Creating the Digital Society – the Role of Teacher Educators

Robert Munro
University of Strathclyde, United Kingdom, r.k.munro@strath.ac.uk

Abstract: Over the last decade many countries have sought to develop a digital society so that they might reap economic and social benefits from ICT. A digital society demands that the education sector delivers ICT-literate citizens but, to date, the adoption of ICT has failed to transform education. The prospect of Web 2.0 and accelerating change brought by ICT means education must decide what and how it should use ICT and resource its integration across the curriculum. This paper suggests some key uses which should form the foundation of future use, identifies teacher educators as a key group to drive the implementation and integration and suggests three main roles teacher educators should pursue to effect change. Examples of specific uses and resources are explored.

Keywords: Teacher education, teacher training, digital divide, knowledge society, problem solving, pedagogy

1. Problems on the road to the digital society

Relentless marketing coupled with enthusiastic adoption of information communication technologies has fanned the race to the digital society. Many countries see the development of a digital society as essential for securing future growth and prosperity as well as offering the realization of socio-economic benefits accruing from the wider use of ICT. Fundamental to this digital society is an e-enabled and e-oriented education system where young people make intensive use of ICT and develop their digital knowledge, understanding and skills.

However, while ICT has been deployed across education for many years and has become an important educational resource, and while the Internet has stimulated major, rapid, recent change, the adoption of ICT in all sectors of education has been slower than anticipated, inequitably distributed, indiscriminately used, under-resourced and has failed to mirror or to capitalize on out-of-school uses seized on by wider society. Generally ICT has modified and improved rather than enhanced and transformed education. ICT use has resulted in
changes to learning environments and to teaching pedagogy but these changes have not been as deep or as far-reaching as had been expected or predicted. Many educationalists have criticised this lack of fulfillment of the educational ICT-dream and a comprehensive range of reasons have been advanced as to why ICT integration, let alone transformation, has, to date, been largely unsuccessful. Most of the reasons advanced today are remarkably similar to those put forward in the nineteen-nineties – lack of teacher expertise, limited software availability, rapidly obsolete technology, low levels of technical support and inadequate pedagogical preparation (Condie and Munro, 2007). Patently we either ignored these issues or failed to address them effectively.

In the recent past another major ICT resource has been presented as heralding a fresh, bright new future for education. Proponents of Web 2.0 maintain this will be the killer resource which, this time round, will finally transform education. Well, maybe we are at the tipping point – perhaps this is the ticket to the brave new world – Web 2.0 could just be the Holy Grail. Even if it is, its adoption raises innumerable questions and issues. Will this new educational vision be any more realisable or effective than those of the past? Can Prensky’s digital immigrants and digital natives work together (Prensky, 2001)? Will Web 2.0 precipitate the modification and redirection of pedagogy or methodology seen as an essential prerequisite for transformation? Will it foster the adoption of collaborative/constructivist approaches throughout education (as identified in the Curriculum for Excellence being developed in Scotland)? Will new skills have to be taught in our schools — and who is best equipped to teach them? Can Web 2.0 adoption resolve the mismatch between what education wants young people to use ICT for and what young people see as the cutting uses they exploit out-of-school? Are many uses of ICT rendered obsolete and redundant if we adopt Web 2.0 and, if so, how do we manage the resultant change likely to impact our classrooms?

I agree that education has failed to fully integrate and manage ICT, it has failed to grasp, promote and realize the potential of an exciting and effective educational resource, it has been unable to effect transformation of the teaching and learning process and, indeed, it has been caught flat-footed by the bewilderingly rapid development of resources/technologies and the social acceptance of many of these. In short, education has failed to cope with the shockwaves the burgeoning development of ICT has generated. If, as Prensky alleges (Prensky, 2007), we are in for even more dramatic and faster-moving change in the next few years what hope has education got of making the right decisions and charting a successful course through the maelstrom?

Teachers have been the traditional recipients of adverse comment about the lack of success of ICT in education. They are forced much between a rock and a hard place. They are criticised if they lack ICT skills, if they are not up to speed with the latest developments, if they don’t have ICT resources in their classroom, if they don’t buy enough software, if they don’t exploit the Internet effectively, if their pupils use the Internet for research but don’t read the content with understanding, if they use ICT as a presentational tool and not as an interactive
medium, if they don’t use handheld devices. The litany is endless. I consider this very unfair and don’t see the teacher as the villain. What of the politicians who promote the benefits and potential of ICT in education but really have no awareness of the realities of life in schools, the constraints teachers operate under or any expertise with the technology. What of civil servants and head-teachers who consider that mere provision of technology will effect change – that a great computer:pupil ratio and a flood network of Internet access is somehow capable of generating educational understanding by osmosis. Many educators have, for years, been more obsessed with technical issues, with identifying problems around equity of provision and the safe-use of technology (particularly the Internet) than the practical implementation of the many forms of ICT. Software resources remain pitifully funded, technical support is rare in schools and pedagogically oriented training is limited in its availability and often inappropriate. Educational leaders and managers have failed to encourage technological adoption, enthuse pupils and implement the progression of relevant ICT integration across education. Teachers have been short-changed in terms of guidance, advice and support.

If I were generous I would say that, as with Web 2.0, we have little collective understanding of what we want to achieve from using ICT in education. Consider these wise words:

“What makes our ambitions possible is to apply the transformative power of technological innovation to learning, enabling technology to be what it has the potential to be.”

“It has got huge potential but its impact depends on teachers.”

“Technology in the classroom is no longer a distant dream – technology is part of everyday life for us all, and schools need to ensure they don’t get left behind.”

“We already use technology such as interactive whiteboards, computers and digital photography, but now we can move towards using the technology we’ve got in a more structured and strategic way.”

And the reaction of Homer Simpson in reply – “Doh?”

For thirty years the proponents of our new future – technology experts, political pundits and educational visionaries and futurologists – have agreed that ICT has great potential and that it is unquestionably the key to success in the globally competitive market place. In the current downturn or recession they probably articulate this view more vociferously. My concern is that many in education have never had a clear idea of what they wanted ICT to achieve let alone a comprehensive plan to ensure their vision was achieved. Like many of the great master artists of the past they paint a great “virtual” image of the future but leave the implementation to the “lesser craftsmen” in the workshop! If we are to resolve the issues outlined earlier in this paper and fulfill the potential of ICT we have to decide what we want to use ICT for, what benefits we expect it to generate and then commit to resource its implementation.
2. Why and how should education use ICT?

My aim has always been that ICT should be used to provide comprehensive information to the user, sophisticated yet transparent tools which let the user quarry, explore and analyse this information to discern key points, trends, characteristics, distributions and relationships, other tools which allow the user to create conclusions from this analysis in a range of effective formats. It should be used to promote conceptual understanding, to support personalized learning and different learning styles and collaborative work. If such a set of uses is agreed then it is simple to move to the next step which identifies and sets the limits of usefulness of different applications. This would allow new uses to be incorporated if they are educationally desirable – rather than incorporated because they are “hot”. With the useful applications identified essential relevant resources could be created to support teachers and learners.

This may seem an absurdly simple vision but a very pragmatic and, I suggest, eminently practicable one. Let me illustrate its feasibility through three key uses. They satisfy my criteria and would be basic building blocks in any future framework. First the Internet – even in its current guise it is an unparalleled information resource. Unfortunately education went overboard for the Internet before educators thought clearly about its use and how to maximize its potential and teachers were encouraged to incorporate it into their teaching just to be “up-to-date”. Now we are told students are accessing too many sites, many sites have wholly inappropriate content, students read information without understanding and without appreciation of bias, teachers pedagogical strategies are unsound and even that Google use is destroying the planet as it promotes climate change. As a geographer I want to exploit the many information sources available and exploit geotagging. I want my students to have access to all the different environments of the planet, see all of the different facets of the continents and countries, explore weather, navigate through socio-economic data and recognize patterns and relationships laid out in maps of different types and at different scales. If they are exploring landforms then I want them to have access not just to textual descriptions and pretty pictures but also to dynamic video of their formation (with explanation at many levels and in major languages), map representations of their distribution and exploitation in different parts of the globe and an assessment of their forward fragility. I would want this all to be seamlessly accessible through Google Earth. Such a resource would motive students and drive curriculum inquiry and would be invaluable in developing conceptual understanding.

My second key use would be the database. Twenty years ago databases were used extensively in History classrooms to support students’ understanding of people in the past. Then, partly because of lack of computers in History classrooms, partly because the databases were totally sterile, textual lists (and usually not about the local environment) and partly because of a difficult user interface for eliciting information, their popularity plummeted and they disappeared. Today in the United Kingdom one of the most popular and fastest
growing areas of Internet activity is concerned with genealogy, finding your ancestors in the National Census, tracing your roots! On 13th January 2009 the 1911 Census website was launched and, on that day, received 13.4 million page views and was subject to 1.9 million searches (Press Association, 2009). This illustrates my earlier contention that schools are failing to use applications or promote interests that pupils/families engage in so enthusiastically with the technology out of school! The database is an unparalleled tool for stimulating enquiry about and understanding of the past, the interface is now simplicity itself and the resources (as the 1911 Census illustrates) are available at the local level. In our evaluative work on ICT resources in schools many pupils maintain they find database work the most interesting aspect of ICT activity as it stimulates their imagination and arouses their curiosity as well as helping them understand aspects of the past. This technological resource can stimulate enquiry, promote problem solving, critical and creative thinking and collaborative activity. It is robust, desirable and very much applicable and helpful to developing understanding and teachers should be encouraged to integrate appropriate database activity into curriculum planning.

My third example is another maligned and neglected use in schools – the simulation. This resource can be deployed across the curriculum – be it World Trade, Ancient Egypt, the American West, chemical reactions or physics experiments – you can find supportive simulation software. Simulations were widely used in the nineteen eighties but they also experienced a pronounced dip in popularity – possibly because of the time required to explore them fully, possibly because many teachers considered them too complex for pupils and possibly because they were not always targeted precisely enough at the curriculum. To many teachers they were games. However, out-of-school the situation is very different and many young students engage with simulations, perhaps individually or multi-player, for many hours at a time. Often they are problem solving and thinking at a high level to ensure success and move through challenges and levels. Research in Scotland has concluded that when children engage in “Brain Training” on Nintendo DS machines, that there is an appreciable improvement in the mathematical and problem solving abilities of pupils (Learning and Teaching Scotland, 2008). This research has already led to adoption of this technology in many primary schools. For a number of reasons, principally related to problem solving and conceptual development I consider simulations should be an integral use of ICT in schools.

3. The key role of teacher educators

There are three examples to include in educational ICT experience. It would be simple to complete a framework of uses to exploit and create an ICT-rich curriculum. Who should engineer the way forward and guide teachers as they seek to achieve the potential of ICT? I suggest that teacher educators should be charged
with this role. They occupy an ideal position to influence the use of ICT in education and help realise the goal of creating a digital society where the ICT skills developed throughout education are valuable, relevant and transferable to out-of-school contexts and, naturally integrate many, if not most, of those used by choice by the majority of the digital society. Teacher educators should be fully aware of the ICT-related aspirations of education administrators and curriculum developers. They should be able to identify the most valuable educational uses of ICT and should possess a full appreciation of and be able to tap into youth culture so that the aspirations of the digital natives can be encouraged. Furthermore they deal with students training to be teachers and teachers in post so they can develop pre- and in-service education, devised in the most pedagogically appropriate way which should facilitate ICT integration and use in classrooms.

There are three clear roles for teacher educators:

- They should fashion seamlessly integrated ICT courses in their institutions for trainee teachers. These should model a comprehensive range of ICT uses and should be designed to foster conceptual understanding, enhance skills and develop research attitudes in both the trainee teachers and their pupils.
- They should create web-based in-service courses for teachers designed to alter pedagogical approaches in schools and to encourage the adoption of software and teacher-ware not normally in use in schools – handheld devices, mobile phone technology and collaborative social networking tools.
- They must create, in partnership with teachers and technical developers, resources which allow teachers to deploy both old and new ICT approaches in their classrooms. Using these resources teachers could engage pupils in greater collaborative activity, often with a constructivist twist, and give them the opportunity to explore the many creative opportunities offered by ICT.

In my institution I partner a History colleague in developing and delivering an elective for trainee Primary school teachers – ICT and People in the Past. This elective, which we team-teach, has been developed to allow students to experience different ICT applications and their relevance to the classroom teaching of History, devise and develop resources to help their subsequent teaching, consider the applicability of emerging technologies and weigh the very different views which exist across education on the desirability and applicability of using ICT in History.

The coverage is as follows:

- New uses of ICT and how they might support the curriculum – blogging, social networks, discussion boards, the role of GLOW (a nationally developed VLE available in all Scottish Schools).
- Creative ICT – the moving image – movie making. Students create a short five minute video illustrating the farming cycle from ploughing to harvesting
of the nineteenth century. Making podcasts and how they can support learning in History.

- Using CD-ROMS to support teaching and learning in History.
- Online resources particularly the facilities offered by the Scottish Cultural Resources Access Network. Over 300,000 textual/visual resources available to all pupils in all schools. Consideration and use of tools offered by SCRAN – twitter, Scribble.
- Creating multimedia presentations.
- Group presentations of the elective assignment designed to persuade staff in schools to use a particular ICT resource/use.

This course is now quite refined and covers a range of key ICT uses/resources but is flexible enough to accommodate new ones. It is extremely “hands-on” and therefore develops the students’ practical skills – which we note have grown markedly over the last couple of years. They are true digital natives. We try to foster research and enquiry skills at all stages and insist that the final presentation is backed up with fully referenced supportive comment. In addition we not only try to develop their understanding of historical concepts but also their appreciation of how to develop the understanding of their future pupils. In many ways we model the Curriculum for Excellence proposals and, where possible offer research and video evidence to support our suggestions/activities. The course offers a template for activity in other major curriculum areas.

As a result of the success of the Elective we are keen to move onto the second strand of the above strategy. Here we run into one of the modern day problems that beset education – money. Our institution would obviously prefer that we sold such courses but this would impact on uptake and create a layer of bureaucracy we would prefer to avoid. Some form of middle road must be found – perhaps courses funded by a national body who then mounts them on their educational website where teachers can access them free of charge. Such courses could be quite short but would focus on emerging uses of technology – handheld devices, mobile phones, digital video production and podcasting for example – to help teachers appreciate the teaching and learning benefits which could accrue from their use and proposing pedagogical strategies to ensure their smooth classroom implementation.

The third element of the strategy also requires funding. We should not be seduced by the Internet and Web 2.0 and see all resources as being web-based. Nor should we assume that teachers only want to use generic software or that schools have the money to pay for highly priced software licences. There should be creation of customized software or resource ware which is clearly focused on elements of the curriculum, is developed in conjunction with teachers and is designed to be used simply and at different levels. In my institution my
aforementioned History colleague has, over the past ten years created curriculum-relevant software, based on his experiences of teaching different topics in the curriculum and imaginatively incorporating ICT. The most recent production “Ruled by the Seasons” looks at farming in North-East Scotland over 100 years ago and through diaries, text, pictures, maps, archive film and video allows pupils to explore crop production and uses, farming techniques of the past, social change, entertainment and leisure pursuits and issues associated with faith. It also supports activities such as database enquiry, movie-making and creating presentations. Again it is a model or a template for the curriculum relevant ICT resources I consider are essential if we are to exploit the potential of ICT.

4. In conclusion

It is vital that teacher educators adopt these roles and discharge them as effectively as possible. We are on the brink of major ICT change. We have to respond to Web 2.0, to handheld computers and mobile phone technology, to ubiquitous computing and to a socially networked digital society and we have to be ready to respond to the other challenges which are just round the corner. We failed the last time round and the failure of teacher educators to contribute adequately to past ICT development and strategic planning contributed to the lack of realization of the ICT-education dream and an inadequately prepared digital society. All members of the education system have to contribution to the creation of the digital society and teacher educators must be in the vanguard of action.

References