips and her learners can transcend the boundaries of the classroom through the creation of online communities of practice for her classes – workspaces, discussion boards, collaborative spaces and resource portals can all be built on a range of platforms. One of the most robust, available free world-wide, is Oracle's Think.com (http://www.think.com/en_us/), which offers a secure online learning environment that is fast, flexible, intuitive and designed on constructivist learning principles.

The administrative and management tools for that Ms. Chips and her colleagues need for their personal use can be proprietary, and link with the school's information management systems, or be customised from spreadsheets and databases. Indeed, the virtue of professional collaborative work is that the same format can be shared and used among colleagues, so that data is used as a powerful diagnostic and reporting tool, rather than simply one for recording performance.

Finally, a teacher with a laptop possesses all the resources for digital publishing in a number of forms – for print; for audio, for video, as images.

Conclusion

We have seen the problems facing many teachers as they try to implement ICT as a powerful tool for learning. In most cases these are institutional – and not intentional: simply the result of systems that are not flexible enough to contain the diverse needs of educators and learners. Even in the best of all possible worlds resource allocation struggles to keep pace with demand. When innovative use is thrown into the equation even the most sympathetic ICT co-ordinators find their time and patience stretched to

breaking point. In smaller schools, especially elementary or primary, dedicated ICT support is rarely on a full-time basis.

The solution that has been proposed, that of the teacher with her own digital toolkit: laptop, materials, projector, may seem extreme. In terms of costs and benefits, however, the price of independence is a relatively small one. For not only will Ms Chips be in control of her own teaching, and support her pupils learning needs, but she will also have independence from the limitations of her school system. For a current (March 2005) investment of £1,000 (€1,440) Ms. Chips will have tools that should last for three years. Not only that: she will also have the key components for a home cinema, should she be able to find time for leisure after work. And, of course, she will have a computer for personal use.

What Is Needed:

A laptop with DVD and CD drive, wireless keyboard and wireless mouse.

A digital projector for use in classrooms (and home).

Internet access for free resource materials.

A printer (maybe).

With this toolkit the new paradigm of Teacher as Digital Auteur takes the concept of collaborative work and learning out of the institution and puts it back into the hands of people – both educators and learners.

Ms. Chips can now work with the Cyborgs, rather than battle against them.

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Footnotes

ⁱ Literally, ‘put in the scene’ – a term originating in the theatre, then applied to the cinema, where everything that we see on the screen contributes to our understanding of the character and motivation of the individual.

ⁱⁱ “Les personnages n’existent que dans le mise en scene”.

ⁱⁱⁱⁱⁱⁱ What Bronach and the other authors were referring to in their paper ‘Learning Lockdown’ were the ways in which ICT networks and systems in schools were set up, and locked down, so that the system administrators and network technicians could control as many of the activities as possible. In this way activities not explicitly sanctioned by administrators were deemed ‘illegal’ or impermissible. This approach assumes an overall level of incompetence on the part of most users, and malice aforethought on the part of others. The reality, of course, is that those who want to get up to no good do so anyway, whilst the vast majority of legitimate users are hugely inconvenienced.

^{iv} A quick and dirty summary of Kant’s categorical Imperative: *Treat people as ends in themselves, other than means to an end.*

^v This has its own pitfalls: many teachers are seduced by surface polish to such a degree that they fail to read the content carefully enough. In many cases this is because they lack the technical proficiency themselves to understand what has been done. See ‘Why can’t teachers do IT? Cognitive dissonance’ In: Cuthell (2002) *Virtual Learning* Ashgate Aldershot, UK

^{vi} Examples of the evidence underpinning the ICT in Schools Programme (including reports in the ICTiS Research & Evaluation Series) may be found on Becta’s ICT research website: <http://www.becta.org.uk/research/index.cfm>

^{vii} A number of studies have looked at the effects of Interactive Whiteboards (IWB) on teaching and learning. See: Glover and Miller (2002, 2005); Becta (2005); Cuthell (2004; 2005); North Islington Education Action Zone (2003); SMART Education at

the University of Canterbury (2005); Smith et al. (2005); MirandaNorth IWB Case Studies (2005)

^{viii} Interactive whiteboards: case studies from the MirandaNet-Promethean projects, 2002 – 2005 (www.virtuallearning.org.uk).

^{ix} A laptop with wireless card and appropriate specifications for less than £500; a projector for less than £470 and a wireless keyboard and mouse for £27: all for less than £1,000. They should last three years, which means that the cost per term for a teacher is just over £100. That price buys independence and professional autonomy – as well as one’s own system for personal use. (Source: www.dabs.com, retrieved February 23, 2005.)