

# Lessons from the Future: ICT scenarios and the education of teachers

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## ABSTRACT

*This paper reviews significant events of the last twenty-five years in schools and teacher education in England and looks ahead to the next twenty-five years. Various scenarios for the future are examined and the potential is considered for new forms of teachers' initial education and continuing professional development using information and communications technology. It is concluded that the current centrally controlled national system is increasingly inappropriate to present needs and will fracture under the combination of pressures of a commodified education market, learners' consumerist expectations of personalised provision, and networks of informal learning enabled by widespread access to portable communications technology. Four lessons from this future prediction are drawn, with recommendations for radical changes in government policy and orientation.*

## INTRODUCTION

This paper begins with a brief review of the rise of central control over schools and teacher education in England. The current tight constraints are judged against two criteria: appropriateness to present needs and adaptability to the needs of the future. On both of these criteria national policies currently in force are found wanting. A narrow managerialist focus on compliance to performance indicators and the formularisation of pedagogy are resulting in a redefining of the professional status of teachers and teacher education, and this is happening at a time when the anticipated needs for the citizens of an Information Society will be flexibility, creativity and originality. Scenarios for the future of schooling are analysed and compared, and a conceptual model is proposed in which large-scale societal trends towards pragmatism and individualism might lead through attempts to widen the brief of schooling, to a period of deterioration in state-funded schools and a weakening of national controls, to an eventual situation in which education and training have become commodified products in a

marketplace dominated by large commercial interests. It is argued that rapid developments in information and communications technology (ICT) will be a major enabler of such change, with the widespread ownership of powerful handheld ICT devices providing access to reusable digital learning objects. The extensive peer-to-peer communication made possible by the technology could result in significant informal learning and the greater empowerment of individual learners. How these developments might affect initial teacher education and teachers' continuing professional development (to be referred to as ITE/CPD) is examined, and it is argued that the near future could see rapid decline in the role of university departments of education (UDEs) as course providers, with school cluster partnerships employing apprenticeship models of training for the vast majority of new teachers. The paper concludes by drawing four lessons from these future predictions for extensive and radical changes in government policy and orientation.

#### THE RISE OF CENTRAL CONTROL

In the last twenty-five years English schools have experienced an unprecedented rise in central state control over almost all aspects of their function. The introduction of a national curriculum for schools in England and Wales in the late 1980s sent a seismic shock through a system which traditionally had relied upon a patchwork-quilt of county-based local education authorities (LEAs) used to defining their own diverse goals and practices. The national curriculum specified the content of what was to be taught in schools and how it should be assessed, but the methods of delivery were left to schools and LEAs. More recently, the central government's Department for Education and Skills (DfES) has introduced strategies for improving literacy and numeracy in primary schools based upon evidence of identified 'best practice', which tightly prescribe the methods of delivery as well as the content. (NLS, 1998; NNS, 1999). Accompanying this trend has been an escalation in assessment demands with Standard Assessment Tasks administered – in an examination environment – to school pupils from the age of seven, and in the last few months Early Years teachers have seen the

introduction of Foundation Stage Profiles requiring them to make 117 judgements on 13 scales for each of their 3-5 year old children.

ITE in England has experienced comparable changes. In the post-war years, like the state schools sector it was ‘a national service, locally administered’, and was the preserve of small ‘monotechnic’ colleges of education administered in many cases by LEAs. The curricula of these colleges varied, but alongside the practicalities of teaching ‘method’ was the consideration of wider educational issues in a pedagogical knowledge-base drawn from the disciplines of psychology, sociology and philosophy. Through the 1970s the colleges worked in partnership with UDEs as teaching became an all-graduate profession within the state sector; but a diversity of approaches was preserved (Edwards, *et al.*, 2002). In the following decade this local autonomy was to be lost. The Conservative government of Margaret Thatcher created a Council for the Accreditation of Teacher Education to set national standards for ITE courses. Subsequent legislation through the decade weakened the autonomy of the LEAs and their role in ITE and from 1994 a Teacher Training Agency (TTA) imposed further central controls, narrowing the focus of ITE to school-based activities in a national curriculum for teacher *training*, with student-teachers now known as *trainees*. Pedagogical theory was sidelined in a move to evidence-based practice and the emulation of ‘best practice’. UDEs were the next to lose their autonomy as their own ITE courses were subject to the same requirements to meet prescribed *standards*, policed by an extension of powers for the inspection agency (OfSTED) to close down non-compliant ‘training providers’.

#### A CRITIQUE OF CENTRAL CONTROL

In both the schools sector and CPD, and also in ITE, the imposition of top-down control and a culture of compliance has brought greater public accountability and a ‘raising of standards’ – as judged by skills competences and the results of standardised tests. From an economic utilitarian viewpoint this might be welcomed, as it is the job of schoolteachers to prepare their students for future employment, and the job of government, as supervisor of public funding,

to create the conditions for this. On the other hand, bottom-up flexibility, local innovation and autonomy have been substantially eroded in what many view as a threat to democracy (*e.g.* Hargreaves, 2003, p.40; Bates, 2004). Two principal criteria by which centralised policies for schools and ITE/CPD in England might be judged are: firstly, their appropriateness for present needs and secondly, how well they are framed to anticipate and adapt to changing circumstances.

To consider the first of these criteria, there has been considerable criticism of the appropriateness of the sweep of government reforms. In schools the freedom of teachers, especially in the primary sector, to exercise their professional judgement in adapting a flexible curriculum to local requirements has been rescinded.

In England the regulation of classroom teaching is evident through inspection processes, national curricula, frequent national assessments, target setting for pupil performance, systems of long- and short-term planning for curriculum delivery, prescribed pedagogies for the teaching of literacy and numeracy and performance-related pay.  
Edwards *et al.* (2002, p.97)

In ITE concerns for student teachers' personal development and an understanding of broader educational issues has been replaced by concentration on a narrow *performativity*:

English teacher training is likely to create practitioners who have been trained in performativity against externally derived criteria rather than intelligently interpreting professional decision-makers able to respond to pupils as learners.  
Edwards (2001)

From a similar viewpoint, Bates argues for a wider social and cultural interpretation of the purpose of schooling, with the implication that teachers and ITE/CPD professionals must engage in a 'broad conversation' on the balance between the personal, social and economic functions of education.

The role of government here is not to regulate the technical detail of teacher education as an administrative service but, rather, to regulate the conditions of teaching and of teacher education in ways that preserve the autonomy of educators, enables them to continue to take part in such a debate, and to incorporate such cultural communication into their own sense of self as a Subject and as a professional.  
Bates (2004)

From its website, the General Teaching Council for England (GTCE, 2005) would appear to be already leading this debate: “The General Teaching Council for England, as the professional body for teaching, provides an opportunity for teachers to shape the development of professional practice and policy, and to maintain and set professional standards”. However, unlike the General Teaching Council for Scotland (GTCS), it has no control over the accreditation of ITE or CPD programmes. Founded in 1965, the GTCS is a well established and powerful organisation funded entirely by its professional members; by contrast, the GTCE was not created until 1998 – four years after the TTA, is financially dependent on the government, and can act only in an advisory role. Neither does the future for the GTCE look robust in view of the extended CPD role and expansion of the TTA.

Gilroy (1999) criticises the new concentration on observing and emulating best practice as essentially retrospective and conservative, and Edmond (2003) finds in the school-based ‘apprenticeship model of teacher training’ for teaching assistants (TAs) a role conflict between the TA as a member of the school staff and the TA as a learner, which can limit the range of experience TAs encounter as well as the quality of their reflection upon experience. Edmond also reports concerns about the extent and quality of professional discourse in schools, raising questions about classroom teachers’ effectiveness in facilitating reflective practice. The same problems might be identified in the Graduate Teacher Programme, strongly promoted by the TTA as a direct route into teaching, and which employs a similar apprenticeship model.

The present centralised policies, then, are judged by many commentators on the first criterion as not appropriate to prepare teachers for the complexities of a role in which they do more than ‘deliver the curriculum’ but are able also to make informed professional decisions and engage in wider professional debate. A judgement on the second criterion can best be made after consideration of the needs and purpose of schooling in the future.

## NEEDS OF THE FUTURE

Castells (1997, p.340) identifies two types of labour in the modern information economy: generic and self-programmable. The latter has the “capacity constantly to redefine the necessary skills for a given task, and to access the sources for learning these skills. Whoever is educated in the proper learning environment, can reprogram him/herself toward the endlessly changing tasks of the production process.” For such self-programmable workers the prospect of multiple concurrent jobs and multiple careers in a lifetime is almost inevitable.

The European Union’s Education Council also stresses the value of adaptability for the maintenance of economic competitiveness:

The nature of work is changing and skills required from employees and managers are changing. Examples of this change are an increasing knowledge intensity in products, an increasing proportion of the workforce in the service sector, changing work organisations that demand new skills, and the role of enterprises as training providers. Knowledge can not be expected to remain static throughout life the way it used to. Lifelong learning in the context of employability will in many areas be a prerequisite to stay attractive to the labour market.  
EC (2001)

This analysis is echoed in the more recent publications of the Future of Work Programme funded by the British Economic and Social Research Council (ESRC). In *Skills and Innovation in Modern Workplaces*, Taylor (2004) predicts that knowledge and skills in ICT will increasingly be at a premium and that successful employers will be those who provide continuing opportunities for their development. The report also notes that “... public policy-makers need to turn much more of their attention to the changing needs of workplaces and the actual structure and skills content of jobs.” Yet, as the Organisation for Economic Co-operation and Development (OECD) observe:

... schools are under increasing pressure to conform to precise, standardised outcomes. The arguments are that education is far too important to be left to chance and that large sums of public monies must be seen to give value. And yet, these pressures are being exerted at a time when most agree that flexibility in individuals and organisations is what is needed in the 21st century. To be an innovative learning organisation means being able to experiment and take risks, with the necessary corollary of occasional 'failures'.  
OECD (2001, p.105).

Edwards *et al.* (2002, p.125) warn:

Even if one accepts a functionalist association between education and the economy we still do not believe that an overly prescriptive and bureaucratic approach to pedagogy on the part of government is functional for the new economy; and nor will it resonate with the complexities of modern culture.

There is some evidence, then, that centralised control of education policy in England can be questioned on its responsiveness to anticipate the future as well as on its appropriateness to the present. However, in order to make a judgement on wider grounds than those of economic utility it will be helpful to examine scenarios for the future.

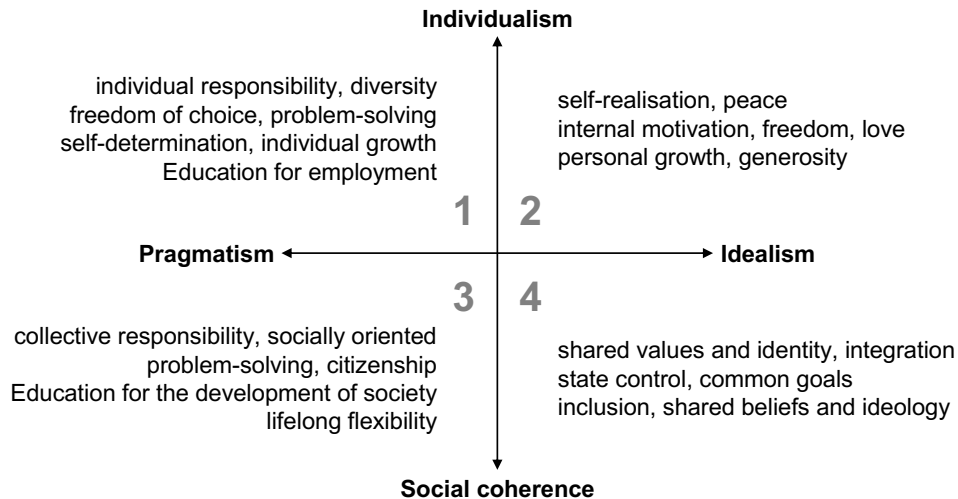
## SCENARIOS FOR THE FUTURE

Scenario models are planning tools used to provide a view of the future. Based upon extrapolations from emergent trends they can have value in promoting understanding of the present situation as well in as identifying needs for the future. Cave & Simmons (2004) outline the use of such tools in the TERRA project; funded by the European Union this aims at optimising the contribution of ICT in an Information Society to foster sustainable development. Scenario modelling has also been used in teacher education:

As an instrument for organisational learning it can be used on the level of the management of institutions for teacher education, helping them to set course for the future and to be pro-active. By developing scenarios, the warning signs of a changing context can be recognised. In this way it stimulates innovation and change. It can also be an instrument for organisational learning for the whole of the organisation. It can open the discussion on implicit presuppositions within an organisation. The resulting scenarios provide a common vocabulary and an effective basis for communicating complex—sometimes paradoxical—conditions and options.  
Snoek (2003)

Snoek chaired the Research and Development Centre 19 team of the Association for Teacher Education in Europe (ATEE-RDC19), which used a four-scenario theoretical model as a ‘reflecting instrument’ to compare teacher education in six European countries. The orthogonal dimensions of Pragmatism–Idealism and Individualism–Social coherence are illustrated in Fig. 1.

**FIG. 1 ATEE-RDC19 Scenario Model**



After Halstead (2003)

Another member of ATEE-RDC19 used the four-scenario model to chart changes in national ITE policy in England over the last thirty years (Halstead, 2003). In this analysis, there has been a cyclical tour, from Quadrant 2 (Fig. 1) in the 1970s, through Quadrants 4 to 3 in the 1980s and 1990s. Halstead notes in recent statements by the DfES and the Prime Minister some indications of a further move towards Quadrant 1, concluding that

The impact of these changes in schools and on teacher training is yet to be seen, and how far the old machinery and managerial style will remain in place is debatable. What is certain is that the mantras of *Driving up Standards* and *World Class Education* together with competitiveness in the economic market place, behind all previous change, are still in place so it is pragmatism which, despite the rhetoric of some documentation, has really ruled education in England during the last 20 years and continues to do so.  
*ibid.* (p.73)

According to the ATEE-RDC19 study, this move in England towards Pragmatism and Individualism is reflected in scenario analyses conducted in the other countries.

In some countries one of the two trends prevails (Poland towards pragmatism, The Netherlands and Sweden towards individualism), in other countries (England, Germany and Portugal) a combination of both can be seen. Both changes can be recognised in general developments in society in Europe, where structures stimulating social coherence (connected to clear and distinguished religious,



humanistic or political standpoints) are disintegrating leading to a stronger individualisation and where economical competition is growing.  
Snoek, *et al.* (2003, p.140)

In the late 1990s the OECD engaged in an exploration of future educational scenarios culminating in the publication of *Schooling for Tomorrow* (OECD, 2001). Its six scenario projections for the future of schools over the next 15-20 years can be grouped into pairs. In scenarios 1 & 2 the state-controlled bureaucratic *status quo* is preserved intact, but the second scenario sees state provision unravel as teachers leave the profession for occupations with fewer bureaucratic demands. The third and fourth scenarios consider different *re-schooling* possibilities for a changed social agenda, from schools as essential agents of community cohesion to a utopian ideal of generously resourced centres of educational innovation, directed by empowered and reflective professionals and focused on the needs of learners. The final two scenarios embrace ideas of *de-schooling* which, although appearing as new departures, have considerable historical pedigree.

In the United Kingdom the Universities Council for the Education of Teachers (UCET) – a body representing almost all UDEs in the United Kingdom, but independent of government – has engaged with the TTA in a 2020 Teaching Steering Group, inviting the opinions of teacher educators on three future models based upon OECD scenarios 3, 5 and 6, and adapted to a projected context of England in 2020. These scenarios are summarised in Table 1.

**Table I UCET/TTA Futures 2020 Scenarios**

<p><b>Scenario 1:</b> an extended market for education</p>	<p>“Based on the OECD scenario ‘extending the market model’, this scenario takes the view that existing market features within education have significantly extended.</p> <p>Wide differences in the quality of public sector education have occurred, and this has led to dissatisfaction among articulate parents and businesses who are concerned about the future of the workforce and the demands of the knowledge economy. At the same time the scope and quality of e-commerce solutions has greatly increased, giving these ‘strategic customers’ a choice in educating their children and employees. Schools and communities have developed partnerships with suppliers of powerful learning products, and a strong market model is present.”</p>
<p><b>Scenario 2:</b> learning networks with a diversified workforce</p>	<p>“Based on the OECD scenario ‘learning networks and the network society’, this scenario advocates that learning has become more individualised through the use of networks of learners, parents and professionals.</p> <p>Schools have gained a reputation for not being able to deliver learning tailored to individual needs, respond to a changing society, and meet the needs of the expanding knowledge economy. Powerful ICT solutions created alternatives to the public school sector, and the educated classes and community groups took advantage. The trend is towards de-institutionalisation of schooling, and the development of learning networks that are not subject to time and place constraints. Individualism has prevailed, and these networks have developed as communities look to redefine the work of schools so that they might better serve the community.”</p>
<p><b>Scenario 3:</b> schools as social centres</p>	<p>“Based on the OECD scenario ‘schools as core social centres’, this scenario looks at how schools are considered to be highly effective in preventing social, family and community fragmentation.</p> <p>They have changed because the ideology of social inclusion and the use of education to raise individuals’ aspirations to empower them out of poverty began to fail. There has been a large rise in crime within certain sections of society, and this has led to a decline of confidence in the public school sector; teachers, who found it difficult to exclude pupils, became over-occupied with meeting the needs of disruptive pupils, to the detriment of the majority of pupils. At the same time, individuals are able to access more and higher quality ICT-based materials to support their cognitive development, and the labour market needs a diverse range of competences. Public schooling has been refocused to counter these negative trends, and significant players within communities have taken responsibility for restructuring the role of schools so that they better serve the community.”</p>

After TTA (2004a)

There are interesting parallels with the ATEE-RDC19 study, and in all three scenarios Pragmatism and Individualism are clearly apparent. Evidence for the ‘*schools as social centres*’ scenario can be found in the DfES *Five Year Strategy for Children and Learners* (DfES, 2004), which heralds a tighter integration between schools and social services in the

provision of support to children. To this is linked devolution, and in the Foreword of the document Charles Clarke, then Secretary of State for Education and Skills, promised

a radically reshaped system for delivering education and children's services, and in particular a reshaped role for Local Government and for my Department, moving away from direction towards an enabling and empowering role. It depends on freedom for those at the front line to personalise services and to improve them. And it depends on Ministers like me holding our nerve and being able to resist the lure of the next initiative in favour of a system that drives its own improvement more and more.

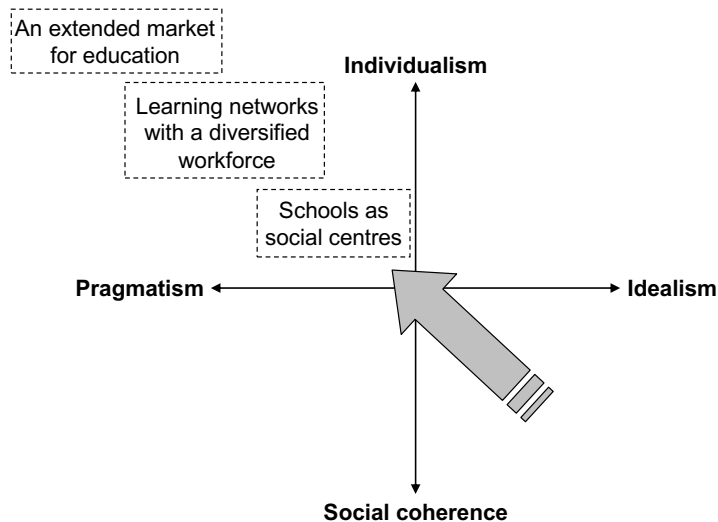
DfES (2004, p.5)

The '*learning networks with a diversified workforce*' scenario is more radical, seeing a de-institutionalising of schooling rather than a widened brief, and a progressive withdrawal from state schools by educated parents (Castells' 'self-programmable workers') dissatisfied on the grounds of lack of personalised teaching and inadequacies in the preparation of their children for the Information Society. In this scenario public-funded schooling would continue, but only for the children of Castells' 'generic workers', as it is these parents who would lack the understanding and resources to seek home tuition and to access the growing network of learning coaches. In terms of a trend from Quadrant 4 to Quadrant 1 the '*extended market for education*' is the most radical of all three scenarios. Like the previous one, dissatisfaction with traditional provision has led to shrinkage in the public-funded schools sector and a growth of private education services including national not-for-profit educational trusts and local public/private partnerships. What sets the extended market scenario apart is the extent to which the new alternatives to schooling have become dominated by globally operating for-profit companies with unalloyed commercial interests. Here, education has been turned into a commodity, and its deliverables – courses and services – are branded and promoted in highly competitive, highly lucrative and diverse market places.

As Snoek argues, the main value of scenario planning lies in the use of models as tools for stimulating reflection about the present as well as the future, rather than in making firm predictions. With this caveat in mind, a tentative attempt can be made to more closely relate the three Futures 2020 Scenarios into the ATEE-RDC19 dimensional model. In this 'meta-

scenario' view illustrated in Fig. 2, a trend arrow indicates the general movements in policy, underpinned by wider changes in social orientation, over the last thirty years and the 2020 scenarios have been placed in order of their degree of Pragmatic Individualism on this diagonal dimension.

**FIG. 2 Mapping the Futures 2020 Scenarios to the ATEE-RDC19 Model**



Following the logic of this arrangement, it follows that all three of the Futures 2020 Scenarios would be visited: *in sequence*. As evidence for this, it can be argued that if the DfES five-year plan is implemented by about 2010 then the ground will have been substantially prepared for the first scenario. And if the diversity of provision envisaged in the learning networks scenario develops as described, a deteriorating state schools sector would coexist with a growing demand for individualised learning. The extended market scenario would be an incremental development of this situation over time: in which the balance tips overwhelmingly in the direction of private provision and the shrinking influence of the state is no longer able to contain the pressures of a full-blown market. Interestingly, the three scenarios fall into the same sequence in terms of the extent of their use of ICT, so an examination of recent developments in learning technologies and their alleged transformational potential may shed further light.

## THE TRANSFORMATIONAL POTENTIAL OF ICT

The following section examines how the catalytic effect of ICT, claimed by many commentators, may not only influence pedagogical practice but also transform the power balance between teacher and learner and threaten institutional structures in education.

Papert, a veteran commentator on ICT in education, argues that conventional notions of schooling are challenged by children's home use of computers. Strongly critical of the emphasis in the United States of America on school standards and standardised tests, he regards the piecemeal and controlled adoption of ICT in schools as a 'safe' institutional reaction to hold in check its subversive potential to transform or even replace conventional schools (Papert, 1999). More extreme views are expressed by Perelman (1993), who claims the public-funded school system is "...the last great bastion of socialist economics" in the USA and that its "schools and colleges are as productive and innovative as Soviet collective farms." Less contentious but perhaps more persuasive is the growing consensus on both sides of the Atlantic on what might be achieved through *ubiquitous computing*, by which a large proportion of the population will have high-speed broadband access to the Internet via low-cost handheld devices sporting sophisticated 'Swiss Army knife' digital functions (Boyd, 2005). Such devices are likely to become as cheap and widespread as the present generation of mobile telephones (cellphones), now owned by 95% of 15-16 year olds in the UK (Boyd, 2005). The advanced functions of fourth-generation (4G) mobiles, likely to reach market by 2010 could make even greater impacts upon personal, social and work environments.

The umbrella term *eLearning* is used rather loosely to cover the educational use of ICT, and has more recently come to include learning with the mobile technologies of digital telephones and wireless-connected handheld computers (known as personal digital assistants, or PDAs). These have been the subject of large research and development projects funded by the European Union, in which the use of handheld technology was reviewed from standpoints ranging from the learning of basic skills and promotion of social inclusion, to the

dissemination of lecture materials to university students (Attewell & Savill-Smith, 2004). Projects undertaken in the USA at the Harvard Graduate School of Education (HDUL, 2004) have examined a number of applications for PDAs in teacher education, involving situated learning and distributed cognition. In their study of the widespread and enthusiastic adoption of mobile phones by young people, Katz & Aakhus (2002) postulate the notion of *Apparatgeist* to model the ways in which personal and social identities and practices have changed so dramatically alongside the use of this ubiquitous technology. Wellman observes a similar phenomenon:

The shift to a personalized, wireless world affords networked individualism, with each person switching between ties and networks. People remain connected, but as individuals rather than being rooted in the home bases of work unit and household. Individuals switch rapidly between their social networks. Each person separately operates his networks to obtain information, collaboration, orders, support, sociability, and a sense of belonging.  
Wellman (2002, p.10)

Rheingold, a leading commentator on the social implications of ICT, points to the emergence of *smart mobs* – interest groups enabled by pervasive electronic communication – and cites examples of how they have already effected political change. This potential for ‘digital democracy’ is in tension with the use of ICT to reinforce existing corporate forms of control.

Media cartels and government agencies are seeking to reimpose the regime of the broadcast era in which the customers of technology will be deprived of the power to create and left only with the power to consume. That power struggle is what the battles over file-sharing, copy-protection, regulation of the radio spectrum are about. Are the populations of tomorrow going to be users, like the PC owners and website creators who turned technology to widespread innovation? Or will they be consumers, constrained from innovation and locked into the technology and business models of the most powerful entrenched interests?  
Rheingold (2004)

The related ideas of *peer-to-peer* and *grid computing* (Buyya, 2004) take the potential democratic power of personal communication systems a step further: away from conventional centralised client-server network architectures to a non-hierarchical grid in which the network processing is distributed between nodes – as evidenced by the powerful Cell microprocessor chip launched in 2005 (Orlowski, 2005). Employing these new infrastructures are the emergent technologies of electronic shareable content objects, also known as *learning objects*

(Littlejohn, 2003), and *intelligent software agents* (Hermans, 2000), a combination with enormous potential to transform education and training at both school level and in ITE/CPD. A learning object is defined by Rehak & Mason (2003, p.21) as “a digitized entity which can be used, reused or referenced during technology supported learning”. A learning object might be an electronic multimedia slideshow (for example, a Microsoft *PowerPoint* file) on the origins of the First World War, or a set of digitised photographs of woodwind instruments with accompanying text and sound clips, or an interactive accounting spreadsheet illustrating double-entry book-keeping. The storage of learning objects in a common file format makes it possible to put together any selection to work in combination (known as *interoperability*) and the same object may be employed a number of times in different contexts (known as *reusability*). Learning objects are stored in digital repositories and – like library books – require careful indexing. The metadata description accompanying each object in a repository must specify its content, level and range of application, and the educational materials must be structured consistently to ensure technical interoperation with other learning objects (CETIS, 2005). With the growing popularity of situated and problem-based learning (Lave & Wenger, 1991), many objects are being designed as components within educational games and simulations. Paris (2003) claims that “simulation authoring tools are at the heart of the next generation of e-learning courseware development products” and foresees a rapid growth such that “by 2006 70% of all off-the-shelf as well as custom e-learning content will include some application of simulations”. Examples of objects designed for use in English schools may be found in the Iconex Learning Object Repository (Church *et al.*, 2003), and many support the learner-initiated interactivity characteristic of games and simulations. Zemsky & Massy (2004) believe that learning objects are currently at the experimental stage in which a variety of competing designs are being trialled prior to the expected emergence of a dominant design, and they regard them as the next major adoption cycle of eLearning. In a possible *learning object economy* of the future, millions of such resources would be accessible via the Internet in thousands of digital repositories, requiring sophisticated adaptive software to identify needs, locate, broker and pay for appropriate content, and Malcolm (2005) explores questions

of how this might impact upon institutional development and diversity in higher education. Tiffin & Rajasingham (2003, p.34) anticipate 'Just In Time Artificially Intelligent Tutors' (JITAITs), which will interact with other software agents to replace much of the manual administration of tertiary education and assist students in the selection of personal pathways through vast arrays of learning object options. This will enable informal, non-timetabled learning to take place online without the mediation of teachers, institutions or accredited curricula. In this vision of the future, students would download and use units of study, selected with the aid of their JITAITs and paid for perhaps with electronic learning credits. Collaborative learning opportunities would also be available, with peer-to-peer interaction possible for learners in similar circumstances. Other online agents would perform learner assessment, academic quality assurance and the accreditation of formal qualifications. As these processes could be conducted entirely online there would be no need for them to be located in any particular country or be driven by the start and finish dates of academic calendars.

Conventional university-based ITE is taught typically in large buildings situated on large campuses. The reasons for this are historical: academic staff and students need ready access to large libraries and lecture halls and administrative staffs need offices with large numbers of filing cabinets. By contrast, courses 'delivered' by open and distance learning have no need for such large infrastructure (the Open University, which pioneered distance learning in higher education, is Britain's largest university by far in terms of student numbers, yet its campus at Milton Keynes is physically the smallest and is rarely visited by students). A major cost benefit of eLearning is afforded by its scalability. Unlike conventional forms of course delivery which require physical plant of limited capacity, Internet-based eLearning courses have virtually unlimited capacities, and when the (higher) initial costs of course creation have been recouped there is the potential for significant return on investment. As the new technologies mentioned above take hold, this profitability could become substantial. The potential of eLearning has not gone unnoticed in the private sector, where investment



worldwide in commercially provided content and services for corporate training currently runs to €5 billion and is projected to increase tenfold by the end of the decade (HRM Guide, 2004). Significantly, the burgeoning international for-profit market for education and training now outstrips that of state governments. There are, however, major obstacles to the further growth of conventional eLearning courses.

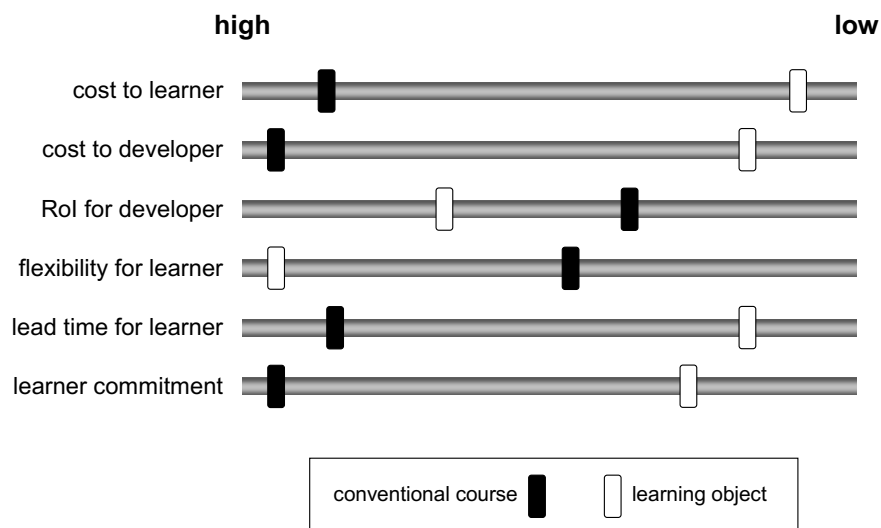
On the one hand, wider access and lifelong learning require vast increases in specially designed course materials to satisfy the greater range of demands for learning. On the other hand, creating the digital resources necessary for online course delivery requires considerable investment, a factor that makes resource development only viable for courses with large student numbers or sizeable budgets.

Littlejohn (2003, p.2)

Furthermore, it is expensive to personalise learning and make it adaptive to individual needs.

It is for these reasons that learning objects hold such potential. As Fig.3 illustrates, their reusability and smaller granularity offer the possibility for better matching to need, greater return on investment (RoI) for developers – so lower unit costs to learners – and a lower level of commitment by learners (poor retention being one of the drawbacks of many conventional eLearning courses).

**FIG. 3 Comparison of learning objects with conventional eLearning courses**



Whether the wholesale use of learning objects would be educationally desirable or indeed effective is open to question, and reservations have been expressed by many (Parrish, 2004; Williams, 2004). However, rather than learning objects replacing conventional forms of course delivery, it is more likely they would be employed alongside, in a *blended learning* approach incorporating online and face-to-face methods. The desirability of a learning object global market is another issue, and Smith (2002) sounds a clear warning of the dangers of branding, commodification and threats to the autonomy of national educational systems presented by this aspect of globalisation.

Conventionally, ITE/CPD has been conducted through formal, accredited courses in a learning situation which can frequently resemble unidirectional transmission. Informal learning has also been present in the interactions between learners, sometimes making a substantial contribution. Coffield (2000) discusses the value of informal and peer learning (sometimes referred to as non-formal learning) in its own right, and Leadbeater argues

We must move away from a view of education as a rite of passage involving the acquisition of enough knowledge and qualifications to acquire an adult station in life. The point of education should not be to inculcate a body of knowledge, but to develop capabilities: the basic ones of literacy and numeracy as well as the capability to act responsibly towards others, to take initiative and to work creatively and collaboratively.  
Leadbeater (2000, p.111)

Unidirectional transmission is less prevalent in the digital world, where communications technologies are considerably more symmetric than print or broadcast media. Printing and distributing a book, or setting up and operating a television station, are not cheap or easy tasks for individuals. But publishing a book on the Internet, participating in an online conference or contributing multimedia materials to an international special interest group are as cheap, easy and technically feasible for individuals as they are for large organisations. Student-to-student communication has been an integral feature of eLearning for many years, being considered as important as tutor-student dialogue. However, this has so far been conducted within the confines of eLearning courses in which the locus of control has resided with the organisation providing the course and 'managing' its students. A learning object economy has the potential

to create even greater symmetry, facilitating informal peer-to-peer learning in which students are engaged more in active creation and less in passive reception. Perelman dubs this peer interaction HyperLearning and Raschke (2003) contends that the ease with which anyone, irrespective of academic status, may contribute to collaborative enquiry reflects the way the Internet operates and blurs the lines between teaching and research. Tim Berners-Lee – the inventor of the World Wide Web – designed the system so that:

We should be able not only to interact with other people, but to create with other people. Intercreativity is the process of making things or solving problems together. If interactivity is not just sitting there passively in front of a display screen, then intercreativity is not just sitting there in front of something 'interactive'.  
(Berners-Lee, 1999, p.182)

The *Horizon Report* (EDUCAUSE, 2005) makes the following predictions for time-to-significant-adoption (within universities in the USA) of the following aspects of eLearning:

- One year or less: extended (blended) learning; ubiquitous wireless networking
- Two to three years: intelligent systems for information searching (less than JITAITS, but necessary for access to large collections of learning objects); educational games and simulations
- Four to five years: social (peer-to-peer) networks and knowledge webs; context-aware computing (intelligent software agents more closely resembling JITAITS).

In Britain, the rather disjointed attempts to address eLearning in its different sectoral and institutional contexts are being replaced by a national policy which seeks to integrate developments: in schools and their communities (*Harnessing Technology*: DfES, 2005), in further education (*Get on with IT*: DfES, 2002) and in higher education (*Strategy for e-Learning*: HEFCE, 2005). The aims of this new approach, related to the DfES *Five Year Strategy for Children and Learners* (DfES, 2004), are to open up learning and communication services for more flexible and personalised access and to foster learning partnerships and staff development. However, these top-down attempts may prove too underpowered and too slow to manage the outcomes predicted in the *Horizon Report* and elsewhere. Raschke (2003) sees an undermining shift in emphasis from the *curator* (of the canon) to the *creator* (of novel

forms of expression across the Internet) which calls into question the need for schools, universities and other organisations as physical institutions.

Digitization is a force that undermines industrial forms of 'corporate' organization in the same instance that it demolishes the medieval 'walled cities' of inquiry that has denoted the higher learning.  
(*ibid.*, p.65)

The educational implications of these developments fit well with the extended market scenario. The staged retreat of central control in policies for schools and curricula could become swamped by the massive popular adoption of unregulated learning content accessed by ubiquitous portable technologies. As with other victims of globalisation, there would result a decline of the national canon and rapid growth in plurality and diversity.

ITE/CPD would inevitably reflect such changes and here too, it would be increasingly difficult for national bodies to maintain control over content and practice in the face of instant access to a tide of attractively-packaged alternatives. Accompanying such variety there might be increasing diversity and flexibility in the delivery of ITE/CPD. The use of eLearning in this area is already established, and major virtual universities such as the Open University and the University of Phoenix in the USA have offered ITE/CPD courses for a number of years (an Internet search in May 2005, using the *Google* engine <[www.google.co.uk](http://www.google.co.uk)> for the terms "teacher training" and "online" yielded over 800,000 hits). However, this existing provision is for formal award-bearing courses, and the impacts of learning objects and intelligent software agents have yet to be made.

#### DIRECTIONS FOR ITE/CPD: THE NEAR FUTURE

ITE/CPD developments in the near future are easier to anticipate, as schools will continue to exist, although perhaps in an evolving form. Gilroy (2003) has predicted that by 2010 most teacher education staff in universities will have retired without being replaced, and the large scale involvement of UDEs in ITE/CPD will have become a thing of the past. Teacher training and recruitment will be the responsibility of school clusters operating the

apprenticeship model in partnership with commercial interests, and an 'Education 3-18' market will be thriving.

What university contribution that survives is based upon the concept of added value to the cluster and its partner. Those university education departments that had grasped in the early years of the century the opportunity of connecting much of their in-service work to knowledge transfer partnerships, having links with both industry and education clusters, will then be well positioned to develop their commercial activity in the new commercial world of Education 3-18. (*ibid.*)

It would not be incompatible with the British government's enthusiasm for partnerships with the private sector for the delivery of ITE/CPD in the near future to be franchised to educational services companies licensed by the TTA and OfSTED. These could manage school-based ITE, provide CPD, pre-school inspection preparation and school inspection services. In addition to Serco QAA (the company already contracted to supply inspector training for OfSTED), multinational corporations such as Educate inc provide a schools function, with over 950 Sylvan Learning Centers in the USA and Canada offering a quality-assured 'McDonaldised' form of learner support (Ritzer, 1993). If franchises for ITE/CPD in England could be made profitable, there might be no shortage of private companies eager to contract.

As discussed earlier, the attraction of eLearning for students lies in its spatial and temporal flexibility. ITE students would of course need to undertake school-based experience, but much of their teaching, study, assessment and certification could be undertaken online. The attraction of eLearning for ITE/CPD providers would be that access to specialist subject knowledge and expertise, especially in 'shortage' and rapidly-changing subjects such as ICT, would not necessarily need to be available within the school cluster. Clusters would also be more able to cope with variable student numbers, as demands upon school-based tutors would be of a different order, and many support functions could be provided online. But the greater symmetry inherent in the new technologies will enable greater and more flexible peer communication. At the level of school cluster-based ITE/CPD the prospect of digital activism seems rather implausible; however, what is more likely is that the wide availability of

pedagogical training and learning resource materials, together with the facilitation of networks for extensive informal learning, will make the experience of ITE/CPD a more heterogeneous and far less conformist one than at present. If greater community involvement is factored in – with the presence in schools (or schools as part of social centres) of more lay persons who have not been subject to government-controlled training and who may be ‘smart’ in the Rheingoldian sense – then local democracy will be strengthened and the grip of central government prescription will be further weakened.

Within this cluster-based scenario there might still be a role for UDEs, in educating the trainers and offering guidance and consultancy to schools, rather than through direct involvement with student teachers. Educational developers in universities might also be involved with subject specialist school-based tutors in schools to design whole courses, learning object components, or services to support online ITE/CPD students. UDEs might also retain a quality assurance role as assessors and validators of students’ coursework submissions, making recommendations to the TTA for the award of Qualified Teacher Status. Looking further ahead, and in a changing environment in which schools would need to adapt to some of the new responsibilities and forms of organisation predicted in the Futures 2020 scenarios, UDEs might have an enhanced role in scoping emerging needs and informing or providing support, training and adaptation services. And nationally, higher education might move into an enhanced partnership role with government, providing deep analysis and projections of emerging developments and being a critical friend in advising policy directions. Universities are well placed for this role; the collection and evaluation of evidence is their stock-in-trade and they are more likely than privately-owned concerns to make unbiased recommendations. The Observatory on Borderless Higher Education (OBHE, 2004) provides such a model; jointly sponsored by the Association of Commonwealth Universities and Universities UK, it is an “environmental scanning facility” focusing upon the development of markets in eLearning, private and corporate education. In ITE/CPD some small steps in this direction are beginning to be taken. UCET, which already has the brief to contribute “to the

educational debate from its specialist position within higher education and to the formulation of policy through contacts with Government and national bodies” (UCET, 2005) was invited by the TTA into the Futures 2020 initiative. The TTA have audited the extent of eLearning in UDEs (TTA, 2004b) and have invited UDEs to bid for small development projects. In addition, the TTA-funded Teacher Training Resource Bank, an online searchable repository of academic and professional resource materials, is being developed in partnership with a higher education ITE provider.

## LESSONS FROM THE FUTURE

It has been argued that the growth of commercial involvement in education and its use of eLearning are likely to be major drivers of transformation in schools and ITE/CPD. The education policies of central government have been criticised for their inappropriateness to present needs and for their lack of responsiveness to changing circumstances. There appear many contradictions within the DfES between the desire for a new openness and flexibility and a reluctance to let go of existing constraints on the curriculum and practices of schools. An open debate between government and other players within ITE/CPD on the changing purpose of schooling has been absent as the DfES and TTA have continued to push through their centralist agendas, and only recently have there been the first signs of change and a move towards more than token consultation. But the genie is out of the bottle and change could come faster and more furiously than the government can anticipate. This paper draws four lessons for the government from its analysis of the future; the first two relate to the present and the last two to the future.

1. The DfES should immediately abandon its micro-management of schools and UDEs and make rapid progress in devolving responsibility. Broad and flexible policies should be determined by a consensus of members of the ITE/CPD community and their interpretation and management in the light of local needs should be the urgent responsibility of local players.

2. The GTCE should be restructured into an independent professional organisation, along the lines of the GTCS, and empowered to lead a ‘broad conversation’ on the future of schooling. As a matter of urgency, this should involve the ITE/CPD community at all levels, establishing an educational climate in which ITE students and teachers in post can develop as aware, reflective and adaptable professionals prepared for the future.
3. The DfES/UCET collaboration to examine scenarios should be extended into a major study, engaging partners in the European Union. It is vital to construct ways in which the public good might be safeguarded against a globalised learning commodities market.
4. The existing TTA funding to UDEs for small eLearning projects should be replaced by large scale projects involving UDEs, regional groupings and commercial partners. The aim should be to anticipate future needs in the development of adaptable eLearning structures and high quality learning materials for informal and formal learning in ITE/CPD.

These recommendations for action are radical and extensive, as it is believed that only a ‘business process re-engineering’ solution will be successful in the likely timescale.

Governmental and institutional inertia must be overcome, and it should be recognised that incremental change at its current rate is too slow. The commercial potential of a commodified education market, growing consumerist expectations of personalised provision and the burgeoning networks of informal learning enabled by widespread access to portable communications technology are too powerful a combination to be managed by cautious and piecemeal solutions.



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