

## **New Technologies and Teachers' Work**

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### **Abstract**

This article explores the relationship between new technologies and teachers' work from a 'reflective critical' perspective. Using examples from England, it identifies issues and trends of wider relevance. The article uses the context of current social, economic and cultural trends as a background to consider the relationship between the changing use of technologies in schools, and the changing nature of teachers' work, framing the relationships in terms of postmodernity, the 'information society', 'technological determinism', and labor process theory.

## **Information and Communication Technologies and Teachers' Work**

### **Prologue: a visit to BETT**

The British Educational Technology and Training show (BETT) is held annually under the aegis of the British Educational Suppliers Association. BETT 2003 was claimed to be 'the biggest education technology show in the world' by the organisers. The four-day event attracts around 25000 attendees - twice as many as the American Educational Research Association's enormous annual meeting - and nearly 500 exhibitors. Government takes BETT very seriously, and each year BETT provides the venue for an important speech from the Secretary of State for Education.

BETT is not an educational conference with an education suppliers' exhibition. It is a trade fair with a seminar programme. Its core purpose is to showcase and sell ICT (information and communication technology) hardware and software. It is an emphatic reminder that education is a large market for the products of industry, and in particular those of the technology industry. It reflects the role of government in the UK: to support the opening up of the educational market to the technology industry, in order to stimulate the development of products by that industry - not just for the home market but also as exportables for 'UK plc'. Secretary of State for Education Charles Clarke appealed to "the sector" in his speech at BETT 2003 "to try to exploit together the opportunities that exist for all our benefits in developing the ICT market in this country and worldwide." He went on to refer to the "common interest we all have, in taking forward these opportunities and exploiting them to the best effect, [which] is critically important for the future education system of this country, and...can lead to massive developments of our technology in a wide variety of ways" (Clarke, 2003, not paginated).

### **Introduction**

Of course, there is nothing new in the concept of the education market, as the familiar sight of the publisher's representative, touting business with a portable display case of books in the school staff room, would attest. But it is worth remembering that much of the technology currently on offer to schools was originally created with other uses and other markets in mind. Much has been repurposed for education from military, business and industrial applications. It is also the case that much of the former electronic 'cottage industry' of educational software

development, which sprang up in the UK around the BBC and Acorn computers -computers which were designed specifically for educational use - has dwindled away as those machines have disappeared from schools. Instead, the PC platform, with a Microsoft Windows interface and Microsoft Office programs - the so-called 'industry standard' - has become the generally accepted education standard. The National Grid for Learning is extending Internet connectivity to all UK schools. Thus UK schools are now, whether they wish it or not, effectively hardwired into the global technology industry. Schools can therefore be seen as a part of, rather than apart from, this industry. This has many and profound implications for teachers' work.

Schools are complex, well-established social technologies into which new information and communication technologies have been introduced. But these new ICTs, and their application to learning, can themselves also be viewed as social technologies. Hence, their introduction into schools can be regarded as the *imposition* of one social technology onto another of longer standing, resulting in 'culture clashes' (Goodson, Knobel, Lankshear, & Mangan, 2002).

In this article, I aim to take what Muffoletto (2001) describes as "a reflective critical position concerning educational technology". This is because "the field of educational technology is historically and ideologically grounded as a form of control, structuring and setting horizons for practice, defining and legitimizing knowledge..." (p. 286). Thus whilst acknowledging the many potentially beneficial uses of such technologies, it is important also to adopt a critical perspective in order to attempt to maintain a public space where teachers and others may enter the discourse. The alternative is to permit the discourse to be determined solely from the perspective of the 'official knowledge' of the state, together with the (sometimes hyperbolic) claims of the commercial sector; in such circumstances the hegemonic process of this aspect of the 'marketisation' of education extends unopposed.

In particular, I will explore the relationship between ICT and teachers' work from such a 'reflective critical' perspective. Though my comments here are based largely on the case of England, there are many similarities with other countries. As will be seen, the relationship between ICT and teachers' work is complex and the impact far-reaching. This is because teachers' work is itself complex, being for each individual a mosaic of responsibilities, specific

tasks and interactions. Some of this complexity is captured by Cuban's description of teachers who, facing batches of thirty students at a time,

*...are expected to implement conflicting purposes. Teachers have to maintain order for many students while creating personal relationships with each one; they have to cover academic content and teach skills while cultivating depth of understanding in each student; they have to socialize students to abide by community values while nurturing independent thought. Teachers, not corporate leaders or elected officials, are asked to carry out these cross-cutting goals daily for masses of diverse children...* (Cuban, 1996, not paginated)

And as any teacher can attest, there is considerably more to their work than just those aspects identified by Cuban. Teachers' work comes under a number of influences, of which ICT is but one. And ICT, of course, is not, and should not be seen as, a single entity; rather, it is a cluster of technological tools and their uses and applications. These tools and applications have different relationships with, and differing impacts on, the various aspects of the work of teachers. In addition, schools themselves are complex institutions in which ICT is used in a variety of ways for a variety of functions, by teachers and others. All teachers are to some degree affected by the institutional use of the technologies, whether or not they use an aspect of ICT directly in their work (and almost all teachers are now expected to do so). Because of these multiple perspectives, and multiple intersections between ICT and what teachers do, it is not surprising that there are also ambiguities and contradictions in the relationships between teachers, their work, and the tools and applications afforded by ICT.

The use of ICT in schools reflects a number of influences. Not least among these is what some see as the need for systemic change in education, reflecting wider changes associated with what has been called 'the information society'. The Government in the UK has demonstrated its belief in the need for education to change in the direction of higher levels of ICT use, and its impatience that such change was not happening sufficiently quickly, by requiring levels of ICT capability and pedagogical understanding amongst teachers. The section 'Drivers for Change' explores some of these influences in greater depth.

The subsequent section, 'ICT in teachers' work', looks at some of the ways in which ICT appears in the work of teachers. Though the use of ICT in teaching and learning is one such manifestation, there are others. All of these represent changes in teachers' work, so it will also be appropriate at this point to return to the discussion of the drivers of change in teachers' work that are related to the emergence of an era of postmodernity.

### **Drivers of change**

The wider rise and proliferation of the computer is interwoven with the broader transition from the modern era to 'postmodernity' (see Hall, this issue). In particular, the development of increased computer memory and faster processing, together with the extension of the Internet and its associated technologies, have been closely associated with the compression of time and space. Harvey (1989) identifies compression of time and space as key characteristics of the condition of postmodernity. The networked computer is thus deeply implicated in the emergence of postmodern social, economic and cultural conditions.

In these ICT-enabled postmodern conditions, the status of knowledge itself is altered (Lyotard, 1984). Increasingly, knowledge, in Lyotard's analysis, becomes reduced to those forms of information which can be held on, and retrieved from, computers. Knowledge is thus 'exteriorised' in relation to the knower. It becomes a commodity in the global economy, and such commodity exchanges are mirrored in the relationship between teacher and learner. Further, the value of such exchange is judged according to the principle of 'performativity' – that is to say, performance optimisation. This is judged in relation to an efficiency view of the cost/benefit equation, with an emphasis on measurable outputs from the system. Thus in education we have standards-related testing and performance league tables together with an increasingly utilitarian view of learning. Education is valued insofar as it contributes to the performance of the system, "a logic which becomes self-legitimizing... [where] enhanced measurable and demonstrable performance is seen as its own end" (Lankshear & Knobel, 2003, p. 163).

The transition to postmodernity has created other tensions in schools. Schools remain essentially modernist institutions (Hargreaves, 1994), yet the world around them has become increasingly postmodern in how it operates. Networked computers have been associated with fundamental

changes in how that world operates, but they have not had the same impact on schools. Many aspects of the way schools are structured - subject departments, timetables, classrooms - mirror the characteristics of Fordist-type mass production. However, much of the economic activity of advanced economies has changed away from Fordism, and this has been associated with the impact of new technologies in the change process. These changes have been championed by some, resisted by others, or accepted as inevitable, but they have not been without controversy, conflict, and unwelcome consequences. For instance, the introduction of electronic typesetting technologies led to bitter disputes and confrontations within the printing industry. Can schools, indeed should they, undergo a similar transformation? For instance, Apple (1992) whilst not opposing the introduction of new technologies *per se* into schools, warns of some of the potential dangers which should be borne in mind when attempting to reap the assumed benefits associated with ICT. "We should be very clear about whether the future it promises our students is real, not fictitious. We need to be certain that it is a future *all* of our students can share in, not just a select few" (p.120).

But schools have more to contend with than simply being 'out of synch' with such larger-scale changes in society. Many modern societies are themselves in difficulty, economically and socially. In spite of having increasingly hard-to-afford systems of public education, schools in modern societies are charged with the responsibility to "administer the innovative treatment if the ailing society is to recover" (Winer & de la Mothe, 1987, p. 64). They have also been opened to harsh public scrutiny and accountability to see that they do so. Part of that 'innovative treatment' is to produce a flexible, highly qualified, technologically literate work force. This has been fuelled by government concern with the economy and with international competitiveness (Ridgway, 1997). In the UK, traditional manufacturing has declined, with movement toward what some have termed an 'information economy'. The drive for education – and, hence, for teachers - to produce a skilled, technologically literate work force, has gained impetus.

The information economy is an aspect of what the sociologist Manuel Castells describes as 'informational society' (Castells, 1996) to distinguish it from previous agricultural and industrial societies. Information of one sort or another has characterised all societies, but in Castells' analysis the world is moving to a situation in which control of, and access to, information and the means of its creation, storage and distribution, are the primary sources of power. As a result,

society itself is changing fundamentally with the impact of new technologies. Others are more sceptical that such change is anything other than one of degree, a continuation of past trends (Martin, 1995; Webster, 1995). Nevertheless, the notion of an information society (or 'knowledge society') of some sort has exercised a very strong influence (Bangemann, 1994) and is the context in which current and recent educational change relating to ICT has occurred.

The rapid development of the information economy, the speed of globalisation and industrial change, and the impact on jobs, have fuelled concerns with lifelong learning.

*The aim of many policy-makers in the UK and around the world is to encourage evolution into a learning society... one in which all people are responsible for their own learning throughout their lives. Access to information and learning will often depend on new technologies as well as on an approach to teaching which supports collaborative professional development. Governments in Europe and around the world have already recognised the need to review educational practices and incorporate new technologies. Their view is of a vocational imperative and one in which IT will increase the quality and efficiency of learning itself. (Somekh & Davis, 1997, p. 3)*

ICT has been much heralded as holding great potential value for the improvement of teaching and learning. However, a fallacy often arises when technology is discussed, being that things (and almost invariably *beneficial* things) are claimed to happen *because of* the technology. The role of human agency is unconsciously overlooked or deliberately omitted. This is referred to as 'technological determinism' (Mackay, 1991). Technological determinism is of interest in the context of this discussion because it can be found not only in advertising material which offers technological 'solutions' (usually without specifying a problem) but also in official discourse, for instance "ICT is more than just another teaching tool. Its potential for improving the quality and standards of pupils' education is significant" (DfEE, 1998, Annex B., p. 1). The point is that such technological determinism in education leaves invisible the work that teachers must undertake in order to use the technology to secure such improvements. A more relational view would see the technology as shaping human activity, but also being in turn itself shaped through human activity.

The extension of the use of ICT in schools has not gone smoothly. Watson notes an apparent 'dichotomy of purpose' between a pedagogic, subject-focused rationale on the one hand ('using computers will improve teaching and learning in your subject'), and a vocational, technocentric rationale on the other ('the country needs young people who are technologically literate for the work force of the future'). The dichotomy has provided confusing messages to teachers about why they should use computers in their work (Watson, 1997). This, Watson suggests, may be one of the reasons for the relatively patchy development of the use of ICT in UK schools.

These confusing messages could well have been exacerbated by other ambivalent feelings about the new technologies. For instance, as Goodson et al (2000) point out, the messages associating the use of ICTs with improved learning outcomes may be seen as implied (or even direct) criticisms of teachers and may in some cases conflict deeply with "teacher identities and their personal educational concepts, ideals and projects" (p.10). Ambivalence may also arise less directly, for instance from the use of ICTs to enable practices that many teachers find oppressive, such as the processing of scores from national standardised tests for the construction of performance league tables.

In November 1998, the Government's National Grid for Learning (NGfL) visioning document, 'Open for Learning, Open for Business', outlined the challenges to learners, education and industry and set targets for 2002 as follows:

- \* "connecting all schools, colleges, universities and libraries and as many community centres as possible to the Grid
- \* ensuring that serving teachers feel confident and are competent to teach using ICT in the curriculum; and that librarians receive similar training
- \* enabling school leavers to have a good understanding of ICT, with measures in place for assessing their competence in it
- \* ensuring that most administrative communications between education bodies and the Government and its agencies cease to be paper-based



\* making Britain a centre for excellence in the development of networked software content, and a world leader in the export of learning services."  
(DfEE/NGfL, 1998, p. 13)

The 'National Grid for Learning' (NGfL) is an application of networked technologies to support the drive towards a learning society in the UK. It is a key aspect of the Government's strategy. In schools, the NGfL programme has so far been focused mainly on improving levels of infrastructure and connectivity, and developing teachers' personal ICT capabilities. But as we can see from the above list, the goal is not solely the improvement of the education system: as indicated by the fifth NGfL target, there is a clear economic driver. The whole programme has, as part of its *raison d'être*, the provision of stimulus to the commercial sector for the development and supply of 'learning services', not just in support of the other local goals, but also as exportables in the global marketplace. Thus the relationship between the economy and the education system (which is not new, of course) is revealed very clearly in this instance. Teachers have effectively been co-opted into the research and development process for these products, through their participation in what amounts to the field-testing of hardware, software and training programmes.

### **ICT in teachers' work**

Awareness of the cost of incorporating computers into the work of schools has changed. Initially computers were seen as expensive, prestigious 'one-off' purchases. Then it was realised that, because of the spiral development of hardware and software, schools would need to plan not only for new hardware purchases to increase their overall complement of computers, but also to replace relatively recent purchases which are 'obsolete'. It was to say the least counter-intuitive to most teachers to abandon expensive resources (that still work!) in a sector perceived by many to be under-funded. Further, many teachers had invested time in familiarising themselves with earlier, relatively simple programs which performed a clear educational role on this earlier generation of educational computers – computers that were now being described by the industry and other proponents of 'up-grading' as obsolete equipment. Teachers had incorporated these computers and associated software into their teaching, and were now being asked to abandon them. Both aspects incurred a cost: one financial, the other in terms of teachers' work.

The understanding of the cost of computers in schools is now summarised by the phrase 'total cost of ownership' (TCO):

*Schools often see the cost of buying a computer system as the major expense of their ICT commitment, but in fact the supplementary costs associated with the equipment are often substantially greater than its initial purchase price. These include the cost of installation of computers and network infrastructure, Internet access, technical support and staff training.*

*...roughly a third of the TCO of ICT equipment is taken up by the initial purchase price of hardware and cabling, a third is made up of the cost of software and related resources, and the final third is accounted for by support and training costs. (Becta, 2003, not paginated)*

What is interesting here is that, though support and training costs appear in the TCO, the impact on teachers' work, particularly the emotional and intellectual aspects of that work, does not, because it cannot be quantified. In a literature review of total cost of ownership, Scrimshaw (2002) notes that "[an] aspect of defining cost categories is to decide whether these are to be restricted to money costs or are also to include financially unquantifiable costs such as the work teachers have to do at home as part of their ICT training". McKenzie attempts to get closer to reality with what he calls the 'true cost of ownership' by including socio-cultural considerations such as 'adjustment', 'churn', 'drag', 'disillusionment', 'distraction' and others (McKenzie, 2003, not paginated).

The relationship between ICT and teachers' work is complex. An aspect of this complexity is the speed of change in the availability and capacity of the developing technologies, and the speed of dissemination of novel ideas. This leads to the danger of fads and over-promotion (Maddux & Cummings, 2003), as companies compete for the educational market before the value of innovations has been properly appraised. This adds to a general pedagogical uncertainty around the appropriate use of ICT in teaching and learning. Writing in the USA to illustrate the dangers of 'faddishness' associated with the promotion of the use of ICT, Noble observes that:

*in 1983 teachers were told to use computers to teach students to program in BASIC, because "it's the language that comes with your computer." In 1984 they were told to teach students to program in LOGO in order to "teach students to think, not just to program." In 1986 they were told to teach with integrated drill-and-practice systems in computer labs to "individualize instruction and increase test scores." In 1988 they were told to teach word processing because children should "use computer tools as adults do." In 1990 they were told to teach with curriculum-specific tools, such as science simulations, history databases, and data probes, to "integrate the computers into the existing curriculum." In 1992 they were told to teach hypertext multimedia programming because "students learn best by creating products for an audience." In 1994 they were told to teach with Internet telecommunications to "let students be part of the real world.*

(Noble, 1996, not paginated)

In England the use of ICT is a requirement of the National Curriculum Programmes of Study for all subjects, with the exception of physical education. Initially such requirements left 'how?' questions largely unanswered with the result that an aspect of teachers' work involved answering the question 'How can ICT be used in the teaching of my subject?' - in other words, the development of knowledge about subject-related pedagogy (Shulman's 'pedagogical-content knowledge'). The development and application of pedagogical content knowledge, it could be argued, has always been part of teachers' work. But there is a tension in the case of ICT, as 'should?' questions seem to have been marginalised in the predominantly technical-rational (and sometimes technologically determinist) discourse about the incorporation of ICT into teaching. In England there is a requirement that teachers should understand when and when not to use ICT, but they are not free to choose not to use it at all! Mandation and professional judgement do not sit well together, particularly "in a context in which the steering and policy directions are unquestionably being framed from outside schools, with teachers being incorporated (or coopted) to work out the implementation details" (Smyth, 1991, p. 8). Such mandatory classroom use of computers by all teachers reveals another impact on teachers' work – that of intensification. ICT becomes yet another thing to think about, to incorporate into lesson plans and schemes of work. This externally imposed requirement to use ICT in teaching and learning is not optional, and

requires training on the part of the teacher. Inspection by the Office for Standards in Education (OfSTED) found that, though progress was being made in the use of ICT, it was going neither far nor fast enough in the official view. Teachers could not be left to develop the use of ICT in teaching and learning unaided. A programme of training for all serving teachers, using money from the New Opportunities Fund (NOF), was the result.

NOF training has been followed by further initiatives to provide industry-developed, on-line training for teachers in how to use ICT in a range of subject contexts, all subject to the framework of the National Strategies. Where the National Curriculum determines the 'what' of teaching, increasingly the National Strategies now specify the 'how'. We see here how the pedagogical use of ICT (along with other aspects of the curriculum) is thus subject to the separation of conception from execution as described by labour process theory. Conception in the 'what' and 'how' of teaching is taken out the hands of teachers, who are left increasingly accountable for execution. Conception is increasingly framed by the National Strategies, and in the case of ICT is presented to teachers as official pedagogical content knowledge by commercial companies working under contract to Government to produce training materials. ICT (the Internet) is also the delivery mechanism for getting the training material into schools – it is truly both medium and message. Taken together, intensification and the separation of conception and execution in the case of ICT in teachers' work comprise a compelling instance of Braverman's concept of 'proletarianisation' (discussed by Hall, this issue). Thus, government in England can be seen to handle the case of new technologies in education much as capitalist management would in Braverman's analysis – that is, to increase control by concentrating conception in the hands of management. Teacher's work is thus reduced increasingly to execution, whilst simultaneously the levels of intensification and accountability are raised.

It could be argued that the situation is at its most extreme in the case of ICT. The individual teacher making use of ICT to support teaching and learning in their work will, certainly in larger schools, be using a network controlled by others. There will be a network manager, ICT technicians to service computers, a curriculum 'delivered' for and specified by National Curriculum Orders, presented according to pedagogical approaches specified by the National Strategies, and incorporated into training material developed by the commercial sector. It is hardly surprising that some see circumstances such as these as constituting a reduction of the

space for teachers' professional autonomy whilst at the same time increasing teachers' responsibilities for implementation (e.g. see Ball, 1990). Further, this occurs in a situation where steerage and policy are framed outside schools, and the success of implementation by teachers is judged according to the principle of performativity.

The pedagogical use of ICT is just one intersection - albeit a highly important one - of the new technologies with the work of teachers. Teachers are also expected to model appropriate ICT use with regard to health and safety, including Internet safety for young people. Teachers' own practices must comply with the requirements of the Data Protection Act. There are in some schools electronic registers and computer-based report writing systems. Recent initiatives indicate expectations that teachers will participate in on-line continuing professional development programmes, and will also select commercially developed teaching material from the new national 'Curriculum Online' facility. In all cases, learning to use the new tools and approaches inevitably requires work. It is a change to existing practice, and change is both intellectual and emotional work (Hargreaves, Earl, Moore, & Manning, 2001). This involves the use of time, both in school and, importantly, at home. In a paper (Fisher, 1999) detailing some of the consequences for teachers of their participation in a pilot project involving the use of portable computers, I noted that:

*For most of the teachers I interviewed, the main cost was their time. In effect, the teachers were putting in many additional hours of their own time on their professional development, at a time when teachers' trade unions are pressing for reductions in teachers' workload. But it was also apparent that the teachers were actively engaged in blurring certain distinctions. In many cases the work/leisure distinction was blurred, for instance in the case of Ian who learned about the Internet at home, by pursuing his interest in sport. Teachers have always taken work home, and the portability of the computers made possible a further blurring of the spatial distinction between home and school. For instance Tim and Martin in an already technology-rich school, were now able to spend extended periods of time properly evaluating CD ROMs at home. (Fisher, 1999, p.1023, italics as in original)*

In the evaluation of a later project, piloting the use of on-line curriculum materials (an innovative approach to the teaching of Latin in the case cited here), I noted similar characteristics:

*Kathy has been teaching English for five years. She describes herself as having been rather resistant to the use of new technologies before becoming involved in the Latin project. She has become a much more confident user of the technology through her participation in the trials of the materials. Kathy had to develop a productive working relationship with the school's ICT technical support in order to receive assistance and advice regarding local technical issues. As a trained English teacher Kathy has also had regular e-mail contact with a project 'e-tutor' who as a Latin specialist advises her on aspects of supporting learning in Latin. Kathy did not wish merely to supervise computer-based activity; rather, she saw her role as facilitator in terms of adding value pedagogically. She puts in a lot of preparation time at home on a portable computer provided by the project. Latin lessons with a volunteer group of students take place weekly after the end of the normal school day in a purpose-built computer room. (Fisher, 2003, pp. 334-335).*

We see in this case that Kathy varied her 'normal' work greatly by becoming involved in that particular project. She increased the amount of work undertaken at home, and lengthened her school day. She developed local and on-line collaborative relationships to support the teaching and learning in which she was involved, and she exposed herself to a high-risk teaching situation involving unfamiliar technologies and untested pedagogical approaches. She was highly positive about most aspects of it, and though without doubt she was subjected to intensification of her work, and this carried a significant cost for her in terms of intellectual and emotional labour, she also was clear that there were benefits. Kathy was not atypical - these and similar characteristics were demonstrated by other participants in the project, and it is clear that, for some teachers at least, the impact of change associated with new technologies is complex, exhibiting both positive and negative aspects. It is an instance of the tendency in postmodern times for particular cultural phenomena to be seen as "both/and", rather than the modernist polarisation into "either/or" (Goodson et al, 2002, p.3).

In the same way that we should be careful not to homogenise ICT and reify it as a single entity, we must also be careful not to homogenise teachers into a supposedly uniform group. The four teachers mentioned in the examples above willingly accepted the additional work arising from their participation in the projects concerned, and should not be regarded as in any sense typical. Different teachers handle change differently, and attitudes to change play an important part in this. Rogers has identified five personality types with respect to the adoption of change. They are: 'innovators' (2.5% of total), 'early adopters' (13.5%), 'early majority' (34%), 'late majority' (34%) and 'laggards' (16%) (Rogers, 1995, p. 262). The first three groups are more positively disposed to change and may find the increased emotional and intellectual work associated with change more acceptable than the more resistant 'late majority' and 'laggards'. The issue is magnified if, as Watson suggests, it is only the innovators and early adopters who can keep pace with the frequent change that characterises ICT – frequent change that is itself a further instance of intensification.

As noted earlier, the Government's response to slow rates of uptake of ICT by schools, and the relatively limited impact on teaching and learning, was to draw up the framework for the NOF training programme. All training, which was to be developed by a range of training providers as commercial products, would meet certain centrally specified criteria. The training would be bought by schools, using dedicated monies disbursed from the New Opportunities Fund. Training would make use of the technology for delivery to schools and to individual teachers, and would take place outside the normal school day. OfSTED, reporting in 2002 on the progress of NOF training, commented:

*NOF training remains unsatisfactory in its overall effect. Training in around six out of every ten secondary schools and half of the primaries has so far failed to tackle adequately those issues relating to the quality of ICT use in classrooms. Training materials for specific subjects at secondary level have often failed to excite teachers. In many secondary schools, the programme has simply ground to a halt. (OfSTED, 2002, p. 3)*

Among the reasons for the poor performance of NOF training is that it failed to take sufficient account of differences between teachers. "In far too many schools, there has been a lack of differentiation in the training programmes to extend the highly competent ICT users and at the

same time meet the needs of those teachers with lower levels of confidence." Further, and significantly in view of some of the ideas elaborated in this chapter, "many teachers found the expectation to work on training materials outside school hours incompatible with other pressures on their time." (OfSTED, 2002, p. 24) This is a timely reminder that the use of ICT is but one factor contributing to the intensification of teachers' work.

## Conclusion

The project to increase the use made of ICT by teachers has not yet run its course, though OfSTED (2002) reports that "there is now an unprecedented willingness in the teaching profession [in England] to embrace ICT" (p. 24). However, we have still some way to go if the vision of the Independent ICT in School Commission (1997—'The Stevenson Report') is to be realised:

*All young people - whether they have access to ICT at home or not - should be able to apply a basic confidence and competence in the use of ICT to all aspects of their learning experience. Teachers in turn should be so confident and competent in the use of ICT that they are able to use it in all aspects of their daily work. And in the longer term, we wish to see a society within ten years where ICT has permeated the entirety of education (as it will the rest of society) so that it is no longer a talking point but taken for granted - rather as electricity has come to be.*

(Independent ICT in School Commission, 1997, not paginated)

The incorporation of ICT into the education system, as envisioned in the Stevenson Report, has complex implications for teachers' work. Amongst these is an increase in proletarianisation as teachers experience intensification of their work, together with increasing separation between conception and execution, with teachers having less and less responsibility for the former. The case of ICT illustrates an aspect of the increasing 'marketisation' of education. Teachers are reconstructed as ICT users and thus as consumers of the hardware, software and training products of the technology industry, and are also repositioned as a constituent part of that industry through the trialing-in-use of its products. While acknowledging the potential benefits of such technologies, one can question whether such "modernization" of education should be extended unencumbered by a critical discourse about the hegemony of the commercial sector or the real effects of such a profound change on teaching and learning.



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