

# **A digitally driven curriculum?**

**by**  
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**and**  
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## **CONTENTS**

**Acknowledgements**  
**About the authors**

**Foreword**  
**David Hargreaves**

**New Media Literacies: informal learning, digital  
technologies and education**  
**David Buckingham**

**ICT and attainment: planting apple trees to harvest  
oranges?**  
**Angela McFarlane**



## **Foreword by David Hargreaves**

The fundamentally different ways in which most teachers and their students approach new information and communication technologies (ICTs) is easily stated: students go directly to work, exploring by trial and error with confidence and excitement, whereas their teachers reach apprehensively for the instruction booklet. This reflects the fact that ICTs are increasingly a natural and inherent part of young people's lives and cultures. Though teachers recognize the need to deploy them professionally in the interests of better learning and teaching, ICTs provoke, especially in older teachers, a sense of low control and so high anxiety, for they fear that they will never catch up.

A primary purpose of the school curriculum is to endow students with knowledge, skills and understanding to which they are entitled but which they might not acquire naturally in their lives outside school. Children now import powerful ICT knowledge and skills from their daily lives into classrooms that increasingly value them. That teachers often have more to learn than to teach in this regard transforms the teacher-student relationship in ways and to an extent that we are just beginning to appreciate.

At the same time much of what is done in schools is deeply influenced by the National Curriculum and formal assessments. These, quite properly, are conservative in that the curriculum contains much of what has been valued in our heritage, and methods of assessment depend on what we trust as reasonably valid and reliable ways of attesting to what students know and can do. Just as ICTs have an inevitable impact on teachers and classrooms, will they, and should they, also affect the very content of the school curriculum and the methods of testing and examining by which it is assessed?

Issues such as these are addressed in two powerful essays in this important pamphlet. David Buckingham demonstrates that we must move far beyond giving teachers technical skills in ICT and inserting ICT into the formal curriculum to helping teachers and students come to terms with the rich implications of digital literacy. If done well, this can contribute substantially to the kinds of skill that are at a premium in the knowledge economy, such as the ability to communicate well in multiple modes and the capacity to innovate. Potentially, the boundary between formal school-based and informal community-based learning can be weakened - lengthening the school day is no substitute for this more difficult task. Quite soon, I believe, we shall see sixth formers spending up to half their time out of school, undertaking learning at home and in other places, thus providing more opportunity for intensive small group seminars and individual tutorials when they are in school. At the same time we have much to learn about how the energy and ingenuity that the commercial sector has invested in children's games can be diverted to making curriculum content and pedagogy more motivating to students if the school is not to become ever more boring and irrelevant to many young people.

There is huge potential in ICTs to transform assessment systems. I believe we should face up to need for cheaper, more reliable forms of testing; for 'just-in-time' testing available when the student, not the test, is ready; and for using multi-media as a resource both to create more imaginative forms of assessment as well as to assess knowledge and skills that have been

neglected hitherto because they remained unassessed. As Angela McFarlane points out, the potential of ICTs to further 'formative assessment', by which, through feed back, students improve how they learn and teachers modify how they teach is considerable. Indeed, I believe that if ICTs contribute to radical advances in formative assessment, this will play a key part in the fusion between curriculum, assessment and pedagogy that is essential to improving the quality of schooling and to raising educational standards.

These two incisive and authoritative essays deserve to be read and debated. They uncover the nature and depth of the challenges for educators, and they point to some of the paths likely to be pursued by those committed to the necessary educational innovations and reforms.

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## **NEW MEDIA LITERACIES**

### **Informal learning, digital technologies and education**

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How can schools equip young people to deal with the challenges posed by digital media? And how can they build upon the new styles of learning that these media develop and require? This chapter argues that schools must recognise and learn from the ways in which children are using new media in their leisure time. It outlines the new curriculum initiatives and new styles of teaching and learning that will be necessary if schooling is to remain relevant to the digital world in which today's children will be coming of age.

Key recommendations for policy include:

1. The development of a new curriculum in 'digital literacy', which will be integrated with print and audio-visual literacies, and become part of the core curriculum. Developing this curriculum will require:

- A clear model of learning progression
- High-quality teaching materials
- Extensive and sustained professional development for teachers.

2. The development of new styles of teaching and learning, that build upon the autonomy and informality of children's everyday uses of new media. This will require:

- More open and flexible access to technology by students
- More effective links between schools, homes and communities
- The provision of public spaces and resources on the web.

Implementing these recommendations will require a solid basis of research evidence and evaluation, in which teachers and practitioners must play a central role.

Fifteen years ago - perhaps even ten - most children's first encounters with computers would have taken place in school. For the large majority, this is now no longer the case. Digital technology is increasingly permeating nearly every aspect of children's everyday lives - and particularly their leisure time. In the process, it has become much more than a matter of information technology. On the contrary, new digital media are rapidly becoming the dominant means of entertainment, communication and cultural expression.

Of course, computers are still aggressively marketed to parents and teachers as an educational medium - indeed, as the indispensable educational tool for the modern world. According to the sales pitches, computers offer children access to untold worlds of discovery, and reawaken their spontaneous desire to learn. For those who can afford to invest in them, they enable children to 'get ahead' in the educational race.

Yet however exaggerated such claims may be, for most children computers are no longer primarily an educational medium. On the contrary, they are now a significant part of children's popular culture. Uses of computers in the home are massively dominated by video games; and leisure uses of the Internet (for example in the form of chat rooms and entertainment sites) are becoming increasingly significant. By comparison, many children say they are bored and disillusioned by their experiences of computers in school. There is a growing disparity between how they use this technology outside school and what they are expected to do with it in the classroom.

So how might schools respond to this new situation? In this paper, I will argue that schools need to provide young people with a form of 'digital literacy' that will enable them to understand and participate in the new worlds of digital media. However, I also want to suggest that schools may have a good deal to learn from their students in this respect: that they need to engage with, and to build upon, the new kinds of informal learning that are developing around these media.

## **Understanding children's digital cultures**

Before addressing these more specific educational implications, however, I need to offer a broader picture of the changing nature of children's relationships with digital media (Buckingham, 2000). To what extent does this technology liberate children's innate creativity and imagination, as some enthusiasts suggest? Alternatively, does it represent yet another assault on childhood innocence, from which we must endeavour to protect them? Or does it offer a more complex and ambivalent mixture of both? If we are to move beyond the opposition between utopian optimism and grandiose despair, we will need to situate children's uses of digital media within a broader social and economic context.

## **Convergence**

To begin with, we need to recognise the significant continuities and connections between 'old' and 'new' media, not least in terms of how they are actually used. The history of innovation shows that new technologies do not necessarily replace older technologies, so much as add to the range of options that are available. Of course, there may be an element of displacement here: statistics show that children in homes with computers and computer game consoles now spend less time watching television - although in fact the decline in viewing hours has been far from dramatic. Likewise, despite the increasing proliferation of electronic media, there is little evidence that children's reading of print has actually declined; although they may well be reading for different reasons, or in different ways. What is increasingly notable is that children are able to combine different activities - to play the Game Boy as they watch TV and listen to tapes and do their homework (or so they will frequently allege) (Livingstone and Bovill, 1999; Neuman, 1995).

In fact, the current tendency is not so much one of displacement as of convergence - a coming together of previously distinct technologies, cultural forms and practices, both at the point of production and of reception. This convergence is most obvious in terms of technology. The

possibility of 'digitising' a diverse range of different forms of communication (not just writing, but visual and moving images, music, sound and speech) transforms the computer into much more than a calculator or a typewriter with a memory. The screen in the living room is fast becoming the delivery point for a plethora of audio-visual goods and services. This in turn reflects a broader convergence of media, which is driven not only by technological change, but also by commercial imperatives. Over the past decade, for example, television programmes have become increasingly linked with movies, books, comics, computer games, CD-Roms, toys, clothes, and other merchandise. This has been particularly the case with children's media, as examples like Teletubbies or Pokemon clearly suggest. Finally, we can point to a convergence of different forms of communication. The advent of video, desktop publishing and the Internet has helped to break down the distinction between interpersonal communication and mass communication. At least potentially, such equipment enables 'consumers' to become 'producers', who can reproduce and publish material using technologies that were formerly the preserve of small élites.

Convergence may itself be a relatively new phenomenon, but much of what is converging is much less so. Despite their apparent novelty, many of these new media rely heavily on the forms and conventions of old media. For example, many CD-Roms implicitly use the book as the model for structuring the reader's access to information; and the Internet, of course, is heavily reliant on written text. In educational terms, then, there is a strong case for addressing these media in combination. Each medium raises unique questions and challenges, but the skills and understandings that children need in order to use and interpret them will increasingly have to be applied across the board.

## **Commerce**

For their advocates, digital media are no less than a means of 'children's liberation': they provide children with new possibilities for self-expression and communication, and for creating their own cultures and communities. Yet the fact remains that most of these technological developments are economically driven. They are part of a much more general move towards a market-led media system, in which the maximizing of profit takes precedence over public service imperatives.

Having 'invented' the teenager in the 1950s, capitalism's inexorable drive to find new markets has increasingly come to focus on children. Children's television, for example, is now dominated by the need to generate revenue in international markets, and to exploit successful programmes through ancillary merchandising - pressures from which public broadcasters such as the BBC have been far from immune. Similar issues are beginning to surface in relation to the Internet. For all its potentially liberating decentralisation, the Internet provides commercial companies with very accurate ways of reaching particular kinds of consumers - among them children, who have become an increasingly valuable target for on-line 'niche marketing' (Buckingham et al, 1999; Center for Media Education, 1997).

Of course, this is not to posit some kind of golden age where culture was somehow uncontaminated by commerce; nor is it to imply that commercialism is somehow incompatible with creativity or authentic communication. We need to decide how far we want our public

discourse to be dominated by commercial imperatives; and, in the case of children, how far we want their peer-group relationships or their play to be governed by the activities of a small number of global corporations. Yet the notion that children should be somehow shielded from the influence of the market, in a 'pure', non-commercial sphere, is not only utopian; it also fails to provide a basis for equipping them to deal with the challenges of an increasingly market-oriented culture - a task which must now be seen as an urgent priority for public education.

This move towards a more commercially-dominated media environment also has significant implications in terms of equality of access. Although the range of new media available is currently proliferating, gaining access costs money. Family expenditure on media software and hardware has been increasing exponentially over the past decade, both as a global figure and as a proportion of household income. Yet at a time when the gap between rich and poor continues to widen, these new technologies are not equally available to all. Despite the falling cost of equipment, there remain significant differences in terms of the type and capability of computers in children's homes (Selfe, 2000).

In some respects, of course, the 'digital divide' is nothing new: despite a century of public library provision, there is still a significant 'print divide' between different social classes in terms of access to - and use of - books. Nevertheless, we may now be witnessing a growing polarisation between the 'media rich' and the 'media poor'. As traditions of universal access and public provision fall into decline, different social groups may come to live in very different cultural worlds - with all the implications for social cohesion which that implies. As policy-makers have increasingly recognised, these gaps cannot be overcome simply by providing access to equipment. The 'digital divide' is not simply to do with access to technology: it is also to do with access to the intellectual or cultural capital that is needed to use that technology in well-informed and creative ways. In this respect too, education has a fundamental role to play.

## **Control**

While some have argued that these new technologies are inherently empowering for children, others are becoming alarmed at the prospect of an 'electronic generation gap', in which children are losing contact with the values of their parents. These new media are seen to give children access to things which used to be kept hidden from them, and which they really ought not to know. As with television in previous decades, digital technology is being held responsible for the wholesale destruction of childhood as we know it; and there is now a growing anxiety about the need for control.

Of course, there is a significant degree of exaggeration here. The notion that children are turning on their computers and being confronted by a barrage of graphic pornography is unduly alarmist. Nevertheless, it is clear that centralised control - and even parental control - is becoming significantly harder to exert, as growing numbers of children have unsupervised access to these technologies in their bedrooms. This has led to an increasingly desperate search for alternatives - and in particular, for a 'technological fix' which will provide the control that parents are seen to be unable or unwilling to exercise. The V-chip, now compulsory on all TV sets sold in the US, is one example; and in the case of the internet, there is growing use of 'blocking software' - programs with symptomatic titles such as 'Net Nanny' and 'Cybersitter'.

However, there is considerable doubt about the effectiveness of such solutions in isolation; and regulatory bodies are increasingly looking to education as part of a broader alternative to centralised control. Education is frequently seen here as a means of 'empowering' the user, and thereby encouraging informed self-regulation (Waltermann and Machill, 2000). As I shall indicate, understanding of Internet safety should clearly be a part of any curriculum in 'digital literacy'; although the notion that education might function merely as a surrogate form of censorship is unduly reductive - and may well meet with considerable resistance from young people themselves.

Ultimately, many parents are bound to find it hard to decide between the appeals of marketers who trumpet the benefits of new technology for children and those of campaigners who play on their genuine anxieties about their children's welfare. So how do we balance the need to protect children from harm against the need to give them access to the potential benefits of the technology? This is a dilemma that is incapable of easy resolution; yet it is one that education surely has to address.

## **Towards digital literacy**

As I have implied, children are often seen to be highly active and autonomous in their dealings with these new digital media. According to the enthusiasts, children possess a natural affinity with new technology, and somehow spontaneously know how to use it effectively and productively. Today's children, it is argued, know much more than the majority of adults; and it is now up to us to catch up with them.

This fantasy of the 'cyber-kid' is undeniably powerful, but it is also highly sentimental. It belies the considerable difficulties and frustrations that children (like adults) often experience in their dealings with new media. In addition, as I have implied, children's experiences of new media are framed and defined by broader social and economic forces which they do not control, or even necessarily understand.

Of course, these new media must to some extent teach the skills that are needed to understand and interpret them - just as books teach readers about how to read. Nevertheless, there is a lack of easily available support and advice that might enable young people to use these media critically and creatively. For example, the anonymity and ease of access afforded by the web permits the dissemination of a whole range of false or unreliable information. In the case of health information or political news, for instance, the web offers unprecedented opportunities for disseminating rumours and lies - with potentially very far-reaching consequences. Yet there are only a few sites that offer assistance in evaluating such material (BBC; Childnet International) - although here too it is not always easy to judge how far they should be trusted.

'Consumer advice' and public information resources of this kind should certainly be supported through public funding; but ultimately schools will have to play a central role in enabling young people to deal with the challenges of the new digital world. I would argue that education in 'digital literacy' should be a central component of contemporary schooling - indeed, a core curriculum entitlement. However, the increasing convergence of media means that we need to

be addressing the skills and competencies - the multiple literacies - that are required by the whole range of contemporary media in a systematic and integrated way, rather than in isolation. Rather than simply adding digital literacy to the curriculum menu, we need a broader reconceptualisation of what we mean by literacy. If we are to have a literacy hour in the twenty-first century, then it should surely be addressing visual, audio-visual and digital literacies as well as those specific to print.

Like education in 'old' literacies, the literacy education of the future will seek to empower children both to understand and to participate in the digital culture that surrounds them. It will aim to create informed, critical, active users of digital media (Buckingham, 1993; Kress, 1995). This has three general implications:

- Digital literacy is not merely a 'functional' literacy. The skills that children need in relation to digital media are not confined to those of information retrieval. As with print, children also need to be able to evaluate and use information critically if they are to transform it into knowledge.
- Digital literacy is more than simply a matter of protecting children from the dangers of digital media. It is much more than a negative or defensive enterprise. As with older media, children need to be empowered to make informed choices on their own behalf, and to protect and regulate themselves.
- Digital literacy must involve creative production in new media as well as critical consumption. Just as print literacy involves writing as well as reading, we also need to empower children to become producers in their own right.

So what might a curriculum in digital literacy look like? Clearly, it would need to begin with some of the 'basics' just identified. In relation to the web, children need to learn how to locate and select material - how to use browsers, hyperlinks and search engines, for example. They also need to understand the need for 'safety first', for example in relation to providing personal information, or avoiding unwanted material. These are basic skills or understandings that can be taught quite quickly and easily, and at a young age; although children will certainly need some opportunities to learn these things through trial and error, and to make their own decisions about them.

Beyond this, there are three broad conceptual aspects that I would regard as essential components of digital literacy - or indeed of any kind of literacy. These have been most coherently elaborated over the past ten years by media educators in the UK, and increasingly around the world (Bazalgette, 1992).

- *Representation.* Like all media, digital media represent the world, rather than simply reflect it. They offer particular interpretations and selections of reality, which inevitably embody implicit values and ideologies. Informed users of media need to be able to evaluate the material they encounter, for example by assessing the motivations of those who created it and by comparing it with other sources of information, including their own direct experience. In the case of information texts, this means addressing questions about reliability, bias and accuracy; and it also necessarily invokes broader questions about whose

voices are heard and whose viewpoints are represented.

- *Language.* A truly literate individual is able not only to use language, but also to understand how it works. This is partly a matter of understanding the 'grammar' or particular forms of communication; but it also involves an awareness of the broader codes and conventions of particular genres. This means acquiring analytical skills, and a meta-language for describing how language functions. Digital literacy must therefore involve a systematic awareness of how digital media are constructed, and of the unique 'rhetorics' of interactive communication, both in relation to information media (such as parts of the internet) and entertainment (such as computer games).

- *Production.* Literacy also involves understanding who is communicating to whom, and why. In the context of digital media, young people need to be aware of the growing importance of commercial influences - particularly as these are often invisible to the user. There is a 'safety' aspect to this: children need to know when they are being targeted by commercial appeals, and how the information they provide can be used by commercial corporations. But digital literacy also involves a broader awareness of the global role of advertising, promotion and sponsorship, and how they influence the nature of the information that is available in the first place. And of course, this awareness should also extend to non-commercial sources and interest groups, who are increasingly using the web as a means of persuasion and influence.

Experience in media education suggests that these kinds of understandings can be developed from an early age, in the form of a 'spiral curriculum'. As I have argued, digital media are an increasingly important aspect of children's lives outside school: they may already bring a whole range of knowledge and understanding to the classroom, which teachers can build upon. For example, children at KS 1 are already making judgements about how media represent the world - about whether what they see is 'realistic', and how far they can trust it. Such a curriculum would provide the means for children to think more systematically about such judgements, to debate them with each other, and to apply them to less familiar kinds of texts. Likewise, we increasingly ask children at KS 2 to consider the reliability of sources of information (for example, in teaching history), and to develop a more systematic understanding of verbal language (for example, in teaching print literacy). A curriculum in digital literacy would enable them to extend such understandings to new media (Bazalgette, 1991).

Of course, these understandings are not gained simply through analysis: they are also developed - in some instances, more effectively and enjoyably - through the experience of creative production. The growing accessibility of digital technology means that quite young children can easily produce multimedia texts, and even interactive hypermedia. Such experiences are not simply an opportunity to develop technical skills, for example in web design. Encouraging children to reflect systematically on their own and each other's work can also enable them to develop more conceptual understandings about how these media function.

Implementing such a curriculum will require a range of policy initiatives. The components of the curriculum will need to be clearly defined, and integrated with the existing literacy curriculum. We will need to develop a coherent model of learning progression which will

specify what we should expect children to know, and how that knowledge might be extended and developed. We will need high-quality teaching materials, and extensive opportunities for professional development. And in implementing these initiatives, it is vital that educationalists work directly with new media producers and other professional groups.

A development of this kind is necessarily an incremental process, but it will require a willingness to think beyond the limitations of the current National Curriculum - and particularly in terms of what is included in the area of literacy. As I have argued, the boundaries between print literacy and other forms of literacy are rapidly blurring, as a result of technological change. This is not by any means to suggest that verbal literacy is no longer relevant. However, it is to imply that the curriculum can no longer be confined to a narrow conception of literacy, that is defined solely in terms of print. Producing teaching materials and providing specialist training on digital literacy should become a central component of the government's literacy strategy. If the government were to draw upon the range of expertise and experience that already exists in this field, this could be brought about relatively quickly.

Finally, it is important to recognise that these experiences should not be confined to school classrooms. This is particularly the case for those who do not yet have access to technology at home. Schools can play a major role in providing access to technology outside formal lesson times; but in the process, they may also need to re-think what counts as learning. These issues will be addressed more fully in the following section.

## **Learning from digital culture**

Digital cultures are significant sites of learning in their own right. Children's everyday uses of computer games or the internet involve a whole range of informal learning processes, in which there is often a highly democratic relationship between 'teachers' and 'learners'. Children learn to use these media largely through trial and error - through exploration, experimentation and play; and collaboration with others - both in face-to-face and virtual forms - is an essential element of the process. Traditional forms of teaching, which involve the transmission of a fixed body of information, are largely irrelevant here. Learning in the age of digital media is essentially about the struggle to achieve autonomy (Buckingham, forthcoming).

Playing a computer game, for example, involves an extensive series of cognitive processes: remembering, hypothesis testing, predicting and strategic planning. Players agree that the best computer games are those which offer the greatest cognitive challenges, and which precisely refuse to position them as 'children'. While game players are often deeply immersed in the virtual world of the game, dialogue and exchange with others is crucial. And game playing is also a 'multi-literate' activity: it involves interpreting complex three-dimensional visual environments, reading both on-screen and off-screen texts (such as games magazines) and processing auditory information. In the world of computer games, success ultimately derives from the disciplined and committed acquisition of skills and knowledge.

Likewise, the culture of chat rooms requires very specific skills in language and interpersonal communication. Young people have to learn to 'read' subtle nuances, often on the basis of minimal cues. They have to learn the rules and etiquette of on-line communication, and to shift

quickly between genres or language registers. Provided they are sensible about divulging personal information, chat rooms provide young people with a safe arena for rehearsing and exploring aspects of identity and personal relationships that may not be available elsewhere. Here again, much of the learning is carried out without explicit teaching: it involves active exploration, 'learning by doing', apprenticeship rather than direct instruction. Above all, it is profoundly social: it is not something that can be divided into a set of psychological types (or 'multiple intelligences'), but a matter of participation in 'communities of practice' (Lave and Wenger, 1991).

Compared with the demanding multi-media experiences children have outside school, much classroom work is bound to appear unexciting. Even where they do use computers and other media in schools, many children complain that this is far too limited and restrictive (Furlong et al, 2000; Facer et al, 2001; Sefton-Green and Buckingham, 1996). Children who use the Internet at home are already becoming critical users of information: they have a strong sense of their own autonomy and authority as learners, and they want to contribute rather than simply consume. Yet this is precisely what is so often denied to them in school.

What we may be seeing here is a widening gulf between the styles of learning that are cultivated by formal schooling and those that characterise children's out-of-school experiences. Children are now immersed in a consumer culture that frequently positions them as active and autonomous; yet in school, a great deal of their learning is passive and teacher-directed. If schools fail to engage with young people's changing orientations and motivations towards learning, there is a significant danger that they will simply become peripheral to their lives. Indeed, some have argued that this situation is potentially explosive - perhaps particularly for boys, who may be highly self-confident users of technology but perceived as failures in the context of school learning. If the provision of technology in schools remains as restricted as it currently is, disaffection may simply become more widespread.

So how might schools respond to this situation? The answer is clearly not to adorn teaching materials with computerised bells and whistles - to 'jazz up' the curriculum with a superficial gloss of kid-friendly digital culture. Nor is it to adopt digital technology in the service of narrowly instrumental forms of learning, in an attempt to make them more palatable. The potential appeal of the Pokemon maths curriculum or the Tweenies literacy hour is unlikely to be very lasting.

The challenge of digital cultures requires a much more fundamental rethinking both of our curriculum and our pedagogy. It requires us to move beyond the present print-bound curriculum, and to acknowledge the full range of 'literacies' that schools should be seeing to develop. It also requires us to regard the learner as a creative actor, rather than a passive consumer of educational 'deliverables'. To use new media simply as new-fangled 'audio-visual aids', as means of drilling children in decontextualised skills, or as the latest device for transmitting 'content' into classrooms, is to neglect their most significant potential for learning. On the contrary, if we are to develop a more creative and demanding approach to pedagogy, we need to learn from the cognitive challenges posed by new media, the emotional fascination they exert, and the new forms of multi-modal communication they entail.

Some of this potential has begun to be explored in the specialist schools for technology and

media arts. At Parkside Community College in Cambridge and Charles Edward Brooke School in Lambeth (South London), for example, digital media are being used in innovative ways that precisely build upon students' out-of-school experiences. From a base in the English and Media departments, these schools have begun to integrate the creative and critical use of new media in a whole range of curriculum areas. Students work on cross-curricular production projects in web design or digital video that can involve collaboration and communication with students in other schools and with the wider community. Crucially, new media are used here simultaneously as an object of study and as a means of learning; and the creative and critical dimensions are strongly integrated (Burn and Reed, 1999).

Likewise, WAC Performing Arts and Media College in North London offers a model of community-based, out-of-school provision using new media. Here, young people are using digital technologies, not just to produce websites, but also in a range of more ambitious forms of multimedia production, including digital video and computer games design. In this context, the web offers a means of distribution - via web streaming of moving image and audio material - and of generating dialogue with other young people, both locally and globally. Here - as in similar projects in several US cities - we can see the emergence of a 'youth public sphere', in which young people themselves are beginning to take control of the means of production (Sefton-Green, 2000 a).

Such possibilities are also available for younger students. In Hackney, East London, for example, the local authority advisory team is working with primary teachers and children, integrating digital media right across the curriculum. Here again, the emphasis is on production - on children making digital 'texts' using multimedia authoring software, that represent what they have learned in new ways and for different audiences. In this context, the boundaries between 'arts' and other areas of the curriculum also begin to disappear, as the visual dimensions of science or mathematics become increasingly apparent (Sefton-Green, 2000 b).

These and other innovative projects raise significant questions about the changing nature of learning that are in need of much more sustained research. Yet they also have some specific implications in terms of the structure and organisation of schooling. Among them are the following:

- We need to rethink how and where students gain access to new media in schools. The organisation of time and space in schools implicitly prescribes a subject-bound, didactic approach to teaching and learning. If new media are to be used to their full potential, students need more than a weekly timetabled hour in the computer lab learning the basic techniques of file management or word processing. Equipment needs to be available before and after school, and at lunch times; and easily accessible to individual students in the course of lessons (Valentine and Holloway, 1999).
- We need to develop new kinds of relationships between schools and other public sector institutions. This is partly a matter of schools providing greater access to facilities in out-of-school hours; but we also need to imagine new types of 'learning centres' that combine the features of schools with those of libraries, internet cafes and community centres. Such centres need to take account of people's motivations to learn, and their preferred styles of learning,

which may not be conventionally 'educational'. Particularly for those whose experience of schooling has been negative, there is a need to develop forms of learning that are more relevant and more genuinely popular. Such centres have to be much more than 'homework clubs'.

- We need to use the web as a public space for young people to communicate and share their creative work in new media. The growth of competition between schools has resulted in a 'promotional culture', in which schools use a range of media (including the web) merely as a means of cultivating a good self-image. A more open use of the web as a public means of distributing or exhibiting student work will require a greater degree of trust, and a greater degree of autonomy for students. Publicly-funded initiatives such as the BBC's Digital Curriculum should also create spaces for young people's participation, rather than simply serving as means of 'curriculum delivery'.

## **Summary and implications**

In recent years, educational policy-makers have increasingly recognised the value of 'learning beyond the classroom'. They have pointed to the need to develop links between home and school, and to recognise the educational potential of leisure activities of many kinds. Yet schools also have a history of seeking to exclude children's popular culture on the grounds that it is somehow inherently illegitimate or anti-educational. So far, current educational policy has done little to redress this.

In this paper, I have argued that digital media are already a key part of children's popular culture. They encourage and invite a whole range of different types of learning; and they permit and require a high level of cognitive and social activity on the part of their users. This is not to say that children's experiences of computer games or internet chat rooms should simply be celebrated. On the contrary, I have argued that those experiences are often determined by factors that are beyond the control of individual users; and that, by and large, children are not the liberated 'cyber-kids' of the popular imagination. Technology will not in itself empower children to deal with the challenges of this new digital age: schools and other educational institutions also have a central role to play. Yet if they are to play this role, schools themselves will also need to adjust their conceptions of learning, and to acknowledge the full range of literacies that children already possess. Bridging the gaps between home and school, and between learning and leisure - and indeed between the media-rich and the media-poor - will require a more inclusive and dynamic view of what counts as legitimate knowledge.

If this shift is to occur, several specific developments and policy initiatives will be required. Since these have been scattered throughout this paper, it would seem appropriate to conclude by bringing them together in a brief 'shopping list'.

Firstly, I have argued that we need to develop a 'digital literacy' curriculum, that will enable young people to understand and to participate in the new media culture that surrounds them. Developing this curriculum will require:

- a clear definition of its major components
- a strategy for integrating it within existing subject areas

- a model of learning progression
- high-quality teaching materials
- professional development for teachers
- collaboration with the media industries.

Secondly, I have argued that schools need to create the space for new forms of learning, that build upon the learning styles afforded by new media. This will involve:

- a curriculum that uses 'multiple literacies', rather than just those relating to print
- more open and flexible access to technology by students
- schools making technology available to the community
- the creation of open public spaces on the web for young people
- support for research on new styles of informal learning.

In both areas, further development will depend not so much on developing policy blueprints as on identifying, researching and disseminating instances of good practice. Getting the detail right is not just a matter for policy-makers, but also for practitioners; and in the case of education, teachers need to be in the driving seat of change.

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## **ICT and attainment - planting apple trees to harvest oranges?**

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What is valued in schools determines what is taught, and how that teaching is managed. Currently, what is valued is determined largely outside the school system by education policy and disseminated through mass media. The statutory school curriculum has identified a corpus of knowledge as more valuable than any other, and success is defined in terms of the ability to use this knowledge to obtain high scores in externally set tests at the ages of seven, eleven, fourteen and sixteen. The success of not only the learner but her teachers and the whole school are measured in this way. Annual targets are set for the percentage of pupils who must achieve a given level of attainment, and a school's ability to hit these targets is judged against local and national norms. Little account is taken of variation in ability of the year group, or the level of improvement they have achieved since entering the school, or their last test. This emphasis on test scores has resulted in the requirements and outcomes of formal assessment, presented to the public in the form of leagues tables, determining largely what, and how, teachers teach. The last fifteen years of education policy, since the introduction of GCSEs and Key Stage tests, have shown without doubt that the assessment framework is the most powerful lever that effects change in the school curriculum - arguably more powerful than statutory curriculum definition. What is not examined remains of a lower status than that which is; as a result the emphasis on subjects other than Mathematics, Science and English in the primary school is reduced, and subjects such as personal, social and health education have never enjoyed status or prominence on the timetable. A close second to assessment in its power as an agent for change is the inspection of schools, which has ensured that even the defined non-statutory curriculum (ie the national literacy and numeracy strategies) is adopted wholesale. The name and shame policy, implemented through league tables and public reporting of inspection, has changed the state funded school of today, and the experience of every pupil and teacher within it.

This is not a culture in which risk taking is encouraged. Any change in the approaches to teaching the curriculum must have clear advantages in terms of preparing learners ultimately for the test. If ICT is to be used to support subject teaching, it must not only be well resourced, and the teachers trained to use it effectively, but there must be clear dividends in terms of raising achievement as measured through tests. It follows then that if ICT, and in particular its manifestation as digital literacy as described here in David Buckingham's paper, are to take root in our schools, they must justify a niche within the prevailing assessment/inspection frameworks. Currently however there is little evidence that the kinds of learning validated through tests, and the kinds of learning supported through the use of ICT, necessarily overlap. In investing in ICT, whilst retaining existing assessment frameworks, are we as the title of this paper suggests, planting orange trees in the hope of a better apple harvest?

## Perspectives on ICT

ICT, here defined as both the tools needed to access and manipulate digital data, and the processes of so doing, is currently treated in three different ways at a policy level:

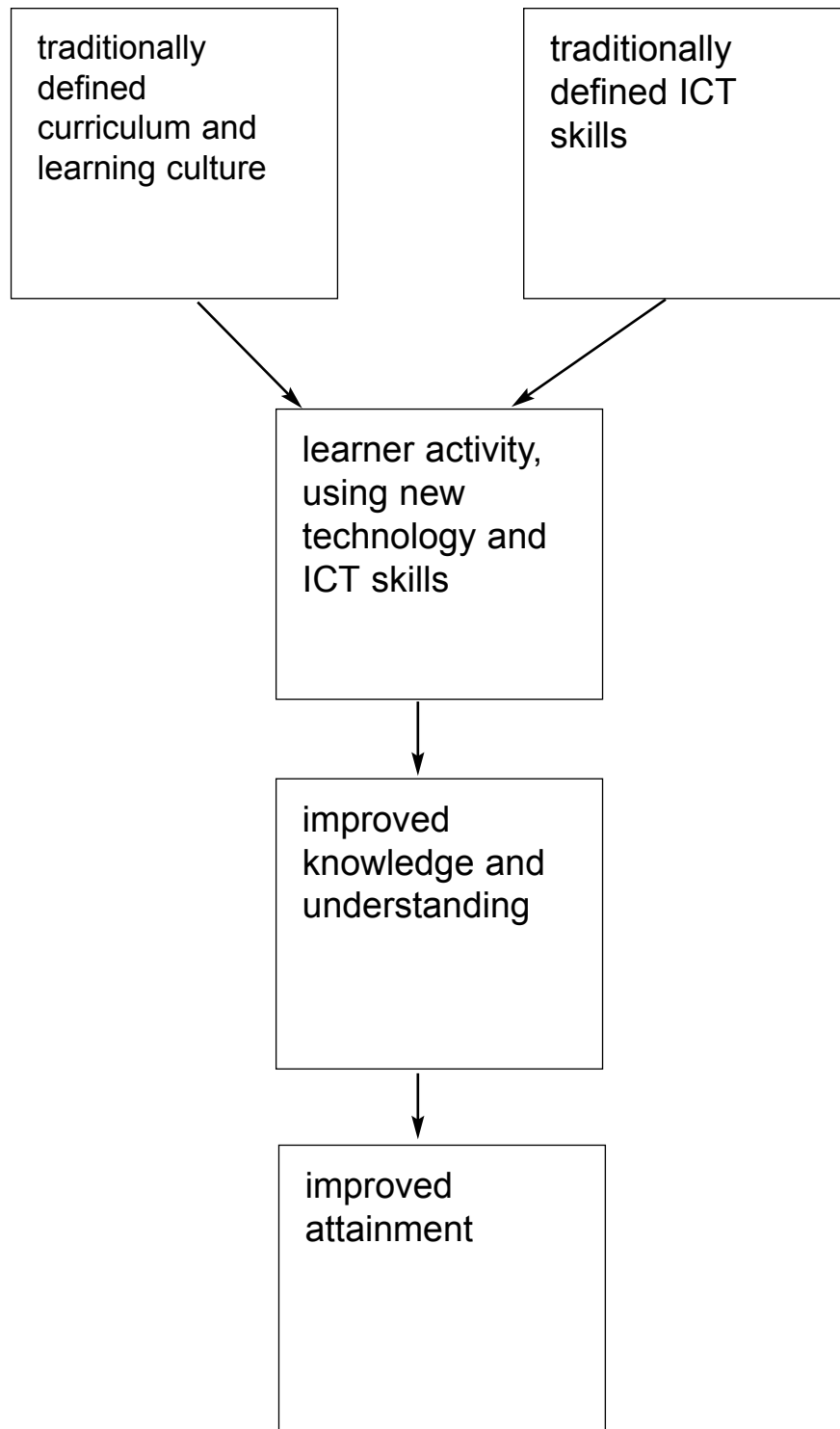
- ICT as a set of skills and competencies
- ICT as a vehicle or tool set to do what we have always done, preferably better or cheaper
- ICT as an agent of change which impacts in a revolutionary way

Each has very different consequences for implementation in the curriculum, and for the validity of assessment. The first of these, an emphasis on ICT as a subject of study, if well resourced and taught will lead to improved attainment in ICT knowledge and skills, but cannot be expected automatically to carry over into attainment elsewhere in the curriculum even if the teaching of ICT is embedded in the wider curriculum (Bonnett et al 1999). Indeed current evidence suggests that the embedding of the teaching of ICT in subject teaching leads to pupils achieving neither the required levels of ICT competence, or particular improvement in subject related attainment, especially in Key Stage 3 (Ofsted 2000). Whilst some mention of the third aspect, ICT as an agent of change, is made in the documents which launched the National Grid for Learning strategy there is little subsequent evidence of this perspective in policy, as evidenced in the national literacy and numeracy strategies or national curriculum 2000 orders. Rather the curriculum emphasis where it arises is on the second aspect, ICT as a tool for doing what has always been done. This has formed the focus of policy, implementation and research in the UK for some 20 years. Indeed the policy has been ambivalent even here, since the use of ICT within subject teaching has only recently achieved a pervasive profile in the National Curriculum 2000. The National Strategies have scant mention of ICT and the guidance material on using ICT to support the strategies was published some six months after its implementation in each case. This surely sends a clear message to teachers that although it is possible to use ICT to support the strategies, it is far from a fundamental part of the recommended pedagogy.

The approach of adding an element of ICT to a learning task to better meet existing targets has been characterised in the Direct Impact Model. In the post-Dearing versions of the National Curriculum teachers are entreated to combine an 'appropriate' element of ICT use with learning tasks which form part of the traditional school curriculum. The emphasis is on the learner as user, and the outcome measures are the same as those used for non-ICT based tasks. Indeed the gold standard for evaluating the role of ICT use is an impact on attainment as measured through end of Key Stage tests or GCSEs. It is here that the evidence to justify the NGfL strategy and its huge investment has been sought (Avis 2001). This is the remit of the DfEE funded Impact 2 study, a three year study of the relationship between ICT use and Key Stage test and GSCE performance - which is the major research programme on ICT and attainment under way in England at this time.

However the Direct Impact Model leaves much to be desired. First it ignores use of ICT by teachers either as a teaching tool or as a data capture or administrative tool which would give access to better pupil performance data, and so support better management of learning. Some

teachers are certainly using ICT in these ways, but research findings relating to such models is rare, and there is little support or guidance for teachers compared to the volume of material

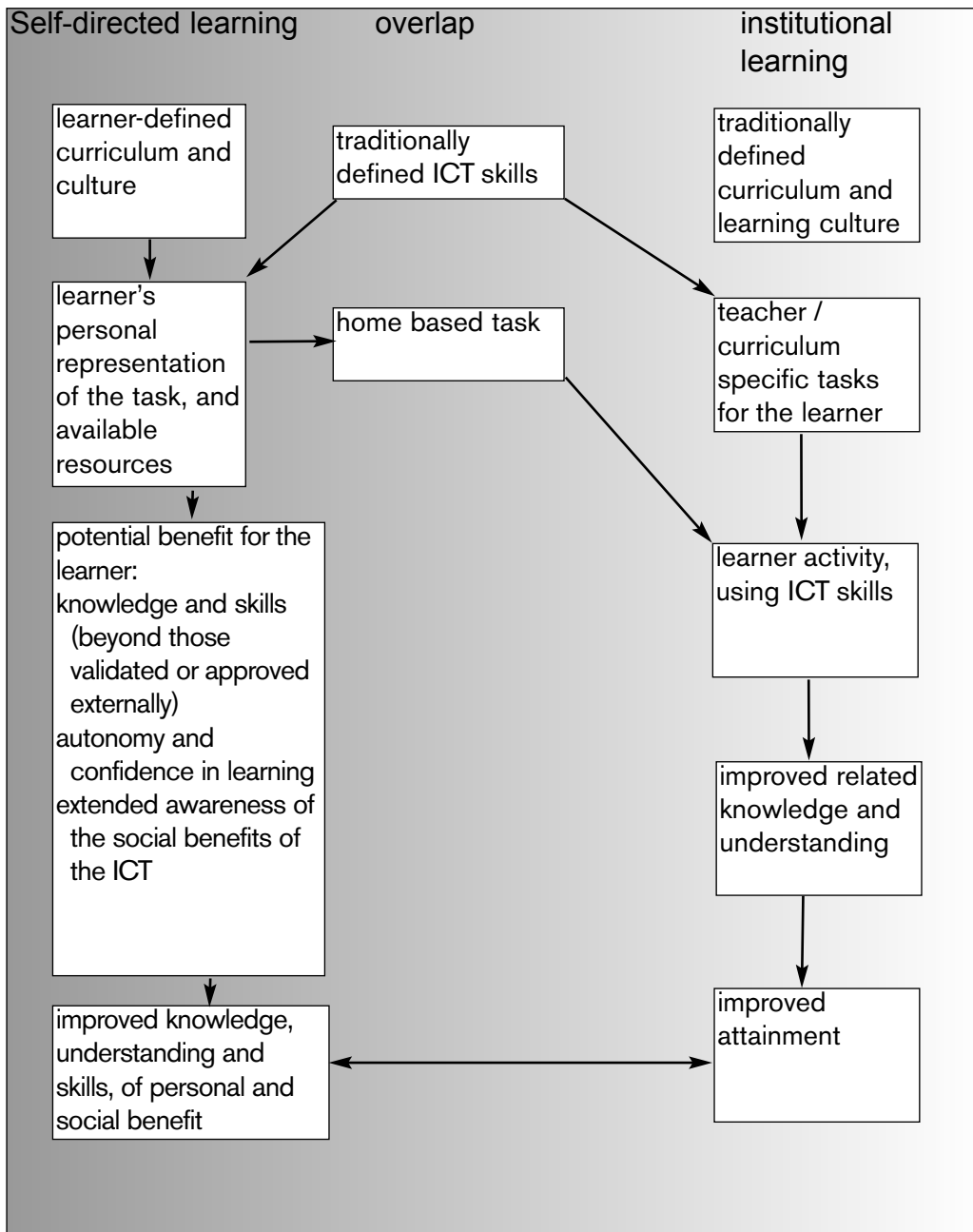


**Figure 1 The Direct Impact Model of ICT and Attainment**

(from *Preliminary Study 1 of the Impact2 Study*, McFarlane et al 2000)

available on pupil use of ICT (see Figure 1). Second, no theoretical distinctions are made between different ICT applications or different models of use. For example, a study might look at the use of talking stories or word processing to support literacy with no theorization of what aspects of these ICT based resources might impact on relevant learning, or of the models of teaching which might exploit these links. Third, research based on this implicit model usually offers poor descriptions of implementations of ICT, omitting vital contextual detail on how the intervention was managed and even the duration of use. Unsurprisingly then, it is all too easy to find two studies which used the same ICT resource but which found quite different outcomes. All this tells us with certainty is that these resources are not neutral and the effect they have depends as much on how they are used as on whether they are used. Finally, the measures of impact are almost always some form of standardised test which means that where desirable learning outcomes such as collaboration, effective questioning or decision making are supported this is not reflected in the outcome. Attempts to summarise the overall impact of ICT on attainment (McFarlane et al 2000, Mumtaz 2000) tend therefore to conclude that the overall effect of increased ICT use is at best mildly positive. In the absence of compelling evidence to link ICT use with 'raised standards' as measured through Key Stage tests or GCSE, it is hardly surprising that use of ICT within subject teaching nationally has not kept pace with the steadily rising levels of resource or teacher confidence as reported in the annual DfEE statistical bulletins and confirmed through Ofsted inspection (Ofsted 2001). This still leaves a fundamental question unanswered however and it is this; is the use of some forms of ICT more effective than other methods at teaching children the kind of knowledge and skills they need to pass school tests? Could it be in fact that use of ICTs do not support learning as evidenced through national tests, and are in fact even counter productive as suggested by some US based research (Russell and Haney 2000)? The ILS research study carried out over five years in the UK concluded that pupils using such systems were definitely learning something, but the question was what (Wood 1998). This nicely encapsulates the current quandary surrounding ICT use; clearly users are learning, but what are they learning, is it valuable beyond the development of a facility with the technology, and if so how do we identify and validate this learning?

In an attempt to inform the debate on ICT and attainment the Impact 2 project has developed a methodology which takes account of a more complex model of the relationship between ICT use and learning. This is characterised by the Socially Contextualised Impact Model of learning (SCIM-L) (See Figure 2 below). In this model the experience of networked technologies that learners have outside the institutional learning context is acknowledged. Moreover, the influence that such independent activity is likely to have on learner autonomy is under consideration. If learners have access to powerful and authoritative sources of information, and tools to manipulate these sources as they construct representations of their own knowledge, what effect will this have on their view of the authenticity of the school curriculum? It is important to say here that this model does not envisage a generation of earnest young people avidly using their home computer to pursue their studies. We know from projects such as ScreenPlay that this is seldom the case (Sutherland et al 2000). Young people may not recognise their use of such technology as related to learning at all, which they may associate only with school related activity. However, in using and becoming fluent with these technologies these users are in fact learning a great deal. Not least, some of them are enjoying a sense of mastery and autonomy which largely go unrecognised and unvalidated in the school context. In some respects this is not entirely new; there has always been a gap between world



**Figure 2: The socially contextualised model of impact on learning**  
 (for *Preliminary study 1 of the Impact2 Study* McFarlane et al 2000)

knowledge and school knowledge. School knowledge can be represented as a corpus of information which is somewhat arbitrarily afforded a value and status above all other, largely because familiarity with it will determine the outcome of the high stakes assessment process. Those who succeed in the school system have to accept the value of school knowledge, perhaps because of its role in determining future success. This has of course always been easier for those who can safely expect to share in this success. What has changed perhaps is that more and more young people have a familiarity and competence within a digital culture that is clearly valued outside school, and which may challenge the authority of school based knowledge. Throughout almost every aspect of mass media the world of computers and the internet are represented and referenced, and have almost unquestioned validity and worth. This is very different from the experience of ICTs they have in school, where use is limited, controlled and restricted, and for many their wider competence goes unrecognised. Imagine the contrast between spending time at home accessing the web for information on your favorite TV programme, or even a homework topic, and the short time you get on a computer at school being used to teach you to cut and paste, or practise spelling. Research evidence suggests that this is the experience of a large and growing number of young people, and using the 'digital divide' as a smoke screen to mask the needs of those who do have access to ICT outside school is unhelpful. At the same time of course it is essential to recognise the situation of those who do not have such access, not by insisting that everyone operate at the lowest level but by ensuring high quality experiences of ICT use for all in school and the wider community. Indeed initiatives such as the City Learning Centres are an opportunity to do this.

The outcomes of the Impact 2 study will not be published for at least another year, but other research by the present author and others suggests that there is a growing level of dissatisfaction among learners, with the Key Stage 3 curriculum in particular. This is also being accompanied by a decrease in standards of behaviour in secondary schools (Ofsted 2000 and 2001). Traditionally such dissatisfaction has been largely associated with those who underachieve, and form the long tail on the graph of results rather than the 'head' of high achievers. However, there are some indications that this disaffection is no longer restricted to the lower end of the achievement spectrum, and that able students who would traditionally have done well in school are rejecting the culture of school learning as restrictive, unimaginative, and based on a consumption model rather than one where the learner is an active agent in their own learning. This is certainly an area in need of further research, for if these early findings are indicative of a widespread underlying trend there is a potential time bomb ticking in our secondary schools.

The role of ICT in feeding disaffection is unproven, but it is not hard to imagine that a child with free access to network technologies and digital authoring software for their work away from school, when denied point of need access to these tools in school becomes somewhat frustrated. However, even if this out of school access is not feeding disaffection, in school access could be used to re-generate motivation, satisfaction and an interest in learning. In an on-going research project we have found that 74% of Key Stage 4 students have access to the Internet at home, and that they use this on average once a week to help with homework - although this is not part of the task as set. Moreover, these students are articulate and discerning critics of the on-line materials they are exposed to in school. (Unpublished data from on-going research) They see these as lacking interactivity and failing to accommodate the input of young people for whom they are supposedly designed. This is very different from the

reaction to projects where learners produce the digital content themselves, especially where this is done with a specific audience in mind (Bonnett et al 1999). Such work is now common in ICT learning centres such as the Hackney High Wire Centre which is exemplary in this field. However such work remains exceptional in school as evidenced through the DfEE Statistical Bulletins on ICT use in schools (DfEE 1999, 2000).

A question which arises at this point is this: Even if current models of ICT use can lead to improved attainment as evidenced through SATs and GCSE is this enough? And if not what are the alternatives, what and how should we be assessing young peoples' achievements if we are to capture evidence of learning which has validity and relevance to learners, as well as preparing them to be effective and successful in their lives beyond school?

## **Perspectives on Assessment**

### Testing

Whether assessing what we have always tested - familiarity with an agreed corpus of knowledge - what we are increasingly testing, ICT skills and competencies - or a very different set of achievements - skills, understanding, 'digital literacy' - it is vital to distinguish between what is tested and how it is tested. For example, using computer based tests, even delivered on-line, which are banks of multiple choice questions (MCQs) will not necessarily change what is tested, or how learners are prepared for the tests. True it will be possible to use adaptive testing methods, and test on demand, but there is no inherent reason why these should be anything other than tests of the same knowledge and skills (if indeed MCQs can address skills) as paper based tests. A new danger is that precious ICT access time in school will be used not only to test, but to practise for tests. Rather than encourage teachers to use more ICT in teaching the curriculum, computer based tests are likely, at least in the short term, to lead to less use of ICT for teaching and learning, and more for test preparation.

A more fruitful strategy in modifying assessment as a method of increasing effective use of ICT in the classroom is to use non-computer based methods to test skills and processes. It is through task-based assessment, mediated by teachers, that these criteria are most effectively tested, and it is these skills and process related outcomes which are best supported through the use of ICT in teaching and learning. In particular production of multimedia representations of personal or group knowledge and understanding offer a transforming method of assessment (McFarlane et al 2000). Ultimately these methods might be partially or fully assessed through computer-based assessment instruments or environments, but currently such systems remain the subject of research and experimentation. Even the best prototypes are many generations away from the reliable and valid instruments demanded by a national high stakes accreditation service in the UK.

### Formative Assessment

The efficacy of formative assessment in the raising of standards of teaching and learning is now undisputed, and indeed the use of such assessment is a criterion of success that Ofsted inspectors are currently charged with monitoring the use of formative assessment in school

inspections. The practicalities of formative assessment are however more problematic. In order to use this powerful support strategy, it is necessary for learners to work iteratively. The process of drafting, getting feedback from teacher and/or fellow learners who act as editors in this context, editing and re-drafting requires a longitudinal approach to planning of an individual learning task. (It is a process which curiously does not feature prominently in the national literacy strategy and might well improve standards in writing if it did.) Where learners are working with analogue media such as paper and pen the practicalities of this process quickly become unworkable, and the time and effort needed to produce an interim and final draft can be demotivating and counter productive, especially for young learners or those who struggle with writing. Where learners are working with digital media, even straight text, the process is transformed. Indeed the drafting - editing - re-drafting approach to a text is a natural method of production. But for the provisionality of digital media to be exploited in the support of effective learning, time will have to be made for learners to work with the same task over a period of time. This remains problematic when the volume of content in the statutory curriculum remains high and teachers and learners are engaged in a march through the syllabus against the clock.

Once digital media become the normal communication milieu in the classroom it is a very short step from text to multimedia, and from linear to non-linear narrative. Learners can engage with all of the mass media they are currently immersed in and become producers. In this way, teaching and learning can embrace the culture of communication and meaning-making which drives the information age. They can be challenged to tell their story, fact or fiction, through the use of text, picture, moving image, sound or any combination of these. In the process they can develop the powers of critical analysis of text, visual literacy, recognition of audience, selection and arrangement of information using the mass communication media of the 21st Century not just those of the 16th to 20th.

## **Conclusions and implications**

The 'standards' agenda currently drives education policy, and ultimately determines what is valued and therefore what is taught in schools. The emphasis is on success as measured through national tests, which in turn concentrate on familiarity with a defined body of content and some related skills in areas such as information handling and analysis. At the same time the ICT in education agenda is promoting investment in infrastructure and to a lesser degree training, but must justify itself in terms of impact on said standards. Whether or not using more ICT in learning and teaching can improve performance as measured by such tests is still unproven. However there is mounting evidence that these technologies can support a range of desirable developments such as motivation, independence in learning, critical thinking and the cluster of analytical and productive skills known as digital literacy, as well as an all important facility with an increasingly important form of mass media. It is entirely possible that the development of these skills empowers learners, who may become less accepting of a school curriculum with little personal relevance, and a poor match with related world knowledge. As yet the case is unproven. Possibly the increasing use of ICTs by young people in the world outside school, and the rather impoverished experience they have of the same technologies in school will in fact lead to improvements in Key Stage test and GCSE scores. An alternative however, is that growing fluency with ICTs will lead to a range of educationally valuable experiences which continue to go unrecognised in the school system, and that learners seek

validation of their obvious skills elsewhere. Indeed it may prove that ICT use in schools does not support the standards agenda, but rather challenges it; that investing in ICT for schools in order to improve test scores is indeed like planting apple trees in an effort to increase the orange harvest. In which case the quandary facing the system is not whether it uproots the trees, but rather how it grades the apples.

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