Education futures, teachers and technology

A discussion document generated from an expert seminar, led by Futurelab and supported by the Training and Development Agency, investigating the challenges and changes to the role of teachers within educational futures.

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April 2010

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Introduction

In supporting positive outcomes for children and young people, teachers[1] have a special interest in the future. Their pupils' lives will unfold over coming decades of change and teachers must support them in becoming prepared to live and shape the world outside of the classroom. As society and technologies change, so the image of education is reshaped to prepare people for new ways of working and living in the 21st century and teachers' own practice will necessarily change to take account of this.

This one-day meeting built on the Beyond Current Horizons programme, led by Futurelab. It considered the future of teaching, and of teachers, drawing on discussion among a group of expert teachers, those involved in teacher training (initial training and continuing professional development) as well as researchers, industry partners and policy makers. The day was intended to explore the changing role of teachers and what the implications are for initial teacher training (ITT) and continuing professional development (CPD), with a particular focus upon the role of digital technologies. This briefing paper is not a full summary of the discussion, but a distillation of some of the main points, and pointers to areas which deserve further exploration.

[1] In this document the term 'teacher' refers to members of the school workforce with a lead role in teaching and learning for children and young people. Whilst this is mainly staff with QTS (Qualified Teacher Status), it also includes a range of support staff roles where they contribute to teaching and learning.

Beyond Current Horizons

Futurelab's Beyond Current Horizons (BCH) programme brought together a wide range of ideas about how social and technological change might shape the future of education for 2025 and beyond – taking the discussion beyond the typical span of current policy debate. The results are documented at www.beyondcurrenthorizons. org.uk and to contextualise the discussion a few notable socio-technological trends were shared that are expected to influence education over the coming decades:

Moore's law still holds
Everyday devices will process more information, faster. The exponential rise in computing power seen in recent decades will continue for a few more doublings yet.

Creation of the personal "cloud"
Access to people, resources and information will float free of location, or institution. Networks, including education and learning networks, will be made and dissolved as needed. This will bring the rise of the mobile learner, and pose questions about how people choose to get access to both formal and informal learning.

A new information landscape
Finding and retrieving information will become second nature. Everyone in developed countries can expect to be wrapped in a personal information landscape, which will be denser, deeper and more diverse than the one we have access to now. What will need to be taught and learned will therefore be different. It starts with how to make sense of this new landscape.

Weaker boundaries
The new information landscape and the cloud will blur boundaries - between institutions, between portions of the day, work and leisure, employment and retirement. This blurring of former divisions will also extend to public/private provision, and to education. Where and when learning takes place will be subject to new choices, new negotiation, new organisation, and accountability.

Silver bullets still missing
New technology will not furnish quick fixes for complex educational problems (no uploading knowledge modules from a chip). The new mix of provision will only create the education we want if a vision of what it can do is developed in advance.

Once per decade disruptions continue

From mainframe computers to mini computers, to PCs and to the internet: every ten years or so there is a fundamental shift in the way in which we think about computers. Current developments in mobile and ubiquitous computing affords us a different way to image how and where learners access people, information and resources. Similarly, developments in cloud computing or haptic technologies conceivably challenge the way we can interact with digital media. As education is remade in the light of the tools and technologies available, how does this trend affect the way in which we reimagine education, and how we prepare teachers for the place within the education system?
All this creates a series of challenges for education:

_ How to handle a significant shift from education institutions being the main site of learning to one among many possibilities?

_ How to create open, flexible networks across diverse institutions, and between formal and informal provision?

_ How to develop a teaching, mentoring and networking workforce, and help people (especially parents) engage in dialogue about education?

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Challenge:
Changing times, changing roles?

Whilst the teacher will remain a focal point in the whole process of teaching and learning, a big change, already being seen in leading practice, will be away from the teacher as dispenser of knowledge. This was described in various ways – children will come to class more information rich; informal learning will become more important, and more pervasive; there will be a change to the relationship between learners and teachers. 'Teacher' itself could become a problematic word, as it covers many roles such as facilitator, enabler, or coach. These developments suggest a rise in the number of roles needed to support learners and a change to the definition of what it means to be 'a teacher'. Not taking this on board would mean a risk of teaching and schooling being seen as irrelevant. The implication is a big cultural shift in learner-teacher relations, especially from the existing teacher role in secondary schools.

> What new roles might teachers find themselves taking on, and which existing roles might disappear?

All this has implications for everything from teacher training to school architecture. Classrooms, and classroom practice, were designed for an era when information was scarce. Now it is abundant, both will look different. Overall, it was said, the fortress school and the factory school will, or should, disappear. The identification of learning, or indeed education, solely with schools will no longer be sustainable.

There will be a further challenge in dealing with new technology, and new generations of new technology, with pupils being more proficient in its use. Adapting to utilise the tools and technologies used outside of classrooms - in homes, workplaces and social spaces - will become increasingly important, requiring iterative development amongst education professionals.

The new networking technologies could strengthen subject teaching by allowing teachers to draw in more experts online, and making more use of other people with accumulated knowledge, such as the retired. It is unwise to assume that access to "information" reduces the importance of teachers' subject knowledge.

Indeed, supporting teachers to develop the depth, scope and reach of their understanding is vital to how they can support learners' development. However, there may also be more of an emphasis on teachers entering the profession with life skills and experience drawn from other work, and others with similar qualities coming into the classroom, in person or online. It is a mix of knowledge, skills and experiences that are needed to support learners to make sense of the changing world.

> Supporting teachers to develop the depth, scope and reach of their own understanding is vital to how they can support learners' own development.

Newly qualified teachers or trainees may be more adept with the technology, while their more experienced colleagues retain more developed pedagogic skills – so the two will need to work together to get the best out of the new technologies which come into use. As student teachers develop in their practice, becoming aware of the wide range of approaches to learning: traditional pedagogic styles; online pedagogies; andragogies[2] and learning from the Personal and Social Development sector (the sector often described as the 'non-formal' learning sector, including youth workers, personal development coaches etc) is important in recognising the range of practices that might be most useful for meeting different learners' needs.

In terms of ICT provision, there will still be haves and have-nots (whether one is teaching children or adults). Students will increasingly have access to their own devices, and be adept in their use. But teachers also need to be ready for those at the other extreme, who will depend on school kit and may need to be shown how to use it.

The assumption that teachers are individually accountable for lessons, outcomes, managing online safety and so on will need to be re-examined if learning takes place in

[2] Although andragogy refers to teaching of adults, some of the methods used within these approaches lend themselves well to personalised teaching approaches being fostered in schools.

managed networks and includes non-teachers, students, their peers and others, as well as access to resources not selected by the teacher. Parents will need to be part of this process, too, and some will be conservative about non-standard learning.

A major challenge is beginning to manage this transition (to new relationships, managing and facilitating learning) in a system which is currently highly centralised, standards-driven, and which can discourage localised innovation.

New uses of IT might lock in aspects of the existing culture, not transform it. For example, the demand that parents be able to access more data could mean developing an online resource in which a school maps out everything it does. If that has a "tick-box" culture built in, it could reinforce existing or traditional practice, rather than support development of new approaches.

> It is the development of a workforce that can create curricula, find appropriate resources and link to other experts, peers and learners that is at the heart of delivering such an approach.

One view is that there is a whole generation of teachers who have not had to sit down and think: what should the curriculum contain? This will clearly provoke continuing discussion. On one hand, the National Curriculum incorporates entitlement and assurances to parents, on the other hand it can overly-subscribe what is taught in classrooms. Promoting a more personalised approach to learning requires teachers to be able to shape activities to individual needs and requirements. Technology can support this approach, yet it is the development of a workforce that can create curricula, find appropriate resources and link to other experts, peers and learners that is at the heart of delivering such an approach.

There will be interesting problems in managing how the new flexibility is exercised. For example, self-organised networks could allow pupils to avoid working with some types of people, confining themselves to friendship groups and the like-minded. This would not foster the kind of collaborative skills likely to be needed in the workplace or

an understanding of different cultures and perspectives. Again, new approaches to learning make new demands of the school curriculum.

On the positive side, many of the elements one might want to promote already exist, or are even widespread – in leading schools. Collectively, it was said, they have the following attributes:

_ learning is collaborative – children work together

_ educators combine conceptual depth (subject based), scope (relating their subject to the world) and pedagogic reach (they connect the subject with pupils and inspire them)

_ teaching is oriented to stage, not age, is enquiry-minded and evokes purposeful work

_ teaching and learning cater to restless, unsatisfied, curious people, and goes beyond a "met before" curriculum

_ teachers and pupils want to be there

_ the school is a community, but teachers and students have lives outside of formal learning.

A broad conclusion from this discussion would be that teacher roles can be extremely diverse – and likely to become more so. The role a particular teacher plays at a particular time will vary according to circumstance, their own skills, experience and personal strengths and weaknesses. Becoming conscious of the range of possibilities covered by the professional demands of the overall role of "teacher" will be a first step to weighing up priorities, defining one's own practice, and improving how some of the roles are performed. The potential transformation in learning borne of freer access to information (if not necessarily understanding) may highlight the other roles which schools, and teachers, are expected to fulfil – and provoke discussion about what they are and how they are best carried out. This has particular implications for the wider education workforce. Teachers may remain as the familiar educational link for learners, but being able to access a range of educational supporters – whether the teacher taking on different roles, or interacting with other professionals, will become an increasingly important part of educational experiences.

Responding to the challenges

This discussion began by considering initial teacher training (ITT) and continuing professional development (CPD) separately. However, there was a strong current of opinion that the two are not conceptually separate. Ideally, there should be a seamless path between them, though funding arrangements can constrain this ambition.

How can ITT and CPD ensure teachers are prepared for their first day of teaching, and their fifth year?

There may be an assumption that incoming teachers-in-training are "digital natives"[3]. Whilst student teachers may indeed have a greater experience of a range of technologies, it must be recognised that technology is a moving front so their successors, and their pupils, may still be familiar with tools they do not know well. It cannot be assumed therefore that trainee teachers are digital natives, nor that they can automatically or easily transfer their use of technologies into their classroom practices.

It was suggested that most recruits are already pretty competent consumers. But they need to become competent, confident creators of digital resources, ideally produced by working with one another.

The pace of technological change is such that it will not be possible to prepare teachers so that they are always ahead of the curve. But they should provide judgement, critical scrutiny and inspiration. This can be seen as an extension of existing practice. A teacher of English has not read every book which might be discussed, but knows what questions to ask.

At the moment, getting up to speed with the use of ICT is often hampered by the failure to get the IT which is already in schools to work, or work as intended. Routine assurance of operational ICT is not a high level conceptual issue, but it is vital to the incorporation of ICT into teaching and learning across schools, especially in the primary phase.

[3] 'Digital Natives' is the term used by Mark Prensky (Digital Natives, Digital Immigrants, 2001) to describe the generation of young people who come to school having great experience of digital technologies.

Lists of good things are nice, but need to go along with consideration of how to make them happen. If one general prescription is that training providers model best practice with technology, how do you model inspiration?

Some existing ITT already uses online collaborative work and debate, which may begin well before the start of the course. This helps embed the technology in practice. An arresting example here is the University of East London secondary "Virtual Schools" initiative. As part of their induction, new trainees are allocated to a 'virtual' secondary school, with its own background information, and can discuss their school face to face or on an e-learning platform. The trainees are grouped so that each school has a mix of students from different subjects, so that they have an incentive to discuss common professional problems. The virtual environment allows students to explore their roles in a realistic school situation, and to collaborate as they might do in a real school.

While we experiment with new training methods, and new roles, some core roles, especially interpersonal ones, will not be changing that much. Mentoring, coaching and co-learning are already good practice. Teachers need to become more skilled in nurturing the relationships on which these depend in online environments and some courses already contribute to this as well. However, this is not only the role of teachers: Personal and Social Development professionals are expert in these processes and could be encouraged to support learners in making sense of their own place within the world.

In a wide ranging discussion on CPD it was suggested that such professional development should be mandatory after initial training is completed, and should include heads and inspectors. On the other hand, if it is voluntary, self-chosen CPD might be a better guarantee of quality and relevance. In either case it was felt that CPD should carefully manage both personal interests and specialisms as well as the needs of the school.

This highlights the role that digital technologies can play in supporting teachers in linking to other teachers, classrooms and experts to develop their own understanding without some of the time/resource costs.

Some argued strongly that ITT and CPD are not really distinct. However, it was suggested that CPD is vital because there are things teachers do not recognise they need to learn until they have some depth of experience. Training is what you need to survive in a classroom: CPD is what you need to thrive in a classroom. One size fits all models are not valid: teachers must be encouraged to be masters of their own development, and the best provision will involve contact with another person. This mirrors the discussion of teaching in general. CPD needs to be personalised for the professionals so they can personalise what they do for and with learners. This raises the issue of resources to develop teacher-trainers to keep up to date with such changes and also highlights the role that digital technologies can play in supporting teachers in linking to other teachers, classrooms and experts to develop their understanding without some of the time/resource costs.

> Many leading teachers already have extended 'Personal Learning Networks' which utilise both digital and non-digital networks to create connections with peers, experts, tools and resources from across the globe to support their own professional development.

Many leading teachers already have extended 'Personal Learning Networks'. Importantly these personal networks are based around areas of interest and need, rather than based upon group labels. This supports CPD across sectors and levels of education. Managing these necessary personal learning approaches with the development needs of the school will become an important part of developing an appropriately diverse range of CPD practices.

Innovation is often seen at the intersection of disciplines: a problem in one domain can be met with a solution from another. In order to support creative change then, CPD should embrace other sectors. There is a range of organisations that could collaborate and form local consortia to provide learning opportunities for teachers, including those in the non-formal sector such as museums, heritage and personal and social development

sectors. At the same time, schools should be encouraged (or mandated?) to take part in both ITT and CPD. One way to boost CPD would be to make ITT open to practitioners, and CPD open to trainees.

> Education Eye is a free web resource that supports practitioners in finding innovative practices and resources from a range of existing sources. As such, it supports teachers working across and between communities of practice to inform their own development.
> www.educationeye.org.uk

Areas for further exploration

There is one large issue which a meeting like this was not going to tackle, but could still highlight: the need for this discussion to be underpinned by a vision of education: What is education about, from birth to 18? What do we actually want pupils to learn, and to be able to do? Can we have a common view of that? How will that change? This vision needs to be co-created by those who have a stake in education: education professionals, parents, employers and learners.

Meanwhile, how might teachers, and teacher trainers, begin to prepare for a range of possible futures? One strong message overall is that one set of things to expect is changes in how, what and when people learn, and who they turn to for help. In that case, teachers' professional development would do well to mirror the changes expected in other kinds of learning. They will both benefit from this immediately, and discover how to approach the shifting demands and roles of their work in different contexts in future.

One area to explore is how the technology used by young people outside of schools can be utilised to support teaching and learning. This requires teachers in ITT to investigate using their own, and others' technology in their developing practice.

> Whole Education is a website that collects and shares stories of practice from a range of education sectors, aiming to widen the range of practices available to teachers and educators.
> www.wholeeducation.org

A further key aspect of this would be encouraging development of personal learning networks. This means a roster of contacts, connections, and sources, often interconnected, which each learner builds up over time, tailored to their personal needs and interests. New technology is poised to make such networks easier to build and, perhaps, more fruitful to tap into. Those who have explored professional uses of Twitter, for example, report experience of a powerful tool for accessing other people's experience, advice, and general professional support with information and ideas. And a teacher who

uses it to access support, perhaps on a subject where colleagues in the same school are thin on the ground, will also be alive to the possibilities of pupils' use.

Another general expectation was that there will be more collaboration – both to help learn how to make best use of new technology for learning, and to support its actual use in practice. New ICT could facilitate this, but would also demand it to maximise the benefits. This could have many dimensions, including collaboration, working together, and sharing experience and resources between:

‒ ITT and CPD providers and learners

‒ schools and universities

‒ professional educators, parents and (increasingly) grandparents

‒ agencies involved in education and children's services, and those working with children and young people

‒ young people themselves, as learners and in other realms.

These multiple collaborations will also be embodied in teachers' personal learning networks, which they need to build themselves from a combination of online and offline resources and contacts. Social networks and micro-blogging tools, with multimedia, can help this along. Teachers as well as pupils need to be part of communities of co-learners. This is not about setting up new formal requirements or top-down management of such developments, but more to do with supporting people to develop their own 'capital' – implementing mechanisms of support, challenge and development.

This is just one corner of the digital world. Teachers, it was suggested, will need to be not just digitally literate, but fluent in a variety of modes and media. They, as mentors, and their own mentors as developing teachers, need to be confident users of Web 2.0 technologies. They also need to be aware of, and knowledgeable about local contexts. There must be a professional approach to lifelong learning, perhaps using a portfolio approach. E-portfolios would fit with the general increase in knowledge sharing as well as support the continuing professional development from ITT through to retirement.

Looking forward, there are ways of expediting some of these areas for development. Some are low cost measures which could be implemented relatively easily. They mainly involve knowledge exchange.

The list below sets out activities that can be implemented from short to long term. The activities nearer the top of the list were described, by the experts present, as having greater impact upon the quality of teacher practice.

_ Develop **e-portfolios** for use throughout a teacher's career to support purposeful CPD

_ Develop a **dedicated YouTube channel** for archiving high quality teacher practice material. Use webcams to share practice across classrooms and schools

_ Develop an **online directory** of organisations and people who can support teachers beyond the boundaries of school. Alongside, set up a **shared portal for the exchange of ideas and information for teachers**, bringing coherence and rapid access to the range of web material available

_ Set up a **linked online area for MTL** (Masters in Teaching and Learning) dissertation work undertaken by teachers and their trainers, coaches and mentors to exploit the full range of learning gained across the system by this new programme

_ Use new technology to **develop nimble and imaginative working links between schools, teacher trainers and CPD providers**. This would be less expensive than traditional training provision

_ Encourage universities to **promote action research and reflective practice in the innovative use of technology in schools**.

All of this will develop against the background of the current debate on the objectives and organisation of CPD for teachers. Funding constraints will of course affect how this develops, but the discussion emphasised that much of what may need to happen is more a matter of shaking up old ways of thinking than making massive new investments. The role of the teacher is going to be less straightforward, it seems, the job description more negotiable.

The challenge is to map the skills which will be needed to deliver novel aspects of that job description in new and changing contexts, and consider how they might best be acquired, whilst recognising the important roles of teachers that will continue in the future.

Dai Barnes, St Benedict's School
John Bateman, UK Youth
Margaret Baxter, Advanced Skills Teacher
Miles Berry, Roehampton University
Neville Coles, Priory Community School
Mike Davies, NCSL
Lynn Faber, Prince Edward Primary School
Debbie Forster, E skills
Jen Groff, Futurelab
Stephen Heppell, Heppell.net
Rachael Hewitt, Leeds Trinity University College
Graham Jarvis, Leeds Trinity University College
Suresh Jethwa, London Metropolitan University
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Dave Murray, Cumbria University
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Paul Oginsky, Personal Development Point Ltd
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Tim Tarrant, TDA
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Ben Williamson, Futurelab
Robert Wood, Former Director of Strategy, TDA
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About Futurelab

Futurelab is an independent not-for-profit organisation that is dedicated to transforming teaching and learning, making it more relevant and engaging to 21st century learners through the use of innovative practice and technology. We have a long track record of researching and demonstrating innovative uses of technology and aim to support systemic change in education – and we are uniquely placed to bring together those with an interest in improving education from the policy, industry, research and practice communities to do this. Futurelab cannot do this work on its own. We rely on funding and partners from across the education community – policy, practice, local government, research and industry - to realise the full potential of our ideas, and so continue to create systemic change in education to benefit all learners.

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