



## Taking the sociological imagination to school: an analysis of the (lack of) impact of information and communication technologies on education systems

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## **Taking the Sociological Imagination to School: an analysis of the (lack of) impact of information and communication technologies on education systems**

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**ABSTRACT** This article suggests that it is time for sociologists to redirect their focus from critiques of policy makers' unrealistic visions for information and communication technologies (ICTs) to the more generic issues that consistently mobilise resistance to ICTs within schools and education systems. There is an extraordinary difference between young people's experiences of ICTs at home and at school. The article explores the nature of ICTs, which are fundamentally antipathetic to the culture of the school, and draws on theories of institutional formation and structuration to explain the subliminal processes of institutional resistance that have so far been effective in emasculating their disruptive power. Illustrations of this process in practice are drawn from recent research in schools in the United Kingdom. The article then draws on three bodies of theory that suggest that ICTs fundamentally change human ontology, and suggests that it is time to stop trying to introduce them into schools as superficial additions to the current system. The article ends with a challenge to sociologists to play a leadership role in scenario building to assist policy makers in the transformation of education systems.

### **Introduction**

In his classic book *The Sociological Imagination*, Cecil Wright Mills (1959) suggested that the job of a sociologist is to develop and use tools of analysis which allow the minutiae of everyday life to be understood in terms of theoretical frameworks. Actors in a social situation are able to perceive it only from their own point of view, trapped within the sociocultural assumptions deriving from their personal life history and the organisational structures within which they live and work. Sociologists have the ability and

public duty to analyse and make meaning from the apparently trivial in order to inform actors and empower decision making.

The purpose of this article is to bring the sociological imagination to education systems and look at the impact information and communication technologies (ICTs) have so far had on schools. For many sociologists looking at this area, the focus has mainly been on using the evidence of non-impact to challenge the unrealistic visions of policy makers (e.g. Cuban, 2001; Selwyn, 2002). Adopting a different approach, I want to pose the possibility of radical change. My focus in this article is on the more generic issues that consistently mobilise resistance to ICTs within schools and education systems. Having spent many years trying to understand the reasons for this resistance, I want to set an agenda for researchers to work to circumvent it.

### **The Impact of ICTs on Young People's Lives outside School**

The first step in my analysis is to review the evidence that ICTs have had a radical impact on popular culture and the daily lives of children and young people outside school. In the ImpaCT2 evaluation, among a sample of 2000 students aged 10-16 in maintained secondary schools in England, home access to the Internet rose from 59% in June 2000 to 73% in June 2001 (Somekh et al, 2002). During the same period, ownership of a computer in these students' homes rose from 83% to 90%. ImpaCT2 collected image-based concept maps to give insights into students' overall awareness of computers in today's world. These showed their extensive knowledge of how computers are used for communications (email and 'chat'), finding information, playing games, accessing music and images, controlling everything from supermarket stock to NASA's rocket launches, and for work in offices and schools. They also indicated that students were using computers for an extraordinary range of activities, although younger children generally called all these activities 'games'. In an interview with 10-year-old George about his concept map (see Figure 1) he confirmed that his main interest was in games. He then clarified that the buildings are part of 'a kind of game where you had to build your world and what these kind of things done was build computers and help developing a construction site so they can build all these'. Through playing this game he appeared to have developed an awareness of the links between computers and the world of work. In a log of her computer use kept for one week, a 16-year-old girl reported spending five minutes at school on word processing and a total of 25 hours at home on: word processing (four hours), art packages (two hours), CD-rewriter (two hours), CD-ROM (two hours), email (six hours), surfing the Internet (three hours), creating web pages (two hours) and communicating using MSN (four hours) (Somekh et al, 2002, p. 11).





(Becker, 2000). Had ImpaCT2 asked students about their use of computers in specialist ICT lessons the answers would have been different, because there was considerable evidence that ICT was being used by schools mainly to teach ICT skills. This is, in itself, a disturbing finding, particularly as the evidence suggests that much of this use in ICT lessons is for teaching low-level skills such as how to use office software (Somekh et al, 2002, pp. 32-33). It is not surprising that Cuban (2001) concludes that the money spent on computers might have been better spent on other resources such as 'smaller class size, higher entry-level salaries for teachers, renovation of decayed buildings' (p. 193) and further 'that computers in classrooms have been oversold by promoters and policymakers and underused by teachers and students' (p. 195).

An intriguing piece of further evidence that ICT has had little impact on education systems comes from the way in which it is largely ignored in most research in education that does not set out specifically to address it. For example, searches on 'computer', 'technology', 'digital media' and 'ICTs' revealed no entries in the indexes of either Arnot et al's (1999) *Closing the Gender Gap* or Alexander's *Culture and Pedagogy: international comparisons in primary education* (2000). In the former text one might have expected ICTs to be addressed directly as a potential site of disadvantage for girls but this was not the case, presumably because the authors did not find that they were a significant characteristic of schooling. In the latter, the extent to which ICT had changed classroom practice might have been expected to feature in the analytical framework used to compare pedagogies across the five countries in the study (France, India, Russia, the UK and the USA). But it was not so. A more detailed reading uncovered a reference in Alexander's study to the presence of computers in the US classrooms (p. 337) and the use of the Web as a means for the UK Government to 'make entire standard lessons available on the web' (p. 339), but Alexander's comment that despite a wide range of resources, including computers, 'the everyday technology of teaching and learning in the Michigan classrooms was much more limited than [this] might suggest' (p. 337) is very significant. In general there was considerable commonality in the organisation of classrooms across the five countries and the presence of ICT in classrooms in the UK and the USA had not led to change.

### **Why the Difference between the Impact of ICT in the Home and at School?**

The difference between children's experience of ICT at school and at home is very extreme and immediately raises the question why. Such a very strong differentiation of use can only be accounted for in terms of the institutional functioning of schools and education systems as a whole. Mills (1959, p. 29),

in a paraphrase and explication of the ideas of Parsons (1951, pp. 38-39), explains the interrelationship of people in institutions in terms of role playing governed by 'mutual expectations', called 'standards', and 'expected reactions', called 'sanctions'. On this basis, Mills defines institutions as 'a more or less stable set of roles'. Through enacting these roles, individuals establish and consolidate the authority structures of the institution.

Gamoran is one of many writers to comment upon the extraordinarily 'stable structure' of the school and the 'persisting process' of classroom organisation and pedagogy:

Dominated by textbooks, lecture and recitation, instruction has remained fundamentally unchanged even though new tools have made other approaches to class work, homework and teacher-student interaction feasible. (Gamoran, 2001, p. 136)

Bidwell argues for the need to understand resistance to change in schools by adopting an integrated approach, combining 'network-based analysis of the faculty workplace in schools ... with a neo-institutional analysis of the formal organization of the school' (Bidwell, 2001, p. 102). Drawing on Waller's classic analysis of schools as sites of struggle in which faculty (teachers) attempt to motivate students to learn 'a collection of dessicated subjects that are far from students' experience' (Waller, 1932, p. 10), Bidwell suggests that schools should be analysed in terms of how their organisational structures impact on their 'production – that is, the processes by which schooling results in the cognitive development or moral socialization for which schools are formally responsible' (p. 101). His basic premise is that the institutional structure of schools, consisting of a hierarchy of bureaucratic roles and divisions of the teaching force into subgroups according to subject discipline and age phase, combined with the strength of external threats (e.g. high-stakes testing and inspection regimes), constructs the informal networks of teachers as mechanisms that are increasingly expert in adapting externally imposed innovations to existing practice.

According to Bidwell's analysis, ICT can be seen as yet another example of an innovation which has failed to penetrate the forces of sociocultural reproduction built into the institutional structures of schools. Bidwell's theory leads me to conclude that schools are locked into mechanisms of mutual constraint: the formal authority of the head teacher (the principal) and policy makers to bring about radical change through the introduction of ICTs is rendered powerless by the capacity of the informal networks of teachers to adapt such changes to traditional practices; while, *at the same time*, teachers are equally constrained by the predicament of working within an institution which, in Waller's terms, is 'a despotism in a state of perilous equilibrium' (Waller, 1932, p. 10), and as a result are

unable to use the potential power of their informal networks to engage in creativity, experimentation and risk taking. This analysis fits well with Giddens's theory of structuration, in which individuals within an institution are active co-producers of its structure and integral to its power relations:

According to the notion of the duality of structure, the structural properties of social systems are both medium and outcome of the practices they recursively organize. (Giddens, 1984, p. 25)

Giddens's theory does not suggest that institutional structures are easy to change, rather its main contribution is to shed light upon the process of institutional formation. The institution is formed, maintained and sustained as much by the assumptions and routine behaviours of those who work within it as by the larger system which gives it legitimacy. Teachers, parents and the community – students even – can be said to be complicit in the un-reformed institution of the school.

### **What is it about ICTs that Discourages their Integration into Teaching and Learning?**

The nature of the Internet is inherently individualistic, anarchic, exploratory and disruptive. It gives control to individual users to access vast quantities of information which have not been subjected to quality control; because there is no process of quality control there is de facto no oppressive control of the flow of information to anyone who seeks to access it; there is no formal division between knowledge consumers and knowledge producers, so that any individual can establish a web page and place material in the public domain; channels of communication are open between users, anywhere in the world, and there is an impetus to invent fictitious identities since there are no mechanisms to cross-check against 'true' identities; there is no division between communication (characterised as 'talking' in school) and information retrieval (characterised as 'work' in school); multitasking with several 'windows' open at the same time is increasingly part of the routine practices of users, particularly since they have not been encultured like older generations into the importance of 'concentrating on one thing at a time'; the process of seeking information is not subject to time constraints, but rather invites open-ended exploration and a certain degree of discovery by serendipity; information is not ordered into disciplines or differentiated according to the capabilities of the user (age or level of education), and hence the power differentials embedded in formal knowledge structures are removed (e.g. medical knowledge is available equally to medical practitioners and their patients); there is sound accessible both as an integral part of specific websites and downloaded to be played and stored on home computers; there is a merging of genres in a new genre of the Web, so that



moving images and commercial advertising impinge on areas of knowledge that have traditionally been presented only through text within non-commercial cultural settings; there is a merging of technologies so that the production of digital images is an integral part of both communication and web publishing, and the Internet can be accessed through cell (mobile) phones and Personal Digital Assistants (PDAs).

It is not difficult to argue that every single one of the features of the Internet and ICTs more generally listed in the previous paragraph is antipathetic to the culture and traditional values of schools. At an apparently superficial level ICTs have the potential to disrupt the routine procedures of schooling and challenge some of the basic principles which it symbolically upholds (Sharples, 2003). At a more fundamental level, following Bernstein (1971), schools and education systems can be seen as sites for both strong classification and strong framing of knowledge, which are fundamentally challenged by the destabilising impact of ICT on concepts like knowledge, teaching, the disciplines and rationality, as identified by writers such as Lankshear:

The circumstances, conditions and the very status of knowledge, learning, teaching and researching are currently in a state of profound upheaval under the double impact of rapid and far-reaching technological changes and the massive assault on longstanding narratives of foundation and legitimation. (Lankshear et al, 2000, pp. 17-18)

### **Institutionalised Resistance to the Radical Changes Made Possible by ICTs**

In line with the approaches to analysis put forward by Bidwell and Giddens, it seems clear that the formal bureaucratic structures of the school and the informal micro-networks of teachers come together, subliminally and powerfully, to defend the school against this fundamental attack on all that it stands for. This resistance on the part of teachers, head teachers and educational officials consists partly of assumptions that run so deep that they are barely recognised formally (e.g. the division of knowledge into separate subjects, and the division of the school day into short time periods), and more explicit invention of new rules to contain and constrain ICTs (e.g. by forbidding the use in school of cell phones, online games, and websites considered by the teacher to be trivial). It is resisted where possible by young people by means such as using the 'mute' facility of their cell phone and text messaging each other silently; or multitasking with several windows open on the computer at the same time, enabling quick transition from one to another with a flick of the hand, using the ALT+TAB command.

To illustrate this process of institutionalised resistance to ICT, which operates largely subliminally and therefore without acknowledged intentionality, I will put forward just four examples: the implications and operational outcomes of constructing ICT as a discrete subject in the National Curriculum; the assumption of 'starting from scratch' in teaching ICT skills; the exacerbation of the 'second digital divide'; and the constraints placed by schools on children's access to the Internet. Each of these springs from the fundamental values embedded in the education system and has far-reaching, unexpected, negative outcomes.

*The Implications and Operational Outcomes of Constructing ICT as a Discrete Subject in the National Curriculum*

ICT has the status of a discrete subject in the English National Curriculum and the accompanying paraphernalia of specified knowledge components, 'level descriptors', 'attainment targets' and national tests. It is largely taught by specialist ICT teachers, who in primary schools are called ICT coordinators; in both primary and secondary schools these specialists are responsible for preparing students for national tests and public examinations. The curriculum specifications are translated into classroom practice with the help of 'guidelines' drawn up by the Qualifications and Curriculum Authority (QCA) and the quality of the school's ICT teaching is perceived by many teachers to be judged by inspectors (Ofsted: the Office for Standards in Education) on the basis of adherence to these guidelines. The guidelines give examples of lessons in which ICT is embedded in an activity; however, although these activities are nearly all oriented towards another curriculum subject (e.g. skills of using email are taught within communication activities which have a relationship to the literacy curriculum), the fact that they are taught by an ICT specialist, often in a specialist ICT suite, means that they are scarcely ever integrated with subject teaching. The effect of this was very clear in the outcomes of the ImpaCT2 evaluation, which showed only a very marginal improvement in test and examination scores in some core subjects at some levels as a result of using ICT: specifically, the only gains that were statistically significant were in English and to a lesser extent maths for 10-11 year-olds, science for 13-14 year-olds, and science and design & technology for 15-16 year-olds (Harrison et al, 2002). As mentioned earlier in this article, these disappointing results can best be understood in terms of the very low levels of use of ICT in English, maths and science lessons recorded by students in the sample in questionnaire responses.

*The Assumption of 'Starting from Scratch'  
in Teaching ICT Skills*

The National Curriculum for England specifies learning in a series of levels which proceed on a linear basis from KS1 (Key Stage 1) for 5-7 year-olds to KS4 for 15-16 year-olds. Although it is nowhere so stated, the National Curriculum is based on the assumption that all learning will take place in the school, or as directed by the school, and it is the responsibility of the school to ensure that students are given their 'entitlement' of teaching to enable them to progress from one level to the next. The school system is, therefore, unprepared for wide variations in students' prior learning of the kind now typical in terms of ICT skills as a result of frequent and sustained use of ICTs by many young people in the home (Lewin et al, 2003). As a result, teaching largely proceeds on the basis of covering the whole of the specified curriculum 'from scratch' with all students regardless of the skills they have already acquired. Several studies have shown that this results in some students being, at best, very bored by ICT at school and, at worst, 'hating it' (Somekh et al, 2002, pp. 31-33 and Facer et al, 2003, pp. 205-211). Tellingly, the latter quote Huw, aged 12, summarising what he sees as good teaching in a situation where some students have more highly developed ICT skills than the teacher: 'Then a good teacher like Miss Andrews would ... take on your information that you inputted into the lesson. She learns from you and you learn from her. So it's like a two-way system. It's not like some teachers who, you know, pound it into you, try to just get information into you'.

*The Exacerbation of the 'Second Digital Divide'*

Embedded in English schools is a very strong 'fairness ethic' by which teachers always try to ensure that no student is given an unfair advantage over any other student. No doubt this is strongly linked to a reaction against the naked injustices embedded in the still-enduring divisions of social class, and the former tripartite system of schooling (in place during 1947-1970 approximately, but still persisting in a small number of local education authorities), whereby children were selected according to ability at the age of 11 for schools which offered different curricula and career opportunities. In relation to ICT the fairness ethic has the effect that teachers are reluctant to ask students to use ICTs for homework, first because they often underestimate the proportion of their students who have access to ICT at home, and second because they see this as irrelevant anyway, since the principle would be the same even if requesting ICT use only discriminated against one student. However, there is now a considerable body of research evidence that shows that in addition to a divide in terms of access to ICT in the home, there is a 'second digital divide' which operates through the

choice of the kinds of use of ICTs that students make in the home (Natriello, 2001). This is merely another manifestation of the well-established phenomenon by which students are differentially advantaged or disadvantaged according to the cultural capital available to them in the home. Lewin et al (2003) have shown that when teachers make no specific requests for students to use ICTs for homework, those in homes with high cultural capital are much more likely to choose to use ICTs for schoolwork than other students with similar access to ICTs at home; moreover, children are less able to argue their need with parents and siblings for access to a shared resource if teachers have not made a specific request for them to use ICTs.

### *The Constraints Placed by Schools on Children's Access to the Internet*

In relation to this issue the term 'children' is used more often by the mass media than 'students' because of its 'fit' with the discourses of anxiety and threat. All the points raised here, however, refer equally to all students up to the time of leaving school.

It is very difficult to untangle all the issues relating to constraints placed on children's access to the Internet, but some things are becoming clear. First, that the dangers of children inadvertently accessing unsuitable material are real but relatively small; and that similarly, the dangers of them being approached and 'groomed' online by paedophiles seeking to meet them are also real but relatively even smaller. Second, that we live in an increasingly risk-averse society in which few children are permitted to play in the street or the park, or walk to school. In England (and undoubtedly in the USA too) children's lives are increasingly circumscribed and constrained by adults, and anxieties about the dangers of the Internet have to be seen in the context of this national panic. Third, that we live in an increasingly litigious society, in which teachers are at risk of prosecution in the case of an accident happening to a child in their care. Rather than being *in loco parentis* and taking reasonable decisions in the knowledge that if something goes wrong they will be given credit for doing their best in the interests of the child, they are increasingly blamed for mishaps. This creates a context for Internet use in schools in which parents and the public greatly overestimate the dangers and teachers cannot afford to take any chances. Fourth, that, as a result of these anxieties, in some schools access to the Internet is severely hampered by 'screening software' that prevents access to a large number of websites and slows access to all. It is common for researchers to be told by children that they prefer to use the Internet at home, where their access is much faster than at school (partly also, of

course, because in school there may be multiple users seeking access at the same time through the same cables).

The points above are, however, only the context for a deeper-level issue relating to control over individual action and responsibility for learning. It is in relation to these issues that ICTs have the maximum potential to disrupt the traditions and routines of schooling. Schools are notoriously sites of control in which students are required to conform to a regime of practice which places the teacher in the role of an authoritative individual and students in the role of members of an ignorant and potentially oppositional group. Waller's analysis from the early twentieth century (1932) locates the imperative for control in the school's focus on a mandated curriculum of little interest to its students. Today, with the urgent need for radical change in schooling to prepare students for a radically different world in the twenty-first century, and the resources of the Internet available to allow coverage of a far wider range of material and online support which could be used to give students far greater responsibility for their own learning, it is both highly desirable and possible to radically change schools. Unfortunately, the anxieties surrounding Internet use are joining forces with the institutionalised resistance to change within the education system to prevent this from happening.

### **New Medium, New Message: time for the end of school as we know it**

In the UK, Stephen Heppell and his team at Ultralab (<http://ww2.ultralab.net/>) have successfully demonstrated a new approach to education through their NotSchool initiative. NotSchool works with school refusers, long-term truants and those excluded from school for bad behaviour, and has shown that by giving them access to a computer in their own home, removing all the structures and discourses of school (buildings, roles such as 'teacher' and 'student'), naming them as 'researchers' and working with them in non-coercive relationships where they are sometimes asked to take on the role of teaching adults, they are able to reconstruct their identities and respond positively to the respect they are being shown. NotSchool might be seen as a twenty-first century enactment of Illich's (1971) vision of *Deschooling Society*, made possible by the new digital media. In both the USA and the UK, Alan November (2001) has challenged schools and policy makers to place the empowerment of students at the centre of their vision and practice. Cuban gives the reason for the failure of education policy makers' visions for technology-induced radical change as originating from the fact that there has been no fundamental change in the system of schooling:

For such fundamental changes in teaching and learning to occur there would have to have been widespread and deep reform in schools' organizational, political, social, and technological contexts. (Cuban, 2001, p. 195)

Whereas, in the past, Cuban's accusations might have seemed unreasonable and Illich's vision unrealistic and unaffordable, NotSchool has actually demonstrated that, with the Internet and other ICTs, fundamental changes to teaching and learning and the whole institution of schooling are both achievable and desirable. The only pity is that it is seen by policy makers as a radical solution to the otherwise no-hope situation of school refusers, rather than a model of fundamental change for the system as a whole.

Three bodies of theory enable the sociological imagination to reach a deeper analysis of the reasons why ICTs cannot be introduced into education as superficial additions to the existing system, but need to be located in radical institutional and systemic changes. All three focus upon the interrelationship between ICTs and users which fundamentally changes the experience of being human and makes ICTs an indispensable part of that experience. The first is McLuhan's (1964, p. 7) explanation that 'the medium is the message', at the heart of which is his theory that media are 'extensions' of ourselves. Writing at the time when the era of mechanisation was being replaced by the era of cybernation (or 'automation'), McLuhan saw the telegraph as an example of 'the electric form, that ... ends the mechanical age of individual steps and specialist functions'. Telegraph technology - which I am taking here to be the forerunner of contemporary ICTs - is seen by McLuhan as a force which has brought about seismic change in the world of journalism and information management:

Any innovation threatens the equilibrium of existing organization. ... the outerring or extension of our bodies and senses in a 'new invention' compels the whole of our bodies and senses to shift into new positions in order to maintain equilibrium. A new 'closure' is effected in all our organs and senses, both private and public by any new inventions. ... Naturally the effects on language and on literary style and subject matter were spectacular. (McLuhan, 1964, p. 273)

McLuhan's use of the language of the body and physical functions is not merely metaphorical, it expresses his understanding that a new medium in use becomes an extension of the body of the user and hence fundamentally changes the body's functions and means of expression. Rejecting any simplistic dichotomy of mind and body, he sees new media - of which for us ICTs are the contemporary example - as having fundamental personal and social consequences because they are extensions of ourselves.

The second body of theory is the work on the impact of ICTs on the self and identity formation carried out by Turkle (1984, 1995) over a period

of more than 15 years. In her early work she probed the way that users of all ages – from young child-novice users of electronic games to postdoctoral students of computer systems and artificial intelligence – vested something of their own identity in the machine, seeing it as a ‘second self’ or responsive mirror. In her later work she focused on the relationship *between* users in the virtual world of ‘cyberspace’ and their playful construction of fantasy identities as a means of self-liberation and exploration of what it means to be human. Her descriptions of individuals constructing and reconstructing identity through ‘living in the MUD’ (Multi-User Domains) of online interactive simulation games provide fascinating insights into the ontology of human experience (Turkle, 1995, p. 11). She concludes that ‘in the past decade, the computer culture has been the site of a series of battles over contested terrains’ (p. 267) and categorises the computer in three different ways: ‘as tool, as mirror, and as gateway to a world through the looking glass of the screen’ (p. 267). The allusion to Lewis Carroll’s topsy-turvy world of an alternative psychological reality signals both creative power and loss of traditional certainties. Like McLuhan, she does not conceive of ICTs as separable from the identity of their human users.

The third body of work is activity theory, which embodies the Vygotskian concept of tools as mediators of human activity. The most powerful description of this fundamental interdependence of tools and human agents skilled in their use is Jim Wertsch’s metaphor of pole vaulter and pole, neither of whom/which is capable of clearing the high bar without the other (Wertsch, 1998). In a notable edited collection, Nardi (1997, pp. 17-44) refocuses activity theory specifically upon the analysis of human interaction with ICTs, presenting it as a ‘potential framework for human-computer interaction research’. The chapter by Christiansen (1997) in this volume draws upon the imaginative insights of sociology and cultural psychology to characterise the special nature of ICTs as lying in their capacity to be loved by their human users:

Of course, an artefact cannot have feelings. It is the relationship between artefact and user that creates a feeling inside the user, which in turn is projected to the artefact. The tool relationship becomes a kind of filter through which the user experiences the artefact. (p. 176)

She goes on to explain that this relationship between tool and user lies at the heart of the conceptualisation of activity as defined by Leont’ev, following Vygotsky. Just as it was for McLuhan and Turkle, technology is seen as interdependent with human experience and action with the power to radically change the nature of human activities. But activity theory goes further to explain the way that institutional structures within national systems, with functions as diverse as education and the postal service

(Engeström & Escalante, 1997), construct and constrain the interrelationship of humans and ICTs in mediated activity.

When the explanatory power of these three bodies of theory that show that to be transforming, ICTs need to become an integral part of human activity, is put alongside the practical example of NotSchool's success, the case for radical change of the school system becomes incontrovertible. The mutual constraints that render school leadership powerless to direct effective change from above and the informal networks of teachers powerless to produce creative change from below are clearly indicated in the evidence of (non) impact of ICTs on education systems over a period of more than 20 years of high levels of investment by policy makers. It is time for the end of school as we know it.

### **An Agenda for Research to Promote Radical Change**

Natriello ends his analysis of the unintended failures of ICTs to have any impact on schooling with a challenge to sociologists of education. It is not enough, he contends to say, as Attewell does, 'We must wait to see whether "Let them have Pentiums" is more practical than "Let them eat cake"'. Rather, he argues, 'Sociologists of education can play a significant role in designing the educational institutions of the digital age. Failure to engage at this defining juncture may appropriately lead to forfeiture of the right to criticize in the future' (Natriello, 2001, pp. 263-264).

In the UK and the USA there are currently a number of significant initiatives aimed at radically changing aspects of schooling. These range from radical designs for new school buildings, to innovative deployment of mobile ICTs for use both at home and at school, and experimental formations of curriculum and pedagogy. They are all still considerably constrained by the technologies of national/state curricula, high-stakes testing and traditional pedagogies, but many are supported by funding from commercial partners who bring with them none of the assumptions embedded in the culture of schooling. The dissatisfaction with the education system which is leading increasing numbers of parents in both the USA and the UK to remove their children from school and educate them at home, drawing on the services of Internet-based providers of educational materials, is a strong signal of the imperative for change. Educational researchers should draw upon the tools of sociology and use their sociological imagination to play a leadership role in scenario building to assist policy makers in the transformation of the education system.



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