

Naace
The Education Technology Association



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Editorial Ramblings

In which your editor muses on the Education Bill and the future of ICT in the English National Curriculum

Some 200 years ago Thomas Paine noted that *“To argue with a man who has lost his reason is like giving medicine to the dead.”* With the cloud of spin, obfuscation, freely interpreted statistics, selective use of data and random citing of sources to fit ill-considered policies around the current Education Bill (and that from all parties), one can be forgiven for noting the prescience of Paine’s thinking. To fully discuss the potentially destructive aspects of the dogmatic, simplistic, philistine and Dickensian approaches advanced in the Bill would take a journal in itself rather than a mere editorial. I therefore refer you to the excellent blog article by Warwick Mansell available at <http://www.educationbynumbers.org.uk/2011/02/18/michael-gove-and-the-launch-of-the-education-bill/> . As an analysis of the struggle ahead this is hard to beat – but we still need to maintain the argument, apparent loss of reason at high levels or not.

The argument in question is nothing less than the future of ICT in English schools and thus of a critical aspect of a modern education and preparation of the skilled workforce this country needs in order to compete. ICT pervades business, commerce, communications, leisure, health and free politics – but, and despite 30 years of effort, not yet our schools.

Why, given the importance of ICT are we now forced to justify its role in education and the curriculum against a misguided philosophy that gives greater emphasis to Latin and Ancient Greek? After all, this is 2011 not 1911 and no longer do we need only to educate a chosen few to administer a now long lost Empire. High standards for all is our watchword

The naïve and simplistic response from some is to parrot the myth of the ‘digital native’, usually from the viewpoint of someone who has minimal grasp of the technology themselves, let alone an understanding of how young people use it. As Angela McFarlane informed us at the 2009 Naace Conference (<http://www.youtube.com/watch?v=81ucCBQ3DgA&feature=related>) this mythical child, naturally and fully versed in all aspects of ICT simply does not exist. Certainly young people use ICT in varied and often creative ways that are often self or peer taught, but this does not mean that they can do more than a limited range of activities that they find useful in their own lives.

Do we stop teaching speaking and listening because most children can talk, or reading once they can decode words (or bark at print)? Digital literacy, in its widest sense, is equally important and just because we observe children using technology is no reason not to teach them to use it effectively, safely and with a high level of skill and discrimination. We have to fight for ICT to take its place at the core of the revised National Curriculum, both as a learning tool and as a subject in its own right. On this point Rose in the

Primary Curriculum Review was absolutely right and his conclusions for primary apply equally to secondary.

In a sane world we would not even be having this debate other than to review the range of learning and associated pedagogies. To our economic competitors learning and teaching with and through technology is a no brainer as they look to the future rather than to classical history. Thus in the USA, *“We want to foster the excellence that flows from the ability to use today’s information, tools, and technologies effectively and a commitment to lifelong learning. All these are necessary for Americans to be active, creative, knowledgeable, and ethical participants in our globally networked society.”* (National Education Technology Plan 2010. U.S. Department of Education Office of Educational Technology).

In Hong Kong, the sandpit for Chinese educational development there is an intention to use, *“Information technology as a learning tool and resources,”* and *“To enhance focus on technology . . . e.g. Business Fundamentals, Design Fundamentals, Graphical Communication and . . . Computer Literacy,”* as well as, *“To strengthen the component of information technology through individual subjects . . .”* (A Holistic Review of the Hong Kong School Curriculum Proposed Reforms 1999). Meanwhile in the rest of Europe, *“Effective integration of ICT into education must go beyond replacing, streamlining or accelerating current practices. It should help to create new and more effective ways of operating and support teaching and organisational innovation. ICT is now embedded in our social and economic fabric; it should be similarly integral to education and training.”* (http://ec.europa.eu/education/lifelong-learning-programme/doc96_en.htm).

M’Lud, the defence rests.

But unfortunately we cannot rest. A robust response to the National Curriculum consultation is essential and all Naace members ought to do so at <http://tinyurl.com/6y76kea> before 14th April. Then comes the real slog, ensuring that the review committee has a clear and workable view of what modern and effective ICT in education should look like. This may not be as difficult as might be thought, as the recent Naace think tanks on the curriculum review were remarkably consistent in the views and ideas expressed and which could form the basis of a modern curriculum and schemes of work.

A number of key themes emerged which can be broadly summarised as:

- Technical knowledge of ICT systems
 - How electronic devices work (computers, phones etc)
 - Networks
 - Data storage
 - Programming and apps development
 - Security – data, virus, hacking etc
 - System life cycles
 - Embedded systems

- Data standards
- Organisation of data.
- Safe use of ICT tools and systems
 - E-safety education – staying safe
 - Legal issues – copyright, hacking etc
 - Environmental issues
- Use of core communication, graphical, modelling, media and control applications
 - Text based communication
 - Producing, editing and using graphics and photographs
 - Multimedia, animation, film and video
 - Web design
 - Games development
 - Modelling including CAD, spreadsheet etc
 - Controlling devices – programming
 - Problem solving
 - Online environments
- Digital literacy
 - Searching for information
 - Discrimination – sources and validity
 - Copyright and plagiarism
 - Social networking – design, appropriate use, ethics etc
 - ICT career paths and working life

Of course, these represent only the tip of a very large iceberg yet present a modern view of the how the current themes in the current programmes of study might be reinterpreted for today. The constant repetition of word processing, spreadsheets and presentation tools is significant by its absence! What these suggestions do is to bring both a rigour and a theoretical and more academic basis to a subject that some do not yet see as a subject. Others would argue that as a basic learning tool ICT should not be a subject anyway. However, with the view in certain quarters that “this is the age of the subject” the politics and the required response are clear – government makes the rules and we must play by them. Though as Machiavelli put it, *“I’m not interested in preserving the status quo; I want to overthrow it.”*

The status quo is the current outmoded content of the ICT curriculum and the misguided view that only ‘traditional’ subjects have value. We have to overthrow this, replacing it with something fit for purpose, as began to emerge from the think tanks. To do this we have to ensure that ICT is both a subject and a learning tool in the new curriculum. We must ensure that our young people are educated appropriately for a world that will, for many, be radically different by the time they start their working lives we have to be proactive now. The only way to fight off the threat of the curriculum undead is, in the words of Terry Pratchett, ***“carpe jugulum!”***

And so to this issue of Advancing Education. Keeping with the theme of the moment Adrian Mee asks, “Where Next for ICT” and offers us a challenge to develop an ICT curriculum for a network society and Sarah Pavey demonstrates how ICT supports 6th form students in developing their skills in writing academic essays. With austerity budgets hitting schools now is a good time to consider costs savings and we have Terry Freedman making the economic case for cuts in ICT spending (but read the whole article – there’s a twist) while you editor considers cost savings through open source and free to use Web 2.0 tools. We also include in this issue some case studies provided by Naace sponsoring partners demonstrating very successful work with schools.

It’s not all doom and gloom and these papers demonstrate that whatever the pressures good teachers and schools will always find ways to use ICT effectively. So, as the motto of Bugarup University would have it, “*Nullus Anxietas!*”

Paul Heinrich
Editor

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Views expressed in Editorial Ramblings are those of the Editor and do not necessarily represent Naace policy.

Reducing ICT Costs in an Age of Austerity

Author: Paul Heinrich

Executive Summary

The recent loss of Harnessing Technology Grant represents a reduction of some 15% in funding specific to ICT at the same time as other budgets are under threat and general costs are rising sharply. Schools will therefore need to re-visit their ICT budgets and seek savings if they are to continue not only to meet the growing expectations of learners but to maintain modern and effective ICT infrastructure, learning resources and management information systems (MIS).

This report suggests that schools seek to reduce costs by considering the adoption of:

- Open source software
- Free to use Web 2.0 tools
- Cloud based education services such as GoogleApps or Live@Edu
- Local cloud services such as an LA wide managed learning environment
- Aggregation of services and supply chain.

Schools will need to evaluate such approaches against a detailed analysis of their individual needs and future plans, using tools such as the ICT self review framework to support this evaluation.



1. Introduction

ICT development in schools has been very well funded over the period 1998 - 2010, though both BECTA and OFSTED studies note that even so only about 24% of schools make particularly effective use of the tools and services available. During the same period there has been radical transformation in how society as a whole uses ICT tools with massive impact on the way in which learners live their lives outside school - social networking, online shopping, instant access to information, instant communication and the ability to showcase their achievements to a wide audience. They do this often at low cost through powerful handheld devices such as smartphones as well as via traditional computers.

If we could not achieve near universal high quality use of ICT in education when money was plentiful how can we achieve this objective when budgets are being cut and many costs are rising sharply? The challenge for schools in the coming years is to ensure that the ICT facilities and tools available can meet the rapidly increasing expectations and demands of users, keep up to date with the technologies available while at the same time continuing to develop ICT use across a changed but dated curriculum.

ICT remains an integral part of the wider learning experience for everyone and while not as high profile for the present government has not been abandoned. BECTA may have disappeared but many of its functions have transferred to government departments - the ICT self review framework and associated ICT Mark for example is now within the DfE itself while procurement frameworks lie within the Department for Business, Innovation and Skills. The new curriculum from 2012 will include ICT both as a subject and a cross-curricular tool for learning. Any teacher or school that thinks that the future will see a return to 1960's chalk, talk and worksheet has not grasped the realities of the modern world. We need to use more ICT rather than less and use it more effectively both to ensure learning gains and to reduce management costs.

2. Costs and the potential for reduction

In any school with a well managed infrastructure and a rolling budget for replacement and upgrade of hardware, software licenses and SLAs there will be a number of fixed costs. Some of these can be reduced significantly and others marginally while there is little scope with some largely externally provided services. The potential for cost reductions will vary between schools.

2.1 Starting Points

The costs of ICT for a typical school include:

- Internet connection
- Curriculum network infrastructure - cabling, switches, servers etc
- Admin network infrastructure
- Hardware - desktop PCs, laptops, handheld devices, data projectors, IWBs, printers, cameras, camcorders, control devices, microscopes, visualisers etc

- Software licenses (for MIS, mail, office, general and curriculum applications, learning platform services and other online services)
- Technical support including technician costs, SLAs etc.

2.2 Can these costs be reduced?

- Internet connection - probably not, unless bandwidth and quality of service are reduced. High quality, filtered and synchronous connectivity is essential and large primary schools in particular will require greater bandwidth in future.
- Curriculum network infrastructure - requires regular update and replacement of switches (every 4- 5 years), server upgrades every 2 years with replacement by 4 years. While upgrade and replacement can be delayed these regular costs cannot be avoided while most ICT tools are provided within the school. Cloud computing potentially offers savings.
- Admin network infrastructure - as for curriculum
- Hardware - desktop PCs have a life of about 5 years assuming some interim upgrading, laptops 3 years, data projectors 4-5 years, IWBs 7 years etc. Low cost items - cheap curriculum cameras, camcorders, microscopes etc should be considered as disposable and therefore revenue cost items.
- Software licenses - no choice here if expensive licensed software is used (including paid for learning platforms). However, considerable savings are possible using open source software e.g. Open Office and cloud-based online applications.
- Technical support including technician costs, SLAs etc. - again unavoidable with traditional approaches but with significant scope for saving via cloud computing approaches.

2.3 Routes to significant cost reductions

There is no simple route to reducing ICT costs. However, the following are worth considering.

- Infrastructure - a single network for both curriculum and admin purposes.
- Hardware - life is extended if using older units as web terminals for accessing cloud based applications and tools.
- Software - use of Open Source tools such as Open Office to replace paid for licensed applications. Again, the cloud route also reduces such costs. Pooled ordering can lead to discounts for education specific applications.
- Technical support - outsource at least for specialist services such as server technicians, either from other schools or the private sector.

2.4 What About Students Personal Devices?

For many schools encouraging and enabling learners to use personal netbooks, tablets and smartphones to access learning represents a fundamental change. However, it is increasingly the case that learners have increasing access to a wide range of devices capable of accessing both local and especially cloud based resources and if the school is unable to fund adequate infrastructure itself a strong case can be made for enabling pupils to use their own.

This raises many issues including security and e-safety but in the case of smart devices connecting to the cloud via 3G some issues are already beyond the control of the school while access to school services can and should be via a secure single sign on. The other main issue concerns parity of access i.e. how do we ensure that all learners can have a device and here schools need to look at creation of a local e-Learning Foundation - leasing devices to families. Support for this is available from the e-Learning Foundation - see:

<http://www.e-learningfoundation.com/> for full contact and other information.

2.5 Cloud computing

Cloud computing is a generic term for remote services such as GoogleApps, Live@Edu, Wordpress etc. Basically applications are run on remote servers hosted in large data farms and accessed via the Internet. Providing the school has good Internet access and fast internal network a basic computer or device with web browsing capability is all that is required. The mission critical element is the quality of the Internet service.

Some cloud services, such as those mentioned above are effectively free to schools. However, schools can also run their own cloud services by purchasing 'pay as you go' packages from appropriate providers. A useful basic paper prepared by the Independent Schools Council can be found online at:

<http://blog.isc.co.uk/2010/03/08/ict-advice-cloud-computing-explained/> .

Cloud computing, whether a free or paid for service offers the following:

- Reduced and/or simplified expenditure on software licensing - With services such as GoogleApps for Education and Microsoft's Live@Edu/Office 365 provided free for education license costs are not an issue. Similar charged for services will also become available.
- Less reliance on school-based ICT staff - when fewer applications are hosted locally technician costs can be reduced, with specialist skills diverted to local network and infrastructure requirements.
- Enabling greater ubiquity of access for students and staff - effectively any time anywhere access, which is what learners now expect from other ICT tools. Cloud computing provides a powerful and effective way of achieving

this.

- Reduction or elimination of problems associated with software version control and updates - with cloud-based applications these are done by the service provider. There are no problems with varying versions within the school and between school and home.
- Leveraging benefits of shared management systems (LMS, SMS etc) - management systems used to make the running of schools more efficient can be more trouble than they are worth. Using cloud-based applications, or virtualising these services e.g. within a local authority portal or MLE, reduces the level of investment required in both capital costs of hardware resources and in software licensing. Other advantages include system interoperability allowing seamless transfer of data (with appropriate permissions) between systems so that student learning can continue uninterrupted.
- Enables experimentation, choice and agility in terms of applications used - consider the rapid adoption of Web2.0 technologies beyond school compared to what happens on the inside. Cloud-based services and applications provide for more nimble, agile use and access - allowing lots of smaller products and services to be 'tried out' without the requirement of a large-scale commitment.
- Reduce barriers to participation, contribution, sharing - identity and access management can be resolved readily in a cloud-based world, enabling greater shared access across and amongst systems and applications.
- Infinitely expand resource sharing opportunities - schools have long had problems in keeping software and services up to date and relevant. Cloud computing provides unlimited opportunities for shared repositories to develop, with access rights and management issues addressed on a wider scale than within an individual school.

3. Free Cloud Services for Schools

Schools may consider the use of cloud services in a number of ways, from simply using quite basic Web 2.0 tools to replace paid for applications, integrate specific tools such as Live@Edu/Office 365 or GoogleApps or use these and add additional Web 2.0 tools such as learning platform functionality.

3.1 Basic Web 2.0 tools

A very detailed list is available from <http://cooltoolsforschools.wikispaces.com/> and this should be a starting point for exploration of what is available and suits as schools particular needs. Personal favourites include:

- Aviary (complete suite of online creation tools)
- GoogleSites (See below)
- Prezi (presentation tool - what PowerPoint ought to be)
- Animoto (builds video clips from pictures, sound and music)
- LetterPoP (create professional looking newsletters and brochure)
- Openzine (create online magazines)
- Glogster Edu (create multimedia pages for websites)
- WebPoster (create and publish lessons, worksheets etc)
- Yola (website builder requiring no technical skills)
- GoogleDocs (See below)
- Wallwisher(create notes on your own workspace wall)
- EtherPad (and other shared realtime word processors)
- Lefora (free hosted forums with moderator tools)
- DropBox (File sharing)
- Wikispaces (Wiki)
- Wordpress (High-end blogging)
- Edublogs (Secure classroom blogging)
- Primary Blogger (As it says on the tin)
- Flashmeeting (Simple small group video conferencing)
- WiziQ (e-learning with web conferencing)
- GoogleApps for Education (As below)
- Pixlr (Photo editing - look, feel and functions of Elements)
- Google Sketchup (3D sketching software)
- ComicMaster (Comic strip creator)
- Chogger (Comic strip creator)
- TuxPaint (Painting package)
- GoAnimate (create cartoons and animations)
- Bookr (create books with turning pages)
- ClassTools (create interactive flash games)
- MyStoryMaker (story writing)
- Jam Studio (Music creation)
- Webspiration (online version of Inspiration)
- Zamzar (online file conversion)

Example (using the conversion)

- iSpring (turn PowerPoints into flash.
- Yacapaca (Create quizzes, surveys, tests, eportfolios and more)
- Hot Potatoes (Free lesson construction software to build a teaching website)
- GoAnimate (easily create animations and share with friends)
- ClayAnimator (A simple to use animation program)
- Scratch (a programming/control language - create games etc)
- Weebly for Education (free website and blog)
- SchoolRack (create a free teacher website or blog)
- Live@Edu/Office 365 (full function cloud services)

The downside with these and similar resources (see the website <http://cooltoolsforschools.wikispaces.com/> for details) is that they come and go - firms close down or are taken over, better tools come along or fashion changes. And of course each site requires a specific user id and login which can cause management problems for teachers. As with all free tools schools and teachers do not have the level of local control that they are used to. However, these are the types of tools that young people worldwide are using outside school. There is no reason not to use them in school while accepting the obvious limitations - after all, they are free!

Those who have read this far and explored the range of resources available on <http://cooltoolsforschools.wikispaces.com/> will realise that it is possible to put together many of the most used learning platform tools by drawing on the list above. The downside is that instead of having a single, easily managed environment the school ends up with a mishmash of tools rather than a single, structured portal. However, for schools not currently using the full range of learning platform functions careful selection of resources such as basic wiki, forum and web page creation tools may fulfill their basic needs.

3.2 Free Portals

Two main integrated suites of resources are available to schools - GoogleApps for Education and Microsoft's Live@Edu/Office 365. Both offer an evolving set of free online tools specifically designed for education. Note that there are other services available such as ZoHo. However it is likely that schools will only wish to work with the major players since these are likely to have both longevity and a road map for future development.

3.2.1 Live@Edu (evolving into Office 365)

Full details can be found at <http://www.microsoft.com/education/solutions/liveedu.aspx> .

The key features of this service are:

- Office Live Workspace/Office 365 - for personal and collaborative document editing.
- Skydrive - providing 25 GB of Internet based file storage
- Windows Live Spaces - web space (pages) for sharing information and ideas using documents, blogs, discussion groups etc.
- Addition features include Windows Live Messaging and Windows Live Mobile.
- A recent feature is a free plug in for the Moodle learning platform enabling Live services to be accessed directly with the Moodle implementation.

3.2.2 Google Apps for Education

Full details can be found at <http://www.google.com/a/help/intl/en/edu/> and an FAQ is available at <http://www.google.com/support/a/bin/answer.py?hl=en&answer=139019> .

The key features of this service are:

- Integrated communication tools - Gmail with 7 GB storage space, calendar and GoogleTalk. Postini filtering and message security (which caused problems with Gmail within ItsLearning) are available as charged extras.
- GoogleDocs - create and share online documents, presentations and spreadsheets.
- GoogleSites - create websites and secure group wikis.
- Groups - create mailing lists and discussion group
- Video - Securely host and stream video
- Additionally many other Google tools can be made available.
- Schools can use their own domain name and customize the interface with their own branding.
- Google also offer teacher training and development to support schools rolling out Google Apps for Education.

4. Issues to consider

At first glance all of the tools discussed above offer valuable resources. However, are they really and alternative to paid for services designed for education?

4.1 Cost

Certainly the basic services are free but providing essential levels of security may be subject to unspecified charges

Certainly the basic services are free but providing essential levels of security may be subject to unspecified charges. Further, while the service is free at the point of use the school still has to be aware of the management costs - a technician still has to provide local user support, staff will require training etc. These costs need to be looked at in the context of your particular school.

4.2 Security and e-safety

There are two issues to consider. Firstly the security of data held in free services requires consideration, especially pupil level data. BECTA published detailed guidelines now archived with the National Archives at <http://tinyurl.com/25g5h8a>. While both Microsoft and Google set out their security policies and have 'Safe Harbour' agreements with the European Union it is important to remember that schools have no actual contract, they merely sign up to the suppliers terms and conditions.

There is the further issue of e-safety. Although both Live@Edu and Google Apps for Education are under the control and management of the school they are not school provided services and neither are additional security and safeguarding tools necessarily free.

4.3 A Replacement for paid for Services?

Taken at face value the answer is yes and this seems to be a general view amongst institutions large and small that are using them. However, bear in mind that you do not control these services you merely have a license to use that can be changed at the whim of the provider. The service could be withdrawn at short notice or charges suddenly imposed for example. With a paid for service the school will have an enforceable contract that sets out all costs, conditions and service standards.

Free services can be cheap, cheerful and immensely powerful but are not risk free. Schools will need to assess whether risks outweigh advantages.

4.4 Can Free Services Replace a Learning Platform?

This depends very much on how the school uses its current learning platform services. If using a full function learning platform enabling work, assessments etc to be allocated to specific groups or pupils at particular times, for work to be handed in online, marked online, data ported to online mark books etc and for those learners to also have full e-portfolio facilities then you need to look elsewhere. Quiz, survey and other assessment tools can only be found in the better commercial learning platforms. However, such facilities could be provided alongside free to use services via e.g. Moodle. However, while Moodle is free to download it requires servers, design and management, training and technical support, all of which incur costs. It would also need to be integrated into some sort of portal offering single sign on to avoid the ongoing issues arising from multiple user identities.

However, in seeking to minimise costs while meeting core requirements schools need to reflect on the tools they actually do use and whether, at this stage, they need facilities that are not currently exploited. Experience suggests that the main learning platform tools actually used in schools are forums, wikis and web space, all of which are available within the two main free to use services. However, to use only these tools is extremely limiting - the full value of a learning platform is not being exploited.

5. Where next?

Firstly schools need to review their overall ICT provision against the ICT Self Review Framework, taking into account potential curriculum changes forced by government over the next year or so. They should then evaluate priorities in terms of learning and teaching requirements before planning for services and infrastructure to support these.

A range of possible cloud solutions can then be considered, from a fully managed and integrated suite of services for all schools to a mish mash of free services 'managed' by a teacher or technician in an individual school or some point in between. Thus the spectrum of services might range between:

- LA portal combining MIS, data transfer, email, calendars, website(s), wikis, forums, parental engagement tools, learning platform, all behind a secure single sign on. This could utilise free to use services (GoogleApps, Live@Edu with a locally managed Moodle learning platform tool - the Moople solution is interesting, see <http://www.moople.net/> .
- A school controlled version of the above (less the MIS services) - GoogleApps or Live@Edu at the core with a school choice of learning platform e.g. UniServity Life (which will integrate) or the school's own choice such as Moodle. Parental engagement and online reporting could take place via the learning platform.
- School controlled use of GoogleApps or Live@Edu without the addition of full learning platform capability. Online reporting though not full parental engagement could be provided by e.g. TASC Insight. MIS remains school based.
- School adopts GoogleApps or Live@Edu for email, website and calendar purposes, making some use of wikis etc and does not bother with online reporting. MIS remains school based.

Assuming that a total service can be agreed and procured at an acceptable price and with similarly acceptable revenue

costs to schools there are very significant advantages in terms of reducing MIS costs, reducing school level technical support and management costs and in ensuring a coherent, transparent and efficient service for all schools. Costs of learning platform provision with an LA MLE would be significantly lower than would be the case were schools to procure individually. Schools would have a quality service defined by a robust service level agreement and clarity on costs for the duration of the contract period, thus providing budgetary transparency.

However, not only does this solution require all or a very significant majority of schools to opt in but it also negates the opportunity for schools to select their own choice of learning platform (or none at all). There is also the question of the overall procurement cost of an LA portal/MLE since this would almost certainly require a full OJEU process due to the contract value.

Option 2 reflects the evolving situation in some schools where either Google Apps or Live@Edu services have already been explored or in some cases adopted. These schools continue to use the existing provider (UniServity) for learning platform services and as with others remaining with the service to the end of the contract will be able to migrate to the new UniServity Life product which will integrate with them. There is also the option for schools to evaluate other learning platform providers including the Moople solution (<http://www.moople.net/>), though costs of migration and retraining need to be considered. These will not be insignificant and will lead to some disruption to learning and teaching during a transition period. Schools will still need to host and manage their MIS on site unless there is an option to buy into this part of the LA MLE only. Schools considering this approach will need to evaluate the comparative costs and school level overheads compared to use of the proposed LA service.

Option three provides a school with basic services only - basic email, calendar and website for staff and admin purposes plus pupil email and the ability to upload resources in the most common formats. SCORM packages would not be usable as these are designed to integrate into a learning platform. For a school satisfied with being in the lower quartile for standards of ICT provision or with very serious budgetary issues this could offer an interim solution. Again MIS costs continue to fall directly on the school.

Option four, if adopted and evaluated against the ICT self review framework results in a judgment of unsatisfactory provision.

6. Conclusions

In order to meet the future expectations of learners, teachers and government schools will continue to need a robust flexible infrastructure capable of routine upgrading to meet increasing demands e.g. improved wireless capability to cater for pupil's personal devices. Above this technical layer, and considerably more important lies the online learning environment, accessible from any web connected device and available 24/7/365 i.e. it's there whenever and wherever the learner wants to access it whether on the bus home via a smartphone, the home games console, a public machine in a library or their own home laptop. Access needs to be universal and not constrained to particular buildings, locations or times.

Thus a cloud approach would seem to offer the most cost effective solution. Infrastructure and technical support costs at the school end are reduced, with the added advantage that a longer life for some hardware reduces the carbon footprint. If using free services the cost of providing many core functions is reduced, if not to zero (there are still some management overheads) then very significantly compared to localised provision. Each school will need to evaluate the potential for savings.

Some services will still need to be either managed locally or bought in. School management information systems (MIS) are almost universally school located with expensive servers and software licenses. These will almost certainly be cheaper if hosted in, at the minimum, an LA level cloud. The other core service is that of a learning platform including tools for parental engagement and reporting. Historically best value in cost terms has resulted from an LA wide procurement for all schools and this remains the most cost effective approach when existing contracts come up for re-procurement. It is. However, it is essential that future services are flexible enough to meet the increasingly varied needs of schools and learners and can adapt and develop as technologies and demands continue to evolve. Again, a large provider has the capital, technical team and expertise to move such services forward quickly and effectively in a way not possible even in a large school.

Despite government rhetoric regarding freedom of schools to innovate this is still best done in partnership with others and the larger that partnership the better value can be obtained from suppliers. As with the SEGfL service rail these suppliers must enable contracts that allow schools to select and buy only those services that they need while at the same time bringing overall economies of scale. Only an LA or a large school consortium is likely to be able to negotiate and manage such a contract, particularly if the OJEU process is necessary.

While some, larger schools, will no doubt prefer to provide their own systems and services, using a mix of locally managed and cloud resources the majority and particularly those in the primary phase can only make essential cost savings through joining together in an LA managed learning environment provided that these can be clearly demonstrated in relation to the level of services that schools require with regard to expectations for good or better overall provision of infrastructure and services.

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Paul is currently a local authority ICT Adviser but will become an independent consultant in September 2011. This paper was written in January 2011 to inform decision making in LA schools.

Visualiser technology enhances learning for all pupils

Thank you for editing the entry. This is how the edited entry will appear in the database.

Author: J Robinson, Matrix Display Systems Ltd

This case study had been provided by a Naace Sponsoring Partner

A visualiser is a digital presentation and teaching tool that connects directly to a large screen such as an interactive whiteboard (IWB). When an item is placed onto the visualiser viewing plate it is enlarged onto the IWB for everyone to see. It allows all types of content to be shown from a pupil's work, a 3D artefact, or the various steps of a science experiment. Users can then zoom in and out on intricate details, move the head of the visualiser to give different views and angles, take photo still shots and annotate over the image (For those of you who need a low tech definition, think of it as a small video camera on a long, moveable arm).

Matrix Display Systems, a specialist audio visual supplier for education, collaborated with Local Authorities and schools across the UK to pilot the use of visualiser technology and explore new ways of complimenting existing teaching practices. Three hundred schools trialled Elmo visualisers in their classrooms for a ten week period to see how it aided teaching children of all abilities.



Immediate feedback from the project was that teachers found the visualisers improved lesson content impact, and pupil engagement. It was apparent the children appreciated that they could all see what was happening; whilst accessing images instantly made their experiences feel real and practical. One teacher from Archbishop Sumner C of E School, commented about visualiser technology: "The Elmo is an incredibly useful piece of equipment within the classroom and has been used on a daily basis for a number of different activities."

Although each school adapted their use of visualisers to meet their own setting, a core set of benefits emerged which included:

- Demonstrations can be made to the whole class without the need to crowd round
- Objects and text can be enlarged, which is especially beneficial to students who are visually impaired
- Preparation time is reduced as there is less need to scan books and other resources
- It is ideal for showing tools and techniques that are difficult to demonstrate to a group such as the use of a protractor in a maths class or shading techniques in art class
- It allows immediate peer, self and teacher assessment during a plenary by showing the children's work
- A simple and effective way to produce animation and easy for the year group to access
- Live content can be shown in real time, as it happens
- Pupils work can be recorded as it develops to form part of an evidence bank



Mr Lewis Smith at George Watson College summed up how teachers and pupils that have used an Elmo visualiser in their classroom feel: "It's really good for showing and annotating pupils work to the rest of the class and for live marking pupils work. I love it, the children do too."

Aynsley Special School

Visualisers are also particularly useful for those looking to ensure that their use of technology includes all pupils. Aynsley Special School in Stoke-on-Trent is a school for children with moderate learning difficulties. The lower school consists of around 30 children ranging from nursery to year 6 who explored the use of the visualiser in different areas of their curriculum.

Literacy

- The visualiser enabled the teacher to make little books into big books by enlarging them on the screen. Shared reading could be done using books that would not normally have been included in lesson planning.
- Children could follow letter formation in handwriting using their magic pencil whilst the teacher writes, everyone can see and follow as the teacher is not standing in front of the board blocking the children's view. The letter formation was



videod using the visualiser and played back so the children could copy it.

Numeracy

- Counting with small objects took on a whole new dimension as little bugs became huge monsters on the screen and the children screamed with delight as they counted them!
- In the lesson on the topic of time children were encouraged to bring a watch in from home to place under the visualiser so that they could study its moving hands.

History

- The children looked at tiny Chinese artefacts, they could get a real insight due to the ability to view objects from many different angles. The pupils were fascinated by the detail they could see.

Geography

- Pupils used the visualiser to focus in on areas of a world map to find China and surrounding countries. It enabled large scale images to be shown effortlessly.

ICT

- Teachers taught the basic use of an Elmo visualiser to all children to which they responded with enthusiasm and skill. They were all able to zoom in and out, auto focus and switch between applications.

Throughout the term, Aynsley school encouraged children to bring things in from home or to look for things outside which they would like to view using the visualiser. This proved very popular and the items brought in ranged from a piece of dirt to an ancient coin.

A teacher at Aynsley school said “The Elmo visualiser has been used cross curricular with fantastic results. We were amazed at how skilled the children became with visualiser and how they used it independently with such care. They understood its role within the classroom and often suggested how it could be used during a lesson.”

All the children were very eager to show their own work at the end of the lesson which was fantastic for raising not only the standard of work produced, but also their confidence and their speaking and listening skills.

Swiss Cottage Specialist SEN School

This school is recognised as one of the most successful schools in the country with 150 learners, aged 2-16 years, with a range of learning difficulties and associated needs. Swiss Cottage found visualisers greatly increased interactivity with children and improved their concentration. Pupils commented that they had great fun with the visualiser and it helped their understanding in the classroom.

The lesson plan below for a key stage 3 SEN group was a perfect example of how children SEN can interact and improve their understanding through using a visualiser.

The lesson objective was to understand the concept of doubling numbers. This was done by placing a large picture of a double decker bus under the visualiser camera and enlarging it onto the interactive whiteboard. Children then placed small cut out people onto both decks of the bus. The pupils could alter the number of people and move them around, learning how to make the number of people on each deck of the bus match and be equal.

The benefits of the visualiser in this lesson were identified as follows:

- All pupils could very clearly see the problem
- The pupils were able to get involved in a physical activity to support their learning
- Being able to see the problem in a physical sense helped the pupils understand the concept of doubles and near doubles
- All pupils engaged in discussion and problem solving re doubles, near doubles and totals
- There was no shadow when pupils approached the interactive whiteboard

The main improvements that the school observed in SEN pupils as a result of using the Visualiser was their engagement, attention to detail and the ease at which they could share work. Moira Gifford from Swiss Cottage School said: “We use them in many ways and all the teachers seem to think they are one of the best bits of equipment we have.”

As a result of the pilot in both mainstream and special schools Matrix Display Systems has gathered a range of information about the uses and benefits of visualiser technology which will be shared amongst other teachers to



information about the uses and benefits of visualiser technology which will be shared amongst other teachers to enhance lesson planning. Here are some general tips on getting the most out of visualisers:

- Ensure that staff and pupils are comfortable with the existing display technology in the school (i.e. Interactive whiteboard).
- Think carefully if you require a visualiser which has its own light source (these are more versatile although they do cost more)
- Make time to see the technology being used, such as visiting a school that has already embedded the technology or asking for a free demonstration at your own school from Matrix Display Systems (email jodierobinson@matrixdisplay.com)
- Can the images/videos created by the visualiser be shared easily? Usually they can be saved straight to a laptop, the interactive whiteboard or an SD memory card for use at a later date.
- Skill the children up in their use, the visualiser you purchase needs to be robust enough for everyday use but resources last longer when those using them know what they are doing!
- Consider how the visualiser will be connected to your display device (IWB), a docking station will allow the user to shift from laptop-dvd-visualiser seamlessly
- Spend a little time looking at when you will use your visualiser over the coming year. A little planning and preparation can yield fantastic innovations in the use of visualisers.
- Pair staff who are ICT literate with those still developing their skills to ensure consistent use within the school.
- Facilitate teachers sharing their ideas on using a visualiser within the classroom



To conclude, ICT resources are like any other resource used in schools, the key to getting the most out of them is a clear plan of how they will be used which ensures children are placed at the centre of learning. Used properly visualisers can ensure that the potential gains hinted at when schools were persuaded to invest in interactive whiteboards (increased pupil engagement, reduced preparation time, improved results) are now realised. The trick to ensuring that they don't become another item cluttering up your desk, is to get the children on board. Once they have been allowed to share their work, interests and ideas using visualisers; they won't let you forget about using them.

For more information please contact Matrix Display Systems specialist education team on 0845 2626 200, email jodierobinson@matrixdisplay.com or visit www.matrixdisplay.com

Naace

Essay Writing Goes Mobile at Box Hill School

Author: Sarah Pavey MSc FCLIP, Senior Librarian

Abstract

Many students arrive in the 6th Form with no previous experience of writing an academic essay and yet it is a skill demanded by many baccalaureate based qualifications and essential at university level. At Box Hill School we have developed some techniques using mobile learning together with other IT applications to flatten the learning curve.

Introduction

Box Hill School¹ is a co-educational independent boarding school for 11-18 year olds located in rural Surrey. The school was founded in September 1959 by Roy McComish, a housemaster and art master at Gordonstoun School² in Scotland. The School follows the philosophy of Kurt Hahn the founder of Gordonstoun and an experimental educationalist. It is a founder member of the "Round Square"³ and as such is committed to internationalism. Round Square is a worldwide association of more than 80 global member schools and 26 regional member schools on five continents which share a commitment, beyond academic excellence, to personal development, taking responsibility and serving others.

The 425 students at Box Hill School are drawn from 37 nationalities. Not surprisingly, in 2008 the decision was taken to abandon the traditional English syllabus in favour of International General Certificates of Education (iGCSEs) and the International Baccalaureate Diploma (IB) for students aged 16 and 18 respectively. However, at this time the school had no library, having disbanded it in favour of IT suites six years previously, due to pressure on teaching space. The IB Diploma programme demands a library and strongly advises the employment of a teacher librarian with particular reference to the requirements of the extended essay⁴. The latter is an essential part of the Diploma qualification and has to be passed at a minimum Grade D.

As Librarian my remit requires me to try and implement information literacy policies throughout the school. I decided, on appointment, to begin with the new IB students in the 6th form and in particular to focus on the extended essay.

The challenge

Many students these days arrive in the 6th form with no previous experience of essay writing and little understanding of research skills. To meet the requirements of the extended essay⁵, students have to liaise with a supervisor in a subject area they are studying and formulate a question. Typically they will investigate the arguments on each side of a debate and write up their findings using an academic protocol referring to literature sources. This presents a steep learning curve for them.

As Librarian, I realised I would have to create lesson plans to teach essay planning, research process and plagiarism awareness. Because these areas were not strictly curriculum based I needed to find ways to communicate the principles that were easily assimilated and yet helped students understand the importance of taking the issues seriously.

At Box Hill school many students have English as a second language and others may have special needs such as dyslexia. Writing is therefore a challenge and as Librarian I observed that many felt hindered by the physical process of getting their thoughts onto paper. Understandably frustration and boredom could set in as a result.

Teaching was conducted through two short assembly sessions and when working with small groups or individuals with their supervisors.

The practicalities

In communicating the information to the students I wanted to find a method that fitted easily into their lifestyle and the obvious pathway seemed to be to take advantage of mobile technology. In particular, I had been inspired by Andrew Walsh's work at the University of Huddersfield.⁶

It was important to underpin a number of essential factors. Foremost was stressing the need to be wary of plagiarism and to give credit to all sources used in the essay.

Explaining the referencing protocols students could use was potentially very "dry" and so I developed a number of ways to make this information more accessible. A booklet was produced outlining both the Harvard and British Numeric (footnotes) methods of referencing but on these booklets I printed QR codes⁷ which linked to Authorstream videos I had made showing the process more dynamically. QR codes can be read by mobile phones that have a link to the internet. They are free to create and free to read. It gives an opportunity for the student to have both the printed booklet and access to a video at the same time. Figures 1 and 2 below show these codes.





Figure 1: Harvard Style Citation



Figure 2: British Numeric Style Citation

However some information that was given to the students was not available in a printed format. I did not want to overload them with paper that might get lost or just be binned because it did not seem relevant at the time it was delivered. To combat this I added a page on referencing to my NetVibes pages.⁸ This not only gives links to the videos above but also included a link to a plagiarism game, the code for which is given in Figure 3 below.



Figure 3: Jail or Freedom Plagiarism Game

I felt it was also important to remind students of the criteria upon which their extended essay would be assessed. Again I designed a booklet which guided them through the research process and outlined the mark scheme. This also gave useful information on statutory requirements such as the word count, layout etc. I also wanted to give them this information in a more interesting format and so devised a quiz using the mobile study website.⁹ By creating a QR code and placing it on the printed extended essay booklet this quiz can be downloaded as a game onto a mobile phone - see figure 4 below.



Figure 4: Extended Essay Quiz

NetVibes is an excellent way of collating information together so that it can be retrieved from just one site and also has the advantage of having a mobile phone App. so the information is portable and available at the point of need.

Our NetVibes pages also provide a link to Turnitin¹⁰, the anti plagiarism software. All students are encouraged to put their final draft essay through this program. The results are then used as a teaching aid to show students how to take quotes, how to paraphrase and how to reference work correctly.

I have found Mobile phones extremely useful in guiding students in research too. Writing down bibliographic references can be very tedious especially when the focus is on finding information. The discipline needed to record accurate information at this stage can thwart the ideas generation process. To make it easier I show students how to take a photograph of the bibliographic data page of a book or magazine and then to message it back with an explanatory note. Because students tend only to use a few book resources it is easy to keep track.

Note taking can also slow down the thought process and so I encourage students, particularly those with English as a second language or special needs, to use their phone to record. I suggest that they read a chapter, paragraph etc and then close the book and dictate their own knowledge into their phone. Then at a later time they can play back the recordings as they write up their essay. This simplifies the information gathering process.

Many academic databases that we subscribe to eg Questia¹¹ also have a mobile App. making access easier. Our NetVibes page also has links to these resources.

Another common mistake made by students is that they assume the essay writing process needs to be linear. I have tried to overcome this by introducing essay writing using a bespoke jigsaw puzzle I have created. This helps students to understand the construction of their essay and also to realize the stamina they will need to complete the work.

Following this I suggest the use of physical or computer based folders to store information as they research, underlining the fact that copy/paste at this stage is perfectly acceptable. Recently I have been suggesting the use of OneNote¹² to record information. The latter has the advantage that it can store information in many formats and also keeps track of where the information has been obtained. The Figure 5 below shows this process:

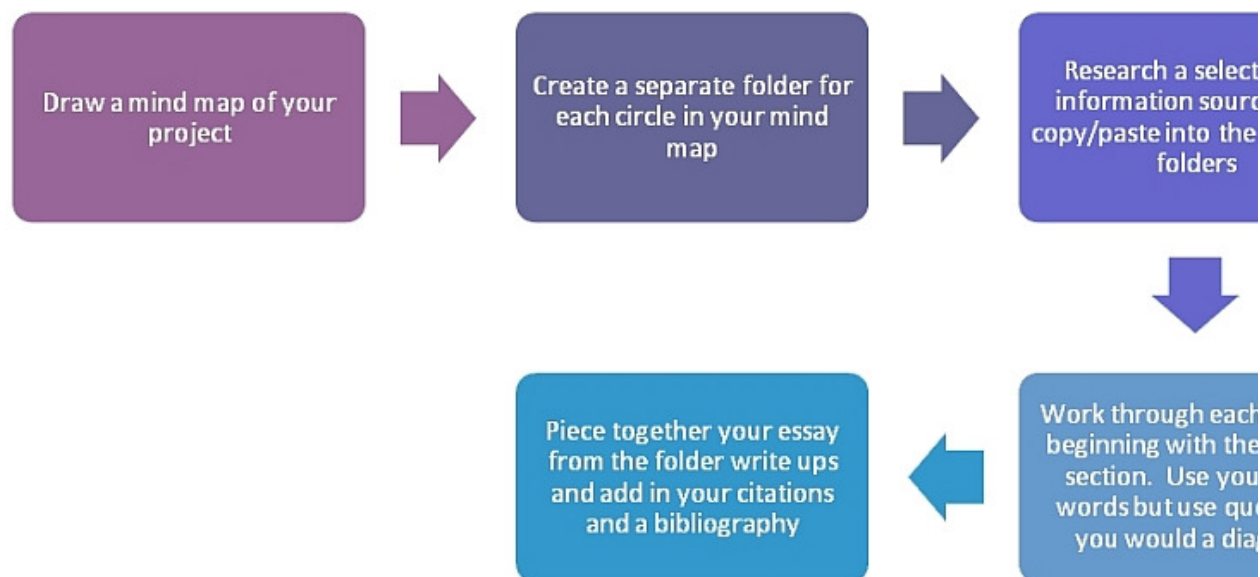


Figure 5: Essay Writing Using OneNote

The OneNote App. is semi developed for smart phones and will allow the phone to sync with OneNote on the desktop but unfortunately at the moment the phone app. can only deal with text. This will no doubt be developed in the near future to provide full functionality which will be an extremely powerful tool for research methodology.

Conclusion

Getting 6th form students to understand the research process and the difference in approach needed for an academic

essay as opposed to a project write up is a challenge. At Box Hill School I have tried to find ways to communicate the skills they will need and have tried to find accessible techniques that fit in with their lifestyle and most importantly save time. I hope that by making the necessary protocols more straight forward, the students will learn to enjoy the investigative nature of research and that it will foster curiosity in their subject. Certainly this year nearly all of our students gained top grades for their extended essay.

Sarah Pavey can be contacted at sarahtheflute@hotmail.co.uk

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² Gordonstoun School. (2010). Gordonstoun School Website Home Page. Retrieved May 18, 2010, from <http://www.gordonstoun.org.uk/>

³ Round Square. (2010). Round Square Ideals. Retrieved May 18, 2010, from <http://www.roundsquare.org/index.php?id=17>

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Parental reporting and assessment – the future for UK schools

Author: Chris Scarth, Commercial Director at Classroom Monitor

As the new coalition government forges ahead with plans to axe industry bodies such as Becta and the QCDA, how can schools continue to drive and deliver important initiatives such as parental engagement and ongoing assessment in the classroom? Chris Scarth, Commercial Director at Classroom Monitor, discusses how greater cohesion can be achieved between ongoing assessment and parental reporting to help engage parents, reduce teacher workload and ultimately transform learning.



In 2008, the Labour government outlined plans for all maintained secondary schools to implement online reporting for parents by September 2010, with primary schools expected to follow by 2012. To date, the majority of secondary schools have implemented systems and strategies to achieve this, with primary schools now beginning to research the options available to them.

Helping parents understand their child's progress

Naturally, the first port of call for many schools has been to enlist the help of their Management Information System (MIS) or learning platform provider to deliver information about student behaviour, attendance and achievement to parents. However, many schools are now finding that simply making raw data available to parents, without context or solid examples of their child's work, is neither engaging them nor helping them to understand their child's progress. In fact, it is adding very little value beyond traditional reporting methods. As a result, many schools are still asking the big question; now parents have access to important data, is this enough to truly engage them in their child's learning?

One of the most important factors for ensuring effective online reporting is relevance. If parents are overloaded with information from schools that is not pertinent or practical they will be less likely to become engaged in their son or daughter's learning than they are already. It is therefore vital that a parent can have sight of specific targets and ongoing information as to how their child is developing, so they can comprehend their progress and provide further support at home.

Emphasis on ongoing classroom assessment

Guidance from Ofsted states that outstanding schools should provide tailored guidance and information about precise ways parents and carers can support their children's learning. One use approach to this lies in the work that primary and secondary schools are already doing to deliver the Assessing Pupil Progress (APP) initiative, whereby greater focus is put upon ongoing classroom assessment. Every day, teachers are gathering examples of their students' work and mapping it to specific learning objectives, which in turn, can be reported to parents.

A great way to help engage parents is to look at more interactive ways of presenting information to them. This could encompass the provision of additional resources, examples of each child's work, photos, sound clips or videos showing how their child is learning. For example, in music, teachers could record sound clips of students' compositions and post them to the portal for parents to download. For younger primary school pupils, teachers could scan their creative writing and upload this to show parents how their child's handwriting and spelling is improving. These examples should already be linked alongside APP targets and if schools are using an online service to record this, they simply need to log on and send this information to parents.

For parental reporting and ongoing assessment to be a continued success, it needs to be manageable, cost-effective and easy to maintain. Following this 'workflow' of recording and storing work to support APP alongside MIS data, should help to reduce the time spent reporting to parents, whilst providing them with useful information they can use to help their child.

Another current issue is teachers' fear of the added workload that parental reporting can bring. End-of-year report writing remains one of the biggest burdens for schools, so the idea of constantly compiling reports seems all too demanding a task. In reality, the structured and on-going approach of APP reporting allows teachers to streamline their efforts and have a clearer view of how each student and class is doing.

The future

Provided that schools look to incorporate and streamline processes via one input, it will allow for information to be fed into lots of other different resources. By centralising all these processes into one hub, teachers can save having to repeat processes or learn various ways of using such applications. It also negates the chance of error or information getting lost in transit and acts as one useful resource for all authorised to access.

For real-time reporting, it is essential for schools to look for a web-based application that is compatible and complements other existing systems in place, including that of an MIS. The application should look to do more than simply act as a 'traditional' reporting system and if used correctly it should reduce teacher workload. By having an integrated and innovative system, schools should look to bring reporting and assessment into one ongoing process.

Top tips for achieving engaging parent reporting:

1. Host a meeting with the senior management team and heads of departments to agree what valuable information you want to share with parents and the mediums in which you want to do this. For example, video clips might work better for the drama and sports department, whereas written material may work better for the English department.
2. Establish how you are going to control the flow of information to parents. For example, how often you are going to publish information, the sorts of information you plan to make accessible and how you will communicate these plans to parents.
3. Publish guidelines to outline your commitment to parents. This is particularly important when agreeing the timescales for returning e-mails from parents. You need to set expectations early so teachers are not continuously contacted and parents do not become disengaged.
4. Streamline the reporting process by researching ways to link up your APP practices and your MIS data so parents get a rounded view of their child's progress.

Chris Scarth is Commercial Director at Classroom Monitor (www.classroommonitor.co.uk)

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Soar Valley College: A Successful BSF Managed Service

Thank you for editing the entry. This is how the edited entry will appear in the database.

Author: Northgate Managed Services

Soar Valley College works in partnership with Northgate Managed Services to deliver the latest interactive learning experience to students.

Soar Valley, a specialist 11-16 maths and computing college in Leicester, opened its brand new doors in 2009 as part of the BSF programme, catering for over 1200 students from diverse ethnic, cultural and religious backgrounds. To stay ahead of their students' ever evolving learning needs and the latest technologies they engage with, the school has been working in close partnership with Northgate Managed Services for over two years. The result: a learning environment supported by educational ICT experts which students and teachers can access anytime, anywhere.

Dynamic two-way partnership

Employed to constantly innovate and challenge the school's vision for ICT, Northgate works closely with the school to provide the best possible setting for young people to learn in. Mel Berry, Headteacher at Soar Valley College, comments: "From the outset, we have been determined to work in close partnership with Northgate to get the very best outcomes from ICT. As a specialist maths and computing college, technology plays such an important role in the teaching and learning experience, so it is vital that we remain at the forefront of technology to maximise learning." Committed to supporting the school on a day-to-day basis through its managed service, Northgate's team of ICT experts are on hand to try to fix any ICT-related problems quickly and efficiently and work remotely to ensure the school receives an optimum service at all times. Ever mindful of school budgetary constraints, Northgate has also looked at efficient ways to reduce the cost of ICT at Soar Valley and so provides a centrally managed printing solution which limits the amount of printers and paper used. Accessed by identity cards this enables the school to help control paper wastage, maintaining a 'green' school environment.

Personalised learning

Keen to help students take ownership of their own learning, the school places a strong emphasis on personalisation and the provision of anytime, anywhere learning. Each student has access to an online Managed Learning Environment (MLE) designed by Northgate. The MLE provides students with their own personalised learning area with the support and assistance they need to maximise independent study. Accessible through the internet from any location, the MLE gives each student their own online space to work on assignments, store work and access emails, enabling them to communicate with teachers and fellow students.

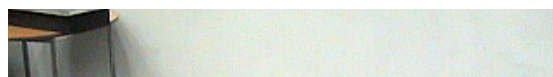


Mel Berry, Headteacher, comments: "The implementation of a Managed Learning Environment allows our students and teachers to share and store work and resources that can be securely accessed anywhere and anytime."

Pupil engagement

Passionate about providing a truly interactive experience, teachers at Soar Valley have integrated some of the latest consumer technologies into teaching practice. Mark Sutton, Assistant Curriculum Leader for Design & Technology, joined Soar Valley five years ago and is an advocate of handheld technology, such as Sony PSPs (PlayStation Portable) and iPhones, as a way of engaging students in their learning. Through funding provided by Northgate, the college has benefitted from eight brand new Sony PSPs.

Inspired to push the boundaries of traditional teaching, Mark is now using "Second Sight" augmented reality gaming technology through the Sony PSPs to literally bring subjects to life. As students walk around a virtual environment, the PSPs 'read' special printed codes, called 2D bar codes or markers, on the walls, and automatically display information to students that includes text, audio, video and 3D images. The process involves adding a layer of virtual information over the physical world. For example, in English lessons students explore the layout of rooms that Sherlock Holmes investigates in the novel, viewing virtual 3D models such as a fireplace or armchair as they run their Sony PSP over a code on the wall or floor. In science, Mark is also using this technology to teach students about the solar system, enabling them to study large 3D models of the planets. To enable students to use the Sony PSPs anytime, anywhere on site, Mark connects to the school's wireless internet solution supplied and managed by Northgate.



Mark Sutton comments: "I am passionate about delivering information to students in a format that excites them."



Augmented reality technology through the Sony PSPs certainly has the ‘wow factor’ for students and if that is what it takes to engage them in their learning and achieve their potential, then I believe every school should try it out. Students use mobile phones and handheld consoles for enjoyment every day, so as teachers, it is vital that we move with the times and teach students in the way they like to learn.”

Use of handheld technology is helping to excite students in their learning, however, Mark is keen to emphasise that the Sony PSPs are used as part of an overall teaching strategy. He believes technology plays a vital role in helping students understand

complex subjects and should be used alongside textbooks to help them engage with different topics.

Next term, Mark is hoping to use augmented reality technology to create a virtual walk through of the evolutionary timeline - enabling students to walk up the tree of life and along the different branches to view 3D models of the different creatures through time.

Teacher development

As is the case in any school, it is the hard work and dedication of staff, which has made this vision for learning such a success. Teacher attitudes towards the sharing and development of pedagogy at Soar Valley have been instrumental in achieving such a quality ICT offering to students. Teachers are using a variety of innovative teaching methods, including the use of voting systems, to engage pupils in class discussion and multiple interactive whiteboards to enable students to participate alongside the teacher.

As part of the partnership with Soar Valley College, Northgate has invested in teachers’ development by supporting their attendance at some of the UK’s leading events which promote industry best practice. Supported by Northgate, the Leicester Innovation Showcase 2011 event will be led by Soar Valley’s Headteacher Mel Berry, providing a platform for Leicester schools to share their experiences, challenges and success stories in driving innovation in ICT, personalised learning and change management.

Mark Sutton’s innovative use of handheld technology has also been recognised with a speaking opportunity at the Learning Without Frontiers Conference in London this January. Supported by Northgate, he has beaten stiff competition to speak alongside some of the country’s most inspirational teachers.

Mel Berry concludes: “We are delighted with the opportunities that ICT has given to staff and students at Soar Valley and we will continue to work in partnership with Northgate Managed Services to support teaching and learning. Continued evaluation of the impact ICT has upon learning and student participation, forms a vital part of this process.”

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The economic case for cuts in ICT spending

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Author: Terry Freedman

A controversial title but read on as Terry puts the arguments for and against cutting ICT spending.

One of the fundamental concepts in economics is that of the margin. It's a simple concept, but an astonishingly powerful one, because most decisions are made at the margin. What does that mean? Perhaps an example would serve to make it clear. Suppose I am in a supermarket. My purchasing decisions are going to be dictated not only by what I would like to have, but also by how much of those items I already have. For example, whether I buy one litre or two litres of milk will largely depend on how much milk I already have in the fridge. We also assume nothing else has changed, ie that I am not having some sort of party tomorrow night, which would change the situation.

In fact, how much I already have will also determine the amount of effort I'm prepared to go to in order to acquire more. Thus, if the supermarket has run out of milk but I already have a litre in the fridge, I'll probably say to myself that I'll buy some more tomorrow or the day after. If, however, I have no milk at all, I'll drive around until I find a shop that has some for sale.

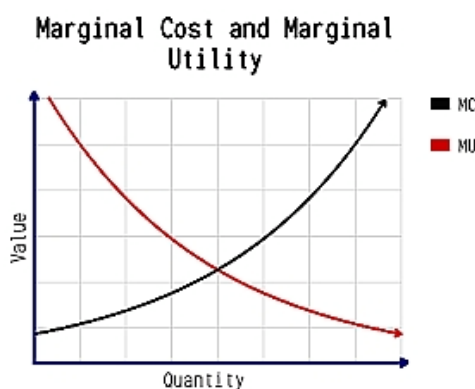
What this example illustrates is the fact that the value of something is partly determined by how much of it we already possess, in relation to how much of it we want. The more you have, the less "valuable" each extra amount of it becomes. That is pretty obvious once it's been said, but the interesting thing is how we tend to forget these points when arguing for more funding. Before we transfer the arguments to that area, let's formalise them a little.

The two key concepts in this context are marginal utility and marginal cost. Marginal utility is the benefit or satisfaction derived from each extra unit of a good or service, whilst marginal cost is the cost of acquiring one extra unit of a good or service. Marginal utility decreases as the amount of the product you have increases, whilst the marginal cost increases.

It's important to remember that the total benefit you enjoy from the product may be increasing even though the marginal benefit is decreasing. Here's how it works. Let's say I have no milk in the fridge. When I buy a litre of milk, I get an enormous amount of satisfaction from that, mainly because it has made the difference between having a decent cup of tea and not having one. The satisfaction I derive from buying a second litre of milk is nowhere near as great as the satisfaction I had from buying the first one, but I'd still rather have two litres than one litre of milk in my fridge (because it means I have the option of having a milky bedtime drink, it won't matter so much if I spill some accidentally, and I know I won't have to go shopping again in a few days' time), so my total satisfaction has still gone up.

The marginal cost goes up because every time I buy another litre of milk, it costs me the price of the milk. If I also have to drive further to another shop, it's cost me the extra fuel too.

We can show these opposing tendencies on a graph, like this:



So what is the optimum quantity of milk to buy? It's the amount at which the Marginal Cost and the Marginal Utility are equal. If Marginal Utility is higher than Marginal Cost, it means you're getting more satisfaction than it's costing you to get it, so you can still afford, in a sense, to get even more. On the other hand, if Marginal Cost is higher than Marginal Utility, it means that the extra milk is costing you more than the value of the satisfaction or benefit you're getting from it, so you should have bought less.

In terms of educational technology, the argument would go something like this: when you have no computers in the school, the marginal benefit of purchasing a computer is high. The marginal cost of purchasing a computer is low.

school, buying one per classroom is going to yield great benefits. Then buying an extra one per classroom is going to yield even more benefit - but not by as dramatic an amount as the first set of purchases. In other words, the marginal utility has gone down, even though the overall benefit has gone up.

Let's bring another aspect of cost into the mix. One of the most fundamental concepts in economic theory is opportunity cost, which is the cost of something in terms of the next best thing foregone. This is important because it means that even if you can negotiate bulk purchase deals, thereby reducing the financial cost of buying extra computers, the real marginal cost - that is, the marginal cost expressed in terms of opportunity cost rather than only financial costs -- could still remain high. This is because spending an extra \$10,000 on computers means, for argument's sake, no replacement for the grand piano in the music department, or no extra equipment for the gym, or not replacing basic furniture like desks and chairs.

Bringing all these ideas together, it's perfectly reasonable to argue that, having had around 20 years of high and sustained investment in educational technology in Britain, the benefits of any additional funding are likely to be lower than they have been, and possibly less than the real marginal costs associated with providing the necessary funding. Moreover, given the amount of knowledge and experience now in the public domain, it might be argued that large organisations such as Becta are no longer as necessary as perhaps they were 20 or 30 years ago. Even Niel McLean of Becta has said that there comes a time when it's appropriate for quangoes like Becta to go. He drew an analogy with the Romans' method of constructing bridges. First they erected a wooden structure, and used that as the foundation of, or template for, the bridge. Then, once the bridge had been built, they burnt the wooden structure, as there was no longer any need for it.

In short, at a time of recession especially, it is not axiomatic that further spending on educational technology is the best use of our resources.

The economic case against cuts in ICT spending

The economic case for cuts in ICT spending is logical, but it is based on certain assumptions which may or may not be justified. One of the most fundamental assumptions always made in economics is *ceteris paribus*, which means "other things remaining equal". This assumption is handy because it enables us to compare like with like. However, when it comes to technology especially, this could be seen as such an outlandish assumption that it invalidates the entire basis of the argument.

In particular, we assumed above that when we buy more technology in a school, we will be buying more of the same. This is unlikely to be the case in reality for two reasons.

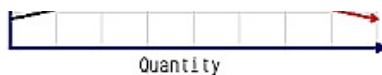
First, there is a whole variety of types of educational technology, ranging from small personal devices to interactive whiteboards and wireless networking systems. Second, and perhaps even more fundamentally, even if you buy a second set of the same technology, the later version is almost certain to be different, because changes are continually being made.

In addition, the *ceteris paribus* assumption ignores qualitative changes which (could) take place as the quantity of educational technology increases. In a school in which there is one computer per classroom, you're unlikely to see a critical mass of teachers using the technology as an integral part of their teaching. Ramp it up such that everyone has access to the technology whenever they like, and it becomes feasible for teachers to share ideas, help each other, and even run training courses for colleagues.

And let's not forget that the type of work that can be undertaken by students with access to technology and, especially, the internet is very different from that which can be undertaken in the absence of such technology. If anything, it's likely to be more demanding, more creative and more realistic.

For these reasons, although the theory of diminishing marginal utility (as it's known) may still be true in principle, in practice the marginal utility curve is likely to be continually shifting to the right, as shown below. That means that as more technology is acquired, the higher the benefits of each additional amount purchased.





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Finally, we should also consider the issue of externalities. These are the wider costs and benefits associated with an activity. For example, having more technology means the school might consider hiring out its facilities to the community, thereby earning some extra money for itself as well as helping the community. It may be able to offer a wider range of computer-related courses, perhaps benefiting both the local and national economies in the long term, perhaps by helping to make some unemployed local people more able to take advantage of upcoming employment opportunities. On the other hand, it may make the school more vulnerable to burglary. If all students take laptops home, they may be more vulnerable to mugging.

Conclusion

Both arguments rely heavily on assumptions, which may or may not be true in practice. They also depend on precision; at least, the terminology and the graphs suggest that there is a greater precision involved than is really the case. I think precision is actually not that important. For example, I may not be able to measure precisely the social costs and benefits of a school acquiring extra technology. However, the important thing, I think, is to recognise that these dimensions exist. Whether you are against or in favour of ICT funding being cut, there is more to it than meets the eye. If nothing else, it is always good to be aware of the opposition's arguments, if only to be able to better refute them!

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...reference has been grasped can a meaningful debate about the purpose and nature of ICT as a subject take place.

Towards an explicit rationale for ICT as a subject.

As a subject which is currently compulsory at all stages of the National Curriculum framework and one whose inclusion was not based on tradition it would be reasonable to assume that the rationale for ICT and therefore its content would be clearly outlined in policy or academic literature but this is not the case. Instead, the rationale for ICT as a subject and attempts to revise and develop its content and direction have been undermined by often poorly articulated or implicit assumptions of what ICT is for.

In seeking to make the rationale for the inclusion of ICT in the curriculum explicit a reasonable starting point would be the aims of the National Curriculum itself for this is the envelope within which subjects are included or excluded and their nature and content defined.

Rationales for the inclusion of any subject or content can be considered under the criteria of instrumentality where the knowledge, skills and understanding gained can be applied for a specific purpose in either the context of work or in everyday life. A second rationale relates to the self-realisation of the learner through exposure to what might be considered cultural elements of the curriculum including art, music and some aspects of science. Here the core value is the cultural significance of what is learned rather than its value in achieving a particular ends.

This smudged delineation between curriculum rationales becomes frequently and unhelpfully articulated as “vocational” and “academic” subjects and the value-loaded nature of such terms is such that I will not use them in this discussion. In consideration of the value of ICT, three interlocking themes could be considered. Using such a framework, ICT’s value is seen to map to three broad themes and it is argued here that any review of the subject curriculum must accommodate the changing balance between these themes overall and across the Key Stages.

Conversations with children and parents indicate that the ‘economic instrumentalist’ perspective is dominant in the minds of learners. For many commentators ICT is about “getting a job” and developing “skills for the 21st Century”. So obvious and powerful is this

perspective that it frequently drives out consideration of other positions and in some cases is assumed to be the sole rationale for including ICT in the curriculum.

A second and emerging rationale is a ‘social instrumentalist’ perspective. Here we are involved in consideration of the necessity of gaining ICT skills in order to be a part of an increasingly wired society and an e-democracy where citizens are to access information

and services and express their views through a variety of electronic media. The failure to master the required skills will, it is claimed, constitute ‘digital social exclusion’ creating a digital divide between those who have the capacity to engage with an ICT based society

and those who do not. Here the early definitions of the nature of the digital divide based on a lack of access to hardware has been supplanted by a lack of skills in engaging with aspects of democratic participation and accessing services in an increasingly digital society. Those who fail to achieve the capacity to use ICT are seen to at risk of ‘digital exclusion’.

The third rationale, that of ‘cognitive instrumentalism’ envisages ICT not as a specific subject domain like English or mathematics but as a ‘service subject’ akin to literacy and numeracy. Here the skills learned are part of a foundation upon which future learning depends. In this strand of argument the capacity to use ICT to research, evaluate, manipulate and present information is seen as an essential skill-set magnifying the learning capacity of pupils in all other areas of the curriculum.

Clearly the balance between these three rationales will determine the nature of any ICT curriculum and its content. An economic rationale of work related skills holds some merit if what is learned is clearly linked to the nature of the skills required by business and industry. Here we might consider if the current focus of many ‘vocational’ pathways in ICT with their focus squarely of the mastery of relatively low level business applications really do constitute “skills for the 21st century”? Already it has emerged that pupils are increasingly disengaged with such courses and it is not unreasonable to ask what proportion of time an emerging e-skilled workforce will spend in constructing PowerPoint presentations or creating short Flash movies.

A second strand of the economic instrumentalist argument is that of the ‘computing’ lobby. The argument runs that in a digital economy technical skills in the fields of hardware and software are already and will increasingly be in short supply. Whilst there is certainly some degree of justification for such claims it would be difficult to argue that ‘computing’ should be a compulsory aspect of the curriculum beyond a broad appreciation of principles which would be

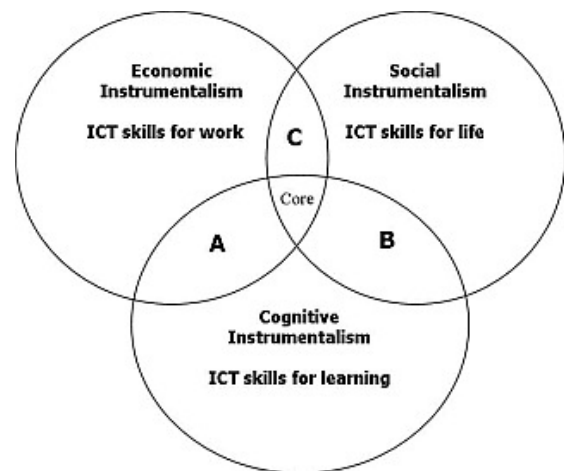


Fig 1: A curriculum rationale for ICT

Computing should be a compulsory aspect of the curriculum beyond a broad appreciation of principles which would be of clear value to all working and living in a society so integrally linked with ICT systems. This said, the pathway between early engagement with the principles of computing and trajectories which will lead to higher education and specialisms in computing certainly need to be addressed and a degree of displacement of 'business applications' in KS 4 courses by computing related elements would support easier progression to specialist routes and increase engagement of pupils who are already 'spreadsheets out'.

The social instrumental perspective is equally problematic. Whilst a modern democracy certainly needs digitally literate citizens capable of engaging with 'network society'¹ it is far from clear what the content of such a curriculum theme would consist of. Its essence of creating critical, informed, articulate and actively engaged citizens is to a degree at odds in classrooms where the mastery of software application skills has become the dominant mode of engagement. The relationship between technology, society and the individual is to an extent included in the current ICT Programme of Study but this is almost universally found to be a 'Cinderella' element of pupils experience, ignored or relegated to second place behind software skills.

It is argued here that this element of the curriculum would need to be dealt with far more explicitly if it is not to remain at the margins pupil's experience of ICT.

The third strand of 'cognitive instrumentalism' is possibly the most convincing rationale for including ICT as a compulsory element of the National Curriculum. Like literacy and numeracy, ICT capability, is central to pupils capacity to learn in an increasingly complex and ambiguous environment.

It is argued that ICTs have the capacity to magnify a pupil's capacity to engage with learning through access to resources and support. Further, that ICTs are central to attempts to re-engineer the processes of education through new pedagogies which place the pupil at the centre of learning and support a more independent and active approach than 'traditional methods'.

Whilst, from the above, it is clear that there are conflicting demands to be accommodated in framing a curriculum which balances these three themes, considerable synergies exist at the boundaries. With careful attention to these boundaries an ICT curriculum could gain strength though diversity with the balance tilted towards particular themes as pupils mature and the role of ICT in their own ambitions becomes clearer.

Two dangerous myths

In framing a discussion about the purpose and therefore content of an ICT curriculum two major 'urban myths' need to be addressed. The first, touched on above, is that by using ICT in a range of subjects pupils will develop the skills required to fulfil each of the above

3 rationales to a greater or lesser degree. The second myth is that of the 'digital native'². This is the belief, based on children's apparent familiarity, pleasure and enthusiasm for a range of personal technologies, that they are "ahead of their teachers" or "know how to use ICT already". This, as I will outline below is a dangerous and erroneous belief.

In addressing the issue of 'cross curricular use', not to be confused with cross-curricular delivery of the ICT POS, we must consider several points. Firstly that the degree to which children's capacity to use ICT effectively rather than ineffectively may become limited

solely by the skills and range of experience of technology of the subject teacher and through their experience of using ICT out of the classroom. Here we face the danger that pupils become tutored into methods of using ICT uncritically and inefficiently to the degree that technology potentially detracts from rather than aids pupil's learning. Whilst a counter argument might cite research based on self report that teachers are increasingly "confident" with ICT it remains to be established how well teachers are able to judge their own 'ICT capability' rather than self-reported 'ICT confidence'. A major flaw, as always with self-report, is the degree to which the respondent "doesn't know what they don't know".

This being so, such reports may simply be a measure of how confident teachers feel in using the most common 'Office' applications to perform routine tasks. The potential consequence of an approach which assumes that ICT capability could be developed by some kind of 'osmosis' through encountering it in a range of other subjects potentially leads to ICT becoming a source of frustration, trivialisation and distraction as pupils uncritically and inefficiently search for information. When pupils go on to spend time using applications to 'present' their work uncritically and without the skills which support the medium adding rather than detracting from the message a downwards spiral begins.

The second myth considered is that of the 'digital natives', a view that children are already technologically literate with the consequence that they need relatively little support in learning to use ICT. It is apparent to the casual observer, especially one, unfamiliar with the concept of ICT capability that children enjoy and regularly use technology. However there is evidence that their understanding of the technological world of which these 'small objects of desire' form a part is very limited. Many children demonstrate a functional ability to use an often limited range of features of their devices to achieve desired results. However the processes involved remain inside the technological black box as a mystery. In conversations with apparently technologically confident teenagers, a thin veneer of functional competence can be easily scraped away to reveal little

appreciation of the broader context in which their ‘gadget’ is an element and no appreciation of the technologies which are inside the device.

It would be possible to argue that it is not necessary to understand how either individual devices work or how the wider networks of which they are apart function. However such a view that we need only a functional familiarity with technologies in their widest sense leaves us with a population of users whose abilities are fragile and incapable of renewing themselves as new technologies emerge and helpless when a system fails. Whilst it is not necessary that each car driver has an in-depth knowledge of the functioning of an engine, an appreciation of the principles of the mechanical system of the car allows drivers to anticipate the way their machine will respond to the demands placed upon it. Without an appreciation, if not an understanding, of technologies then we are relegated to disempowered users of ‘techno-magic’.

Towards a new ICT curriculum?

It appears then that any useful discussion around the topic of ICT’s status in the curriculum in terms of being a core or peripheral element and the contents of any revised programme of study must first address the question, “what is ICT for?”

Firstly any revision must not only ‘update’ the content in line with new technologies but more fundamentally it must recognize and articulate the new and emerging relationships between technology and society.

Any programme of study must be flexible enough to recognize all three purposes which underlie the rationale for learning ICT and flexibility must be allowed to ensure that all pupils have an opportunity to develop their capacity to use ICT to support their learning. They must also develop a working appreciation of the benefits and risks of technology in their everyday lives and its implications for their role as citizens in an increasingly digitally mediated society. Lastly the curriculum should provide an entitlement for those who wish to specialize in the study of technology itself as a vocational pathway towards a career in a field which is central to any nation within an increasingly knowledge based economy.

The challenge presented by framing a new ICT curriculum is to recognise the growing ubiquity of our engagement with digital technologies. The initial framing of a curriculum for ICT drew on a historical narrative which evolved from its mathematical computing roots. During the 1980s and 1990’s it drew its direction from the desktop computer’s emergence as a widely used business tool and it is in this second era that ICT has become stuck as a school subject.

Our challenge now is to develop an ICT curriculum for a network society where social, economic and educational engagement or exclusion may rest on the capacity of the citizen to engage in a skilled, informed and responsible manner with technologies which are already changing our world in fundamental ways.

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¹ Manuel Castelles has suggested that we increasingly live in a “network society” where digital technologies and the networks they are creating interact with the social sphere to fundamentally change the relationship between technology and society.

² Marc Prensky introduced the term “digital natives” to describe young people who have grown up in a digital world have developed a relationship with technology which is fundamentally different to that of former generations.

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