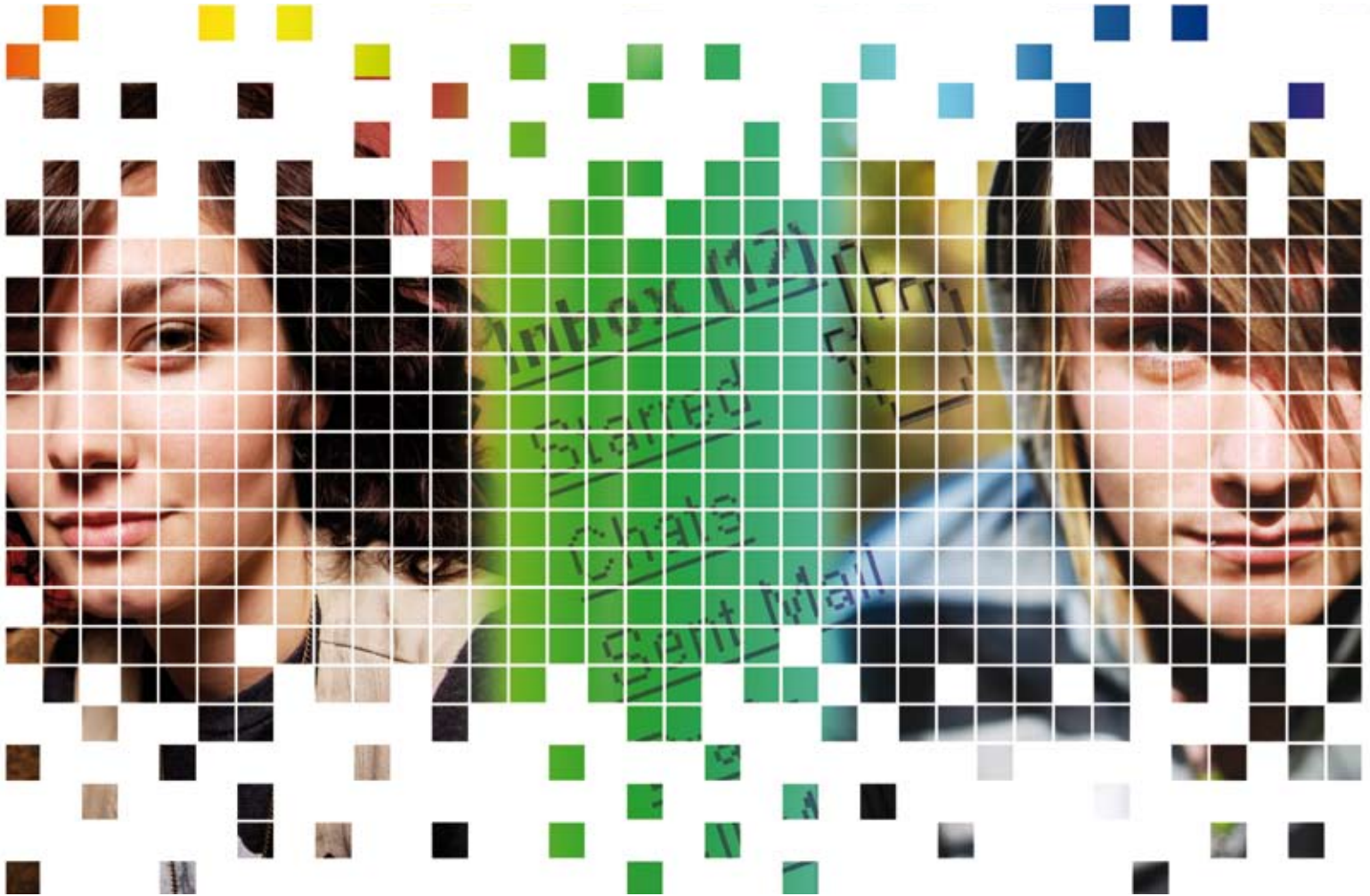# Theorising the benefits of new technology for youth:
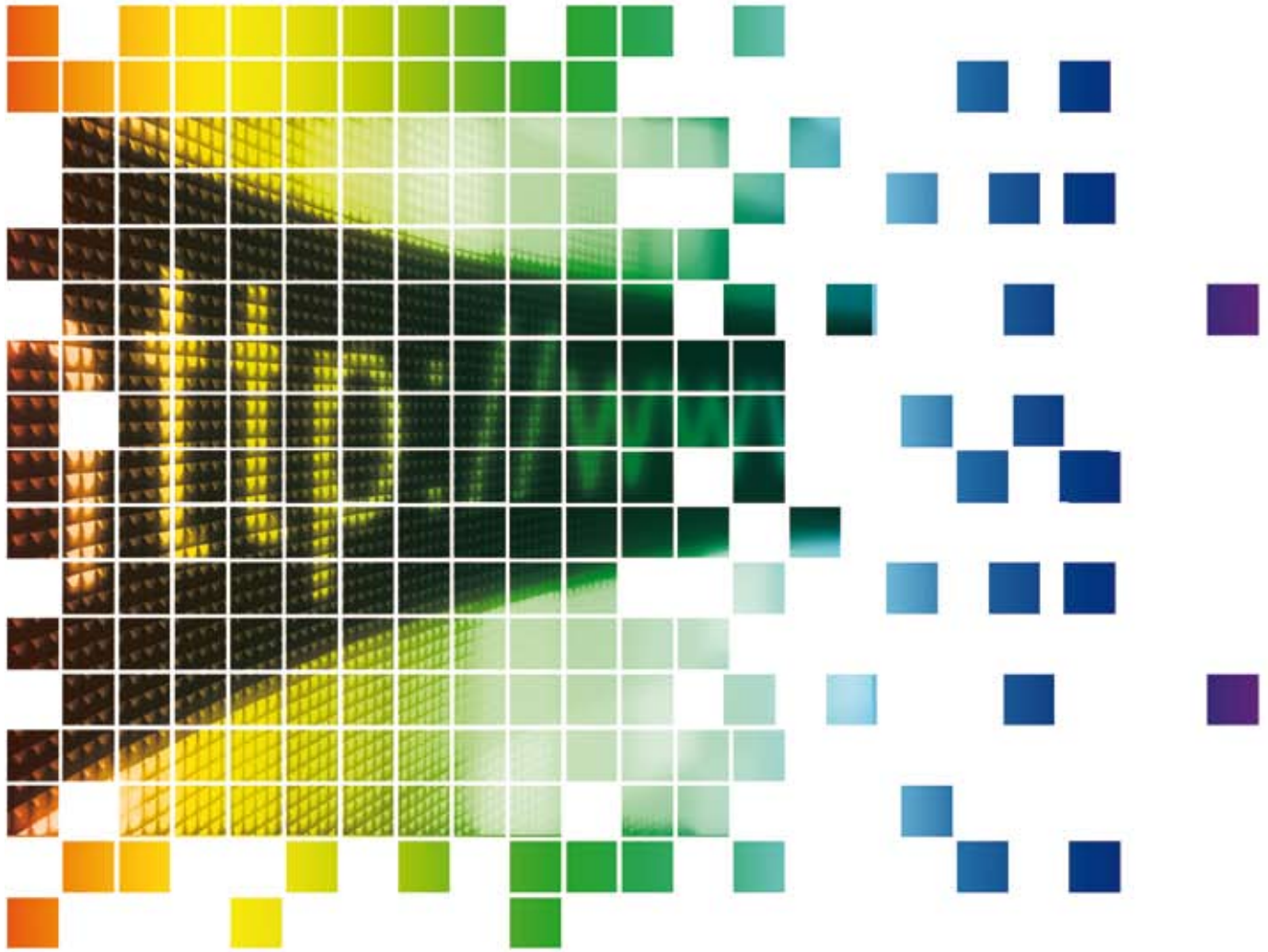
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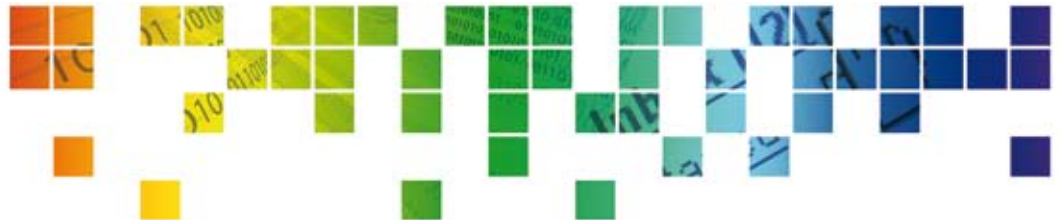

The first of four reports in the ESRC Seminar Series:

The educational and social impact of new technologies on young people in Britain

Report of the seminar held on Wednesday 12 March 2008
Department of Education, University of Oxford

Contents

Executive summary

This report covers the content of the first seminar in the series, funded by the ESRC and entitled 'The educational and social impact of new technologies on young people in Britain'.

The seminar series was conceived as a multi-disciplinary initiative, bringing together academics, policy makers and practitioners from many different backgrounds, in order to consider the ways in which new technologies were affecting young people, and in particular to look at ways in which new technologies were having a positive effect on the lives of adolescents in our society.

It will consider the benefits of new technologies for young people, exploring the ways in which society can ensure that information and communication technologies (ICT) contribute to positive educational outcomes and examining how an multi-disciplinary framework could assist in developing a new understanding of this important topic.

This, the first seminar in the series, had three main goals. First, we wanted to consider ages and stages, and to think through whether, and if so, how the particular concerns of adolescence mesh with the opportunities afforded by new technologies. Secondly we were interested in technological determinism, and wanted to have an opportunity of looking at questions relating to constructivism and determinism in the context of youth today. Finally we wanted to look at formal and informal education and ask, what is the role of ICT in learning, however that is defined.

The seminar consisted of a welcome and introduction from Sonia Livingstone, a short paper from Chris Davies on the views of young people, and then three papers, each dealing with one of the topics outlined above. Each paper had a discussant, and at the end of the seminar there was a panel debate and open discussion. A lively and enthusiastic expert audience contributed to an informative and enjoyable seminar.

In her Introduction Sonia Livingstone argued for the importance of a wider and more critical discussion about the ambitious hopes society holds out for ICTs, along with a recognition of some of the constraints associated with new technologies. She identified several unresolved questions so as to set out a research agenda for the future.

Chris Davies, in his presentation of the views and practical experiences of young people, highlighted the continuing differences between the use of technology in the home and at school. Although based on a small sample, his findings demonstrated the limitations that characterise in young people's use of ICTs in the school setting, especially when compared with the flexibility and positive attitudes shown by adolescents when using these same technologies at home.

John Coleman's paper, looking at ages and stages, examined how lifespan developmental theory, rather than Piagetian cognitive development theory, is best suited to understanding the social and emotional character of adolescence today. By critically discussing the major parameters of development, he emphasised how these interact with the opportunities provided by new technologies, and thereby making the use of the internet and of mobile phones especially attractive to young people.

Neil Selwyn's paper drew particular attention to the differing ways that technological determinism has been used in discourses on youth and new technologies, contrasting this with a social constructivist approach to technological affordances. Arguing that there is no one 'correct' theoretical stance when looking at young people and technology, he reminded the audience that a full analysis of the ways in which a technology is used by a young person requires a deep understanding of the social and interpersonal circumstances in which technologies exist, and through which they attain their meaning.

In the third paper, Charles Crook examined theories of formal and informal learning, especially in relation to web 2.0, suggesting that it would be a mistake to believe that this new medium offers a replacement for interactions that characterise traditional educational practice. As he put it: 'These new media merely change the nature of the arena into which those interactions socialise us'. Following his overview of four influential theories of learning – behaviourism, constructivism, cognitivism and the socio-cultural perspective – he concluded in favour the latter as the only approach that provides both a socio-cultural framework for learning and a recognition of the interpersonal relations that mediate learning.

Introduction

Sonia Livingstone, London School of Economics and Political Science

Welcome

This report contains the presentations and discussions held at the first in a new series of seminars funded by the ESRC to consider 'The educational and social impact of new technologies on young people in Britain' during 2008 – 2009.

The series is organised by John Coleman, Chris Davies and Ingrid Lunt, from the Department of Education at the University of Oxford, and Sonia Livingstone, from the Department of Media and Communications at the London School of Economics and Political Science.

For the first seminar, participants were specially invited from a diversity of disciplines (psychology, education, sociology, information systems and media studies) and a range of stakeholder groups (academic, industry, policy) to consider 'Theoretical frameworks for the social shaping and social consequences of new technologies for children and young people'.

The seminar structure, participants and speaker biographies are in the appendix of this report. Further seminars in the series are planned as follows:[1]

- Seminar 2: Changing spaces: young people, technology and learning (7 July 2008)

- Seminar 3: Social and digital skills: new challenges for young people (21 October 2008)

- Seminar 4: Questions of identity: young people's perspectives on the appeal of new technologies (February 2009)

- Final conference: The educational and social impact of new technologies on young people in Britain (May 2009)

Overview

- What are the benefits of new technologies for children and young people?

- How can society ensure ICTs[2] contribute to positive educational outcomes?

- What can a multidisciplinary research framework offer practitioners?

These are the kinds of questions we set ourselves to address as we designed this seminar series. The first question is theoretical and empirical – how do we conceptualise, measure, investigate and understand the possible benefits (educational and other) of which technologies for which children, under what conditions, and why?

The second question is normative – what positive educational outcomes are at stake, how do they relate to other possible benefits of using ICTs, which segments of society are responsible for ensuring these benefits?

The third question is a meta-question – how should these questions be addressed, by whom, and is it really the case that a multidisciplinary research framework is the best way forward?

A wider discussion

All of these, and related questions, are part of a wider, societal discussion. Consider the following quotations:

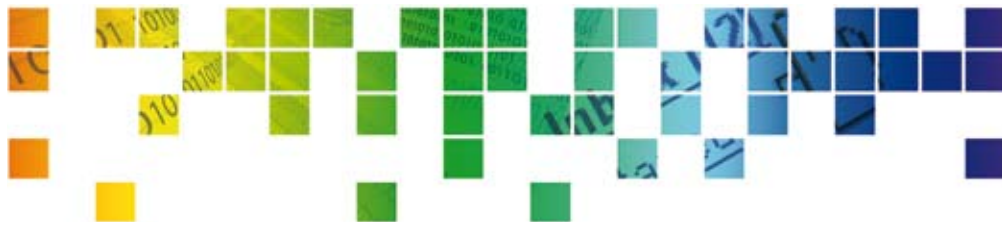'ICT can improve the quality of teaching, learning and management in schools and so help raise standards. That's why ICT is at the heart of the DCSF's commitment to improving learning for all children.'[3]

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[1] For updates and reports, see http://www.education.ox.ac.uk/esrcseries/home/index.php

[2] Information and Communication Technologies

[3] See http://www.teachernet.gov.uk/wholeschool/ictis/

'We have to find a way to make access universal, or else it's not fair. More than a million children – and their families – have no access to a computer in the home. I want a home computer to be as important as having a calculator or pencil case is… The so-called "digital divide" cannot be allowed to reinforce social and academic divisions.'[4]

'Becta leads the national drive to inspire and lead the effective and innovative use of technology throughout learning. It's our ambition to create a more exciting, rewarding and successful experience for learners of all ages and abilities enabling them to achieve their potential.'[5]

Each stresses the ambitious hopes held by society regarding the benefits of ICT for children and young people. With government policies in place to ensure that ICT can enable all children to learn to their full potential, with industry behind the diverse initiatives designed to make this happen, with households with children gaining and sustaining internet access at home – one might think there was little left to discuss.

Infrastructure for learning

The idea of 'ICT skills as a third skill for life alongside literacy and numeracy' (Office of the e-envoy, 2004) has become taken for granted.[6] This is not because ICT skills are important in and of themselves, but because, like other forms of literacy, they constitute the means by which people can access information of all kinds, learn in a multimedia environment, communicate in a global context, participate in civic activities, express themselves creatively and, last but not least, obtain employment in a competitive knowledge society.

Today in Britain, nearly every child uses the internet and other online technologies – most of them at home and school, some only at school, some elsewhere also. Not just computers on desks, ICTs are becoming embedded in the fabric of every activity – they are part of the infrastructure that supports learning, communication, participation. For example, the UK Children Go Online survey found that 60 per cent of pupils think the internet is the most useful tool for getting information for their homework – only 21 per cent named books.[7]

From expectations to realities

Yet ICT remains problematic – it can be expensive, unreliable and difficult to use – for teachers, for parents, even for the so-called digital generation. It is demanding to update and maintain, both exciting and disappointing in reality, persistently opaque as regards its purpose or benefit. It is worth remembering that those without access don't necessarily think they are missing out at all.[8]

Problematically too, ICTs absorb our attention such that we focus on them instead of on children, their lives, their needs, our aspirations for them. Parents check out their local school by looking at the computer suite, perhaps more than talking to the teachers. The Government's current Home Access initiative is clear that homes need connected computers; it is less clear what children should use these for.

In planning this series, my colleagues and I argued about the title – was the starting point the ICTs and the question that of their 'impact' on young people? Or instead, is the starting point the children, and the question that of the 'use' to which they may put the ICTs?

[4] Schools Minister Jim Knight, announcing the Home Access initiative at BETT, 2008

[5] See http://about.becta.org.uk/

[6] Office of the e-Envoy (2004). UK Online Annual Report. London: Office of the e-Envoy

[7] Livingstone, S and Bober, M (2005). UK Children Go Online: Final report of key project findings. London: London School of Economics and Political Science.

[8] Dutton, W H and Helsper, E (2007). The Internet in Britain: 2007. Oxford: Oxford Internet Institute, University of Oxford

Although still speculative, many advocate an alternative, even radical conception of learning – a pedagogic shift from a rule-based model of education to an immersive, child-centred model of 'learning-through-doing'.

We don't really disagree – though one might replace the term 'impact' in favour of a critical examination of what ICTs afford their users, in turn a matter of their social shaping as well as their social consequences.[9]

But I use this example to point to the many unresolved questions and debates hidden behind the grand expectations of policy makers, technologists and futurologists.

Unresolved questions

Here's another example, this time concerning the clash between expectations and empirical evidence.

'ImpaCT2 is one of the most comprehensive investigations into the impact of information and communications technology (ICT) on educational attainment so far conducted in the UK… In every case except one the study found evidence of a positive relationship between ICT use and educational attainment… However, in some subjects the effects were not statistically significant and they were not spread evenly across all subjects.'[10]

A recent report to Congress in the USA reports findings with similar ambivalence and, perhaps, frustration. It found that test scores in classrooms using reading and mathematics software for a full year were no different from those using traditional teaching methods.[11]

It did find some indication that more ICT use could improve results for reading (but not mathematics) among 9 year olds and that, among 5 year olds results were larger when class sizes were smaller. But as with the ImpaCT2 study, explaining the particular patterns of significant and insignificant findings obtained invites ad hoc rather than intellectually convincing explanations.

What do we mean by learning?

Of course, there is other research, and we should consider this in our seminars. But some will already be frustrated with the reduction of learning to test scores. Surely, the potential of ICTs for learning is far greater than this?

The question of learning itself is a theme for this seminar. Although still speculative, many advocate an alternative, even radical conception of learning – a pedagogic shift from a rule-based model of education to an immersive, child-centred model of 'learning-through-doing'.

As Smith and Curtin note, not only are children 'the first generations to live in an all-encompassing electronic habitat… to deal with this complex habitat, children develop forms of cognitive and attitudinal organisation that enable them to interpret the world and perform it'; but also, unfortunately, in this new world, "conventional school curricula and pedagogical procedures are out of step".[12]

More positively, Jackie Marsh quotes a teacher who describes the beneficial effect for one little boy of engagement in a media/ICT-based project at school:

'Shafeeq, who doesn't particularly talk a lot unless it's, "I'm gonna shoot you", that kind of thing, he really got into it and he wanted to tell us a story. His story came alive and it was alive for him and everyone was listening to his story. Well usually it's, "Come on, don't talk about guns, don't talk about that". So he really found a vessel to tell his story and to… I think he's got more friends now through it.'[13]

This example is not simply one of ICT motivating a previously-disaffected child, but also points to the potential of ICT to help children formulate their ideas, find a voice and communicate effectively.
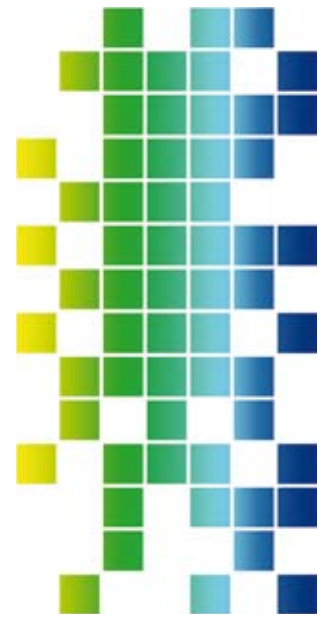
[9] Hutchby, I (2001). Technologies, texts and affordances. Sociology, 35(2), 441-456

[10] See http://partners.becta.org.uk/page_documents/research/ImpaCT2_strand1_bw.pdf

[11] See http://ies.ed.gov/ncee/pubs/20074005/

[12] Smith, R and Curtin, P (1998). Children, computers and life online: Education in a cyber-world. In Snyder, I (Ed), Page to Screen: Taking Literacy into the Electronic Era (pp 211-233). London: Routledge. p 212

[12] Marsh, J, Brooks, G, Hughes, J, Ritchie, L, Roberts, S and Wright, K (2005). Digital Beginnings: Young children's use of popular culture, media and new technologies. Sheffield: Literacy Research Centre, University of Sheffield. p.69

Henry Jenkins (2006) hopes to inspire us to think more creatively by pointing to the case of home-schooled Harry Potter fan Heather Lawver who, in her early teens, launched 'The Daily Prophet', an online newspaper for Hogwarts. As he put it,

'A girl who hadn't been in school since first grade was leading a worldwide staff of student writers with no adult supervision to publish a school newspaper for a school that existed only in their imaginations'.[14]

The research agenda

For this first seminar, the idea is to discuss some of the unresolved questions that underpin the entire field of youth/technology studies, yet which find too little opportunity for discussion.

The first is the question of age. It's easy to talk of 'children and young people', though people define the end point of this category very differently, but it is much less clear how to consider age in social, cognitive and cultural terms (other than in terms of key stages in the curriculum). So, how do we meaningfully distinguish the needs and interests of children of different ages and why?

Secondly, although technological determinism has been roundly critiqued by academics, it remains a driving force in some policy and industry discussions, while in the academy, a variety of soft determinisms are little articulated. Also unclear are any differences among those taking a broadly constructivist position. So, what are the key ways of thinking about the technological?

Third and last, while formal education is the primary driver for children's ICT use, led by schools and, also, by parents wishing to support their children's education, the relation between formal and informal learning (where the latter could be extended to include almost everything children use technology for) remains unclear and contested. So too, therefore, does the relation between home and school. What is and what could be ICT's role in learning, however defined? What are the key ideas and debates here, what's at stake?

Each of these three issues is taken up by one of the seminar speakers and developed by a discussant, as presented in the body of this report. The issues thereby raised were brought together in the final plenary panel. This report attempts to capture the range of points made during the seminar. It also provides an opportunity for participants to add short comments after the seminar.

This report also includes a summary of a series of group discussions conducted by Chris Davies in local secondary schools during March 2008. This set the context for the seminar by focusing on the meanings of ICTs to children and young people and, especially, the positive and negative experiences they have had with ICTs at school and in relation to learning at home.

[14] Jenkins, H (2006). Convergence Culture: Where old and new media collide. New York: New York University Press. p 172

Views of young people

Chris Davies, University of Oxford Department of Education

In order to ensure that the voices of the young people whose lives we are discussing in this series, we collected opinions prior to this first seminar from 60+ young people aged between 11-16 in schools in two different parts of the country. This was not systematic research: just a quick and fresh snapshot of some of the things that young people are doing for themselves with new technologies, in their own time, and of how those activities compare with their experiences and opportunities in the school context.

In their own contexts away from school, it was striking to see how assured the great majority of the young people questioned were in talking about their uses of technology. They were not struggling for things to tell us, and very nearly all were easily able to give quite detailed lists both of the different kinds of technologies they like to use, and of the varied and sometimes complex ways they had built up a pattern of use for these things that met their own needs and inclinations. In terms of hardware, it is interesting to see that peripherals are taken as seriously as major items: not only do they talk of laptops, Xboxes and mobile phones, they refer – not entirely facetiously – to iPod speakers, memory sticks, microwave cookers and fridges.

They gave the impression of building up personal technology infrastructures as an important element in conducting their own lives. Their choices of websites demonstrate a similar level of a constructed patterns of favourite choices: not only do they talk, obviously, of bebo, YouTube, MSN, Google, Wikipedia, MySpace and Yahoo, but also of miniclips, flowgo, Chain Reaction, World of Warcraft, teamspeak, Fanlib, ironmaiden. com, ebuddy and Tellytubby Slaughter. Asked to name any technologies they disliked, not much emerged apart from a few stated dislikes for 'Playstations, xbox, Wiis – things like that'.

What was really interesting was the number of young people who offered quite coherent pictures of how all these things fit together in their lives, and their often very clear feelings about what they gained from the technologies they use in their own time. Many describe very straightforward sets of functions that their own technologies allow them to carry out: talking to friends, interacting with other people, communicating with friends/family, chatting; listening to music; playing games and playing around; watching movies, watching video clips; revision; fun. One spoke, strikingly, of using technologies as a means of 'finding comfort'. In addition to lists of this kind were the multiple-use descriptions: 'I mostly like using games consoles and computers – I mostly use a computer for finding information, and games consoles for games'; 'phone to text, computer for msn, facebook, bebo, music, watching films, ps2 to play games, buying things'; 'mobile for talking to mates, computer for email, instant messaging – music, Xbox 360 again talking to mates and playing games together, – music'. Such accounts provide a kind of verbal picture of young people laying out their own devices on a bedroom table, and constructing the way they manage their own lives (to the extent at least that they have control over their own lives in the midst of their wider commitments to family and school and other responsibilities) around them.

This was clearly not the case when it came to the part played by technologies in their lives in school. The picture here was not uniformly bleak: plenty of respondents gave positive examples of technology uses encountered in classrooms. Some found it to be enjoyable and helpful in various aspects of the curriculum (depending, it appeared, on individual teachers above all), while others found offerings rather weak.

On balance, they appreciated any efforts made to provide digital resources and opportunities in their school learning. Many good examples were quoted in areas as varied as experiences in RE using PowerPoint, in English, graphics, designing things, French coursework, making a flash document, foodtech, looking up info like history; 'I went on a language website and interacted with different people', 'business studies because you can find out about people in business'. The higher up the school, the more positive were some of the experiences reported.

But none of these fairly isolated positive instances hide the fact that the general experience of technologies in schools failed to impress the young people themselves. They are frustrated by the way that 'Everything is blocked!' and their advice for better ICT experiences in school was always unambiguous: 'Don't be so petty by blocking websites like game websites'; 'let's use more websites'; 'faster loading computers, unblock some pictures'; 'take away the filter'; 'do better projects'. If their experiences of using ICT in lessons were generally coloured by frustration, they found the experience of trying to extend their out-of-school patterns of use into their free time in school really disappointing, wishing constantly that they had the opportunity to 'text each other, listen to music and be able to use msn etc. at breaks'.

For the most part these young people did not include the many disenfranchised technology users who exist alongside the more privileged young people with lots of devices of their own. Just one young person expressed the frustration of not being in the game at all: 'I don't use them often – don't have a computer – nothing nothing nothing nothing all blocked – I would like a computer at home and internet and I would like a phone that actually works'.

Neither did it appear to be the case that his school was doing much to alleviate this young man's negative experience. But for the most part the picture was of young people fairly happy to build technologies into their lives, as normalised means of making things work in their own time they way wanted. Of course the picture might really be more negative than this even amongst this small and not necessarily representative group – the peer pressure did seem to encourage the expression of a confident and flexible approach to technologies that might be a long way from the truth for some of them. But that was definitely the preferred mode for most of them: technologies as resources that they exercise in ways that enable them to choose, to some extent, how they manage those aspects of their lives over which they have some degree of control.

Paper 1

Ages, stages and theories of adolescence

John Coleman, University of Oxford, Department of Education

In this presentation I will address two main questions. These will help us understand the nature of adolescence, and take note of how this period of development differs from childhood and adulthood. The questions will also assist us in understanding the way new technologies matter to young people. A lot of publicity was given last week to the statement by a well-known children's author that childhood now ends at 11. This gave rise to numerous questions about what we mean in our society by concepts such as childhood and adolescence, but the debate also made it clear that there is much ignorance about basic human development among commentators as well as the public at large.

My first question is as follows:

'Do we have a theoretical framework which can help us understand this period of human development?'

The most common concept applied to early development is one of stages. It is no doubt easier to think about growing up in this way, as it is neat and tidy, and allows us to parcel up childhood as something that is relatively easy to understand. However I will argue here that the notion of stages is nor really much help to us, and does in fact create more confusion that clarity. Indeed the statement by Jacqueline Wilson I just referred to is a good example of the over simplification of stage theory. To say childhood ends at 11 is just too simple to be of any use.

There are a number of limitations of the stage theory approach. First, there is in fact huge individual variation in the pace of development. If we were to have three 11 year olds here in front of us, they would vary from mature to immature, from short to tall, from adolescent to child-like.

This is particularly true around the age of puberty, which can start at any time from eight or nine, to 13 or 14. All this is perfectly normal. The second disadvantage of a stage theory is that it suggests a sense of discontinuity. It gives us the impression that at one moment you have a child, and then, hey presto, here is an adolescent. Of course nothing like this happens, and we need more of a sense of continuity.

Finally there is a real problem with stage theories, as social and biological change alters the landscape and means that any particular stage is subject to considerable transmutation. Adolescence is a perfect case in point. As a stage it now could be said to reach from nine or ten till the early 20s. It would appear that puberty is starting earlier than in previous decades, so that adolescence may be appearing at a younger age for some individuals. And at the other end, because of social changes relating to education and entry into the labour market, adolescence goes on for much longer than in previous times. Clearly a stage that lasts so long does not have much meaning, and cannot be helpful in encouraging greater understanding of human development.

I wish to propose here that a more helpful approach to understanding childhood and adolescence is what has become known as lifespan developmental theory. This theoretical approach to human development has a number of advantages. This approach involves a number of assumptions which I will outline very briefly.

- Development is continuous, rather than discontinuous. This means that the notion of an individual having elements of both childishness and adolescent maturation at the same time is possible.

- Development occurs across domains, and is therefore interactive. By this is meant that to understand development we have to include biology, psychology, anthropology and so on. This is very helpful, as I shall show in a moment.

- Development is determined by the context as much as by any other factor. This stress on the environment, or the ecology of development, was a major move forward in allowing us to explore the differences between individuals depending on the circumstances in which they develop. Stage theory tended to assume that there were constants in development that simply did not exist.

- Development is bi-directional, not uni-directional. Again this is extremely important, as our understanding of all aspects of human growth and change have been enhanced by seeing that, while the adult may influence the child, so does the child influence the adult.

- Finally there is the principle of active agency. Again this has had major significance, since it allows us to see that the individual is an agent in his or her own development, rather than being a passive receptacle for biological or social determinism.

To conclude, I would argue that lifespan developmental theory is a much more helpful perspective. It enables us to see the individual as someone who is experiencing a range of changes and transitions at any one time. It enables us to recognise a host of influences, and to take a much more nuanced and inclusive view of this period that we call adolescence.

The second question to be addressed in this paper is as follows:

'What are the main parameters of development during this period which affect the way young people respond to new technologies?'

There are a number of answers to this question, and in order to clarify the answer it is as well to bear in mind one of the principles stated above, namely that development occurs across a variety of domains simultaneously. In the first place it is important to recognise the major advances that have been achieved in the last few years in learning more about the adolescent brain. This is not the place to enter into a long discussion, but we do know that much is changing at this time within the cortex, and that this will have profound effects on the sorts of behaviours we are interested in. There is synaptic re-organisation, which leads to the establishment of a plethora of new inter-connections across the regions of the cortex. We know that activity in the pre-frontal cortex is especially vigorous at this time, particularly when decision-making is involved. It also appears that, in comparison with adults, activity is stronger in adolescents in certain regions, but is less evenly spread across regions. We have to be careful not to confuse structure with process, but at the same time we cannot ignore this key element of development.

It is well understood that intellectual development occurs during this period, and you will be aware of the work of some of the most well-known researchers in this area such as Piaget and Kohlberg. We know that young people make some major transitions in respect of their intellectual grasp during and immediately after puberty. More recent research has, however, addressed another critical area connected to intellectual development, that of social cognition.

Research has shown us that, for young people from the age of about 12 onwards, there is rapid growth in the individual's capacity to understand and process information relating to social situations.

This has implications for our understanding of the place of new technologies in adolescent development. Research has shown us that, for young people from the age of about 12 onwards, there is rapid growth in the individual's capacity to understand and process information relating to social situations. These topics are also of great salience and interest to young people. Three areas in particular have been the subject of investigation. These include impression formation, perspective-taking, and behavioural decision theory. It is perhaps not surprising to see how popular social software has been when we recognise how central these topics are to the developing young person.

Remaining in the social arena, but moving now to relationships, we know that both friendship and the peer group are of critical concern to young people during this period of their lives. There has been much debate about why this should be so, but little disagreement with the phenomenon itself. Young people are more likely to use peers for support networks, in social decision-making, and as a reference group for attitudes and opinions, culture, leisure, and fashion. However it is important to recognise that the family still has a role to play, in areas such as education and work, as well as in core issues to do with morality and ethics. It should be noted that we cannot really appreciate the opportunity offered by the internet unless we take on board the significance of friendship and the peer group as key forces during this time of development.

I now want to turn to the question of mastery and autonomy, two essential needs of the young person as he or she moves towards maturity. You will remember that I mentioned that one of the principles of lifespan developmental theory is the notion of the individual as having agency, of being able to influence their own development. I want to suggest here that one of the most important reasons for the popularity of new technologies for young people is because they provide a medium for the exploration of just this element of development. Mastery and the search for autonomy are at the heart of the young person's drive towards growing and up and being an adult, and the web offers a golden opportunity to practice and rehearse the skills underlying just these phenomena.

Of course we are not able to cover all aspects of development here, but the final point I wish to make relates to the development of identity in adolescence. As all writers, from Erik Erikson onwards, have made clear, adolescence is par excellence a time of identity exploration. It is during this period of life that individuals find themselves considering such questions as what sort of a person am I, what job or career do I want, what values do I wish to espouse, what friends suit me best, and what sort of a man or woman am I likely to become. It is not difficult to see how the opportunities offered by the internet can allow this sort of exploration to take place within a relatively safe environment. I appreciate of course that there are risks involved, but in the main these risks are probably relatively minor, given the benefits that are available. However this is a area of considerable interest, and it is for this reason that the organisers of this seminar series have decided to dedicate one seminar to the topic of identities.

In this brief paper I have set out some of the themes that arise when we consider how adolescence and new technologies work together. I have noted that simply considering adolescence as one stage of development is not particularly helpful.

I have outlined the lifespan developmental approach, and shown how some key aspects of adolescent development lead young people to engage with and embrace the opportunities offered by new technologies. I hope that this perspective will offer a useful platform for the papers that we are to hear later today.

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Discussant

Rebekah Willett, Institute of Education,
University of London

I'd like to look at a tiny bit of data to help us think about some of the points John Coleman has raised. Jessica Ringrose and I have been doing some pilot research looking at social networking sites with 14-16 year olds. This is a blog entry written by a 14 year old girl (who we're calling Daniella) on her Bebo site. Daniella and her friend wrote this and addressed it to a classmate who they were friends with but who had developed a relationship with an older boy. The boy was very controlling and causing conflicts amongst the girl friends.

> *A Little Message To SomeOne We Miss;;*
>
> *I Can Love My Best Friends &&* My Boyfriend At The * S a m e * Time.*
>
> *So I Don't Miss Out On The Good Times With Either Of Them Or My Childhood*
>
> *But You * A r e * Missing Out On The Good Times With Your Friends &&* Your Childhood*
>
> *Your Already An Adult With An Adult Boyfriend Whos Made You Loose Your Childhood Friends*
>
> *We Just Want The Old * Y O U * Back.*
>
> *The One We Could Have A Laugh With;; Have Good Times Together;; Do Childish Things Like The Children That We Are;;*
>
> *Without >> HIM << Checking Up On You;;*
>
> *Without >> HIM << Ruining Your Life;;*
>
> *Without >> HIM << Taking You Away;;*
>
> *Without >> HIM << Taking Your Childhood Away;;*
>
> *Without >> HIM << Taking The People Who Care The Bloody Most About You Away;;*
>
> *Can You Not See That You've Gone !?*

This is an emotional and complicated text, which I won't analyse here, but rather I want to use this as an example to help us think about how different disciplines might view this youth practice and this text. John Coleman provides us with some useful ways of discussing this. We can see this as an expression of a time of 'storm and stress' which characterises adolescence.

1. Stress is expressed in relation to continuous development – in this blog the authors are situating themselves as children, but clearly they are aware that this friend is sexually active; and in fact Daniella's Bebo site plays extensively with a hyper-sexual position (Daniella calls herself 'slut' – her girlfriend is whore; Daniella refers to her boyfriend's **bed** as her hometown, etc.). Both childishness and adolescent maturation that John Coleman referred to is being expressed here.

2. This 14 year old's experience of adolescence is different than other 14 year olds; so, for example, in reference to this blog, Daniella told us that she took this friend to the doctor to get the morning after pill. As researchers, looking at a range of Bebo sites from 14 year olds, it becomes clear that biological stages of development are not the only determining factors in how they express themselves, their experiences, their relationship to peers, school, technology, and so on. As John Coleman has pointed out, we need to consider this blog entry and her Bebo site across different domains, including sociology, social psychology, cultural and media studies, etc.

3. Importance of context: we needed to interview Daniella a couple of times in order to better understand this blog entry and her Bebo site; it's clear that digital technologies are integrated into many young people's lives, at least in the UK. So it's almost impossible to talk about friendships without discussing mobile phones, digital photos, text messaging, instant messaging and social networking sites. So the context of young people's use of digital technologies is increasingly social and cultural – affected by a variety of factors including age, gender, socio-economics; peers, parents, school policies, etc. This is not just about issues in terms of research method (ie. we might conclude ethnographic research has an importance place in understanding young people and digital tech); we also need to consider methodology, how we **analyse** young people's interactions with digital technologies, how we theorise the **meaning making practices** behind their interactions, how we examine **societal rules and norms** which are determining ways that identity management is working to position people in particular ways, etc.

4. Active agency: Daniella is actively positioning herself as a child in this blog entry, which has implications in terms of her friendships, what she does with her friends and what she does (and doesn't do) with her boyfriend; socially and biologically she's in control

5. What John has referred to as the need for 'mastery and autonomy' are expressed here in terms of an ongoing struggle and angst, particularly around sexuality – in a sense Daniella is saying that her friend has matured too quickly by going out with an older man, she's loosing her childhood; but we also

see Daniella criticising her friend for giving up her autonomy by entering a controlling relationship. Daniella here is saying that you can be autonomous within sexual relationships. Daniella has mastered the balance between friendships and sexual relationships.

6. Clearly this sort of blog entry demonstrates what John Coleman has called 'the role of social cognition in intellectual development'; we could say that the blog is providing important opportunities for self-reflection and self-realisation, and for expressing some of the conflicts and crises that characterise adolescence. Other researchers looking at personal web pages and SNSs, namely Susannah Stern and dana boyd, have made similar arguments.

What have we left out?

1. In analysing Daniella's site, I want to consider various structures which are determining how Daniella performs and in some sense experiments with her identity online. These structures range from the templates on offer on a networking service (the choice of skins on a site, for example, the use of a playboy bunny skin), the monetisation of sites and the implications for that in terms of the resources that are on offer to young people, through to social structures that are monitoring and regulating her performance of self.

2. It's really interesting that, similar to Jacqueline Wilson, Daniella is drawing on a social construction of childhood and positioning childhood partly in terms of biological and psychological development. The pervasiveness of this discourse around changing childhood (that children growing older quicker), from the children's laureate through to

We can say her performance is about pushing the boundaries, it's about play; but we still need to understand why she engages in a hyper-sexualised performance of the self, rather than something else.

this 14 year old in rural England is quite extraordinary. Important to see terms such as 'childhood' and 'youth' as social and historical constructs, rather than universal states of being. And it's important to see how these constructs are positioning children, young people, and for example their relationships with their friends or their relationship with media (which are often blamed for the 'growing older quicker' phenomenon).

3. Daniella calls herself 'slut' and includes various other extremely sexually explicit references in relation to herself for particular reasons, partly because she and her friends trade passwords and have a game which entails changing each others' profiles to include outrageous texts, so it's not necessary about Daniella expressing herself; but in any case it's partly about her need to push the boundaries of childhood; but it's also about with how she is positioned in her peer culture, her socioeconomic background and the stereotypes surrounding 'chav' girls, the limited range of femininities that are on offer to her as a white working class girl. We can say her performance is about pushing the boundaries, it's about play; but we still need to understand why she engages in a hyper-sexualised performance of the self, rather than something else. We also need to see Daniella as a 'being' in her own right, rather than an adolescent who is going through a stage of pushing the boundaries, and I think this will help us to theorise her hyper-sexual performance in different ways, possible as subversive and resistant, as a reaction to the contradictions and tensions in her life.

4. Clearly this blog entry is a really complicated text, and my intention here was not to analyse it, but rather to show how John's ideas help us uncover different meanings and purposes within this text and digital practice, but also to raise questions about how we might want to research and analyse the practice further.

Discussion from the floor

Although it is difficult to define the age of adolescence, evidence from paediatric endocrinologists suggests that puberty is no longer occurring earlier.

Although there are sometimes questions concerning the usefulness of the construct of 'adolescence', and children and young people negotiate 'impression management'. There has been a shift in the ways of thinking about adolescents, incorporating notions of agency, and emphasising their active agency.

Technology is completely embedded in young people's lives and this is mutually shaping. Adolescents are no longer isolated and can move easily between worlds. However, the flip side of this is that they are unable to get away from their peers, and they are moving into a peer culture and potentially therefore moving away from their parents in terms of social structures.

Paper 2

Developing the technological imagination: theorising the social shaping and consequences of new technologies

Neil Selwyn, London Knowledge Lab, Institute of Education, UK

ABSTRACT:

Although technological determinism has been roundly critiqued by academics, it remains a driving force in some policy and industry discussions. Moreover, in the academy a variety of soft determinisms are little articulated, as are the differences among those taking a broadly constructivist position. So what are the key ways of thinking about the technological, and what bearing do theories of the social shaping of new technologies have for those seeking to account for he educational and social impact of new technologies on young people?

Introduction

Many criticisms can be levelled at academic discussion of new technologies and young people. There has been a tendency, for example, to approach the subject in a decidedly a-historical manner. Commentators are often driven by assumptions of the allure of new media for young people rather than empirical evidence. Researchers tend to concern themselves primarily with questions of what should happen, and what could happen once young people engage with new technologies and digital media. Within the education literature the predominance of these concerns has lead to a rather uniform constructivist-led view of technology use, and a pronounced tendency to focus only on the positive aspects of technology use. As David Buckingham (2007) observed recently, research in the area of young people and technology is overpopulated by discussions of 'model' schools and classrooms with enthusiastic teachers and well-resourced students basking in the glow of the 'Hawthorne effect' of the attention of researchers.

One of the most disappointing aspects of academic work in the area of young people and technology – especially from within the disciplines of education and youth studies – is a general failure to think carefully about the technological. This is not an altogether surprising shortfall as, in many ways, thinking critically about younger generations and technology is a disconcerting thing to do. One of the most uncomfortable intellectual leaps for academics to make is that of disconnecting any analysis of young people and ICTs from their own personal experiences of ICTs. As privileged, technologically-competent researchers, the working lives of nearly all academics are imbued with technology. As individuals who are rich in economic, cultural and social capitals, academics' personal lives (and the lives of their children) are similarly entwined around ICT uses. Whilst usually fiercely critical in most other areas of their work (and indeed their daily lives) it seems particularly difficult for academics to distance themselves from their positions of elite technology privilege and 'make the familiar strange'. In particular it often appears difficult for academics to think critically about something that they are dependent upon and something that many of them have come to love.

As such there is a need for any academic analysis of technology and young people to take as theoretically sophisticated and considered an approach as possible. As has been argued succinctly from the outset of this seminar series, the careful use of social theory is a keystone in the development of rich understandings of the structures, actions, processes and relations which constitute young people's uses of technology. Given this importance it would seem vital that academics reflect upon the full range of theoretical options available to them. Thus not decrying the

relative values of the various psychological, developmental and learning theory approaches to the debate, this paper seeks to outline the various theoretical approaches which focus on the socially constructed, or socially shaped, nature of technologies.

The need to escape 'soft' technological determinism

Looking back over the past three decades of academic work on the educational and social aspects of young people and technology, it could be argued that technology itself has been decidedly under-theorised – contrasting starkly with the sophisticated theories of development and learning that have been utilised during the same time. Throughout the 1980s and 1990s the majority of academic writing was content to imbue technologies such as the television and computer with a range of inherent qualities which were then seen to 'impact' (for better or worse) on young users in ways which were consistent regardless of circumstance or context. The crude but compelling 'technologically determinist' perspective that 'social progress is driven by technological innovation, which in turn follows an "inevitable" course' (Smith 1994, p.38) has a long lineage in academic research – not least in terms of widely-held assumptions about 'media effects'. For example, a determinist way of thinking underpins the wealth of claims that video games *cause* violent behaviour, or that online tuition *enhances* learning. Of course, these explanations are appealing in as much as they offer a simplistic view of an otherwise terrifyingly complex socio-technological age. Yet the inadequacies of such 'cause and effect' idealisations of technology change are obvious to see as soon as one considers the uneven and messy manifestations of such change in

practice. Indeed, this disjuncture between technological rhetoric and reality has prompted growing unease amongst scholars concerned with the descriptive limitations of such determinist analyses.

The case against the 'immensely powerful and now largely orthodox' view of technological determinism is perhaps most succinctly put by Raymond Williams (1974, p 13). Building upon the earlier work of theorists such as Thorstein Veblen, Williams made a compelling case for understanding technological innovations as taking place within specific social and economic contexts, instead of new technologies somehow having inevitable internal logics of development. Following this line of argument there can be no pre-determined outcome to the development and implementation of technologies. Instead technologies are subjected continually to a series of complex interactions and negotiations with the social, economic, political and cultural contexts into which they emerge. Indeed, following Williams' lead, overt notions of technological determinism are now dismissed routinely by many academics who remain careful to be seen to approach questions of technology and youth in more nuanced ways that transcend the simple 'cause and effect' agendas of old. Increasing numbers of researchers are painfully keen to include disavowals of technological determinism early on in their writing. Particular care is taken to avoid any potentially offensive use of the 'C'(ause) word. Instead softer phrasings are employed which portray the 'influence' and 'bearing' of technology but certainly not its impact.

Yet such semantic adjustments belie the fact that thinking about technology and young people without recourse to some form of technological determinism is a difficult task. This is due, in part, to the

> Current political understandings of the internet's profound effects on the 'shrinking' of the world and undermining of national boundaries are classic examples of technological determinism.

determinist nature of the commonsense ways that 'technology' is talked about in the real (as opposed to academic) world. Although it is rare to find anyone proclaiming herself to be technologically determinist, the view persists in many contemporary popular accounts of new technologies. Indeed, most popular conceptions of technology are rooted in technological determinism. Current political understandings of the internet's profound effects on the 'shrinking' of the world and undermining of national boundaries are classic examples of technological determinism. Commercial marketing is continually selling us the notion of *'Vorsprung durch technik'* and news media warn us of technology-related dangers such as the how text-messaging is stymieing the vocabulary of young people. Such interpretations can appear as 'natural' common sense and certainly appeal to those whose job it is to make sense of the societal importance of new technologies. The belief that 'technology determines history' (Williams 1994, p 218) is hard to shake.

It can be argued that the endurance of technological determinism in popular discourse has had a subtle bearing on academic conceptualisations of technology. Whereas most social scientists are able to resist a 'hard' or 'strong' determinist view of technology developing in complete isolation from social concerns, what can be termed a more passive form of 'soft' or 'diluted' determinist view persists throughout the social science literature on technology. This soft determinist view sees technology impacting on social situations in ways which are, to a degree, malleable and controllable. Rather than the internet improving learning, it can be said that the internet can help improve learning – acknowledging the possible existence

of other contextual influences, whilst retaining the notion of a technological effect. This way of thinking usually reaches conclusions that recommend the overcoming of any constraining or negative contextual influences so that the effect of technology can be more fully felt. Whilst most researchers may be comfortable with this compromise, we would argue that by ascribing any degree of agency to the technological artefact rather than the non-technological processes which shape its development and implementation, such recourse to soft determinism is susceptible to all the problems associated with reductionist thinking. In particular, researchers put themselves at risk of under-playing (or even ignoring) the crucial 'contingencies, particularities, oppositions, dis-junctures and variabilities' (Martin 1996) which underlie technological change.

From anti-essentialism to anti-determinism

Perhaps the most comprehensive corrective to soft technological determinism is the view that technology has absolutely no inherent qualities. In this sense technology can be seen as open completely to interpretation and capable of determining nothing. This 'anti-essentialist' approach was advanced throughout the 1990s within the social studies of technology (STS) literature, offering the perspective that technologies lack any properties outside of the interpretive work that humans engage in to establish what these artefacts 'actually are' (see Grint and Woolgar 1992, 1997; Woolgar and Cooper 1999). Following this line of thinking, what we encounter as 'technology' is simply the outcome of interpretive accounts – some more persuasive and influential than others.
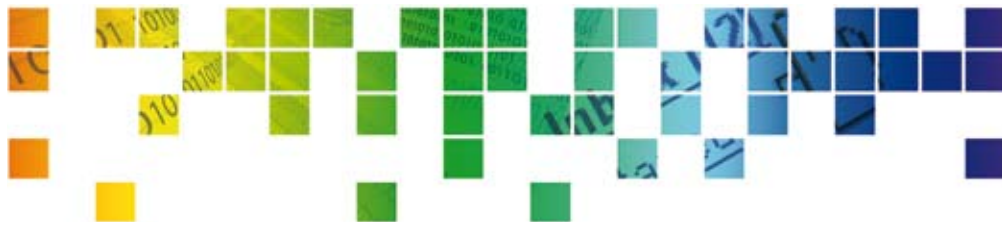
To illustrate this argument, Grint and Woolgar (1997) proposed the notion of 'technology as text'. Here it was posited that technologies can be seen as open texts which are 'written' (configured) in certain ways by those social groups involved in stages of development, production and marketing. After some time, technologies are then 'read' (interpreted) by their consumers and users with recursive 'feedback loops' between the different stages. Although technologies can have preferred readings built into them by dominant interests these writing and reading processes are seen to be open and negotiable processes. The metaphor of treating 'technology as text' elegantly draws attention to the often unseen work by designers, financiers, marketers and others in crafting the materiality *and* interpretations of devices. It also provides acknowledgment of the opportunities that exist for alternative appropriations and uses of technology. In short, seeing technology as text highlights the interpretive flexibility of the rhetorical and material nature of technologies and, crucially, reminds us that technologies are never completely closed however established or advanced their development and use may be. Indeed, Grint and Woolgar playfully propose an 'onion model' of technology, where technologies are seen solely as layers of social and cultural factors without any 'hard' technical core at all. In this sense it is only the increasing difficulty of removing successive layers of interpretation which 'sustains the illusion that there is anything at the centre' (Grint and Woolgar 1997, p 155).

Anti essentialism is a logical response to what Grint and Woolgar see as the 'residual technicism' of all other theoretical takes on technology. In this sense, the value of the anti-essentialist stance is highlighted in Ruth Finnegan's defence of technological determinism, i.e. that...

'it is both illuminating and stimulating to have the counter-view stated forcibly. The strong case is perhaps stated over-extremely – but its very extremeness helps to jolt us out of our complacency and draw our attention to a range of facts and possible causal connections previously neglected. As a suggestive model of looking at social development it may well have value, despite its factual inadequacies' (Finnegan 1975, pp 107-8, cited in Chandler 1995).

Logically then anti-essentialism reminds us that, at the very least, it is difficult to maintain a soft technological determinist view of technology in the face of its apparent malleability and interpretability. Yet there is a danger that in setting technological determinism as a 'conceptual Strawman' (Winner 1993), one then finds oneself forced into a viewpoint where nothing can be said to be influenced by anything else. Indeed, as Raymond Williams (1981, p 102) warned, academics face 'a kind of madness' if they are simply determined not to be deterministic. To ascribe complete interpretability to any technology can be seen as an equally constraining and reductionist form of 'social determinism' where only social factors are granted any importance. Of course, all but the most committed anti-essentialist would concede that not every technology is *completely* open to *any* reading by any person at any time. As critics of the technology-as-text metaphor reason, if so one could interpret a fruit machine to be a means of transatlantic communication just as much as a telephone (Hutchby 2001), or see a rose as a means of shattering skin and bone just as much as a gun (Kling 1992). Anyone attempting to develop a more socially-sophisticated theoretical take on the technological, therefore, is faced with deciding how best 'to introduce elements of the social into explanations of the

technical rather than granting the social an all-important standing' (Rappert 2003, p 568).

In this sense anti-essentialism has considerable value in pointing us towards a number of theoretical 'middle ways' (Hutchby 2001) where technology both is shaped and shaping as well as enabling and constraining. The anti-essentialist position therefore acts as a reminder to pay heed to wider theoretical debates, not least those between realism and constructivism. It also serves to illustrate the need to reconcile long-standing issues in social theory about structure and actor agency. Above all, as perhaps the most extreme anti-determinist position that one could adopt, the anti-essentialist position can guide us towards a range of social theories which seek, as Bijker et al. (1987) put it, to 'open up the back box of technology'.

Other anti-determinist approaches to understanding technology

Moving away from the extreme position of anti-essentialism there are a number of anti-determinist approaches to the technological which are worthy of consideration. These approaches are often grouped under the umbrella term first proposed by MacKenzie and Wajcman (1985, p.18) of the **social shaping of technology (SST)**. In essence the SST tradition is concerned with exploring the material consequences of different technical choices. Most proponents of SST would concur that the development of technology is best seen as a 'garden of forking paths' where different routes are negotiable, all leading potentially to different technological outcomes (Williams & Edge 1996). SST studies tend to consider the organisational, political, economic and cultural factors which pattern the design *and* implementation of a technology.

Crucially, SST researchers are interested in the relative bearing of different social groups on the technological pathways which are taken, and how these influences relate to the social consequences of the use of the technology in situ.

Perhaps most well-known of these approaches is the **social construction of technology (SCOT)**. SCOT studies start from the premise that the form and meaning of a technology is socially shaped rather than being a clearly defined product of a particular innovator. SCOT researchers seek to demonstrate the 'design flexibility' and 'interpretative flexibility' of a given technology, recognising that a technological artefact has different meanings and interpretations for various 'relevant social groups' (Pinch and Bijker 1984, Bijker and Law 1992). These relevant groups are not only the stated designers and producers of the technology, but competing producers, journalists, politicians, users, non-users and other interest groups. Crucially, these groups will often have diverging interpretations of the technology in question. Against this background a SCOT analysis will first seek to reconstruct the alternative interpretations of the technology, analyse the problems these interpretations give rise to, identify the conflicts that arise from any differences in interpretation, and then connect them to the design features of the technological artefacts. SCOT analyses then attempt to identify the point where socio-technological systems can be said to reach a state of 'closure' where the ability for alternative interpretations of a technology diminishes. Addressing many of the same concerns of Grint and Woolgar's onion model, SCOT studies often highlight the notion of 'obduracy' – i.e. the fact that some devices and systems are harder to alter than others based on their materiality.

Relating the content of the technological artefact to the wider socio-political milieu is the third but rarely reached stage of the SCOT methodology. That said but many writers not ostensibly working within the SCOT tradition have provided illuminating accounts of the **political economy of technology**. The political economic approach tends to focus on the interpretations of technologies at the level of politics, policymaking and the economic and commercial activities of firms and governments. The political economy approach therefore examines how political institutions, political environments, and the economic system intersect and influence each other at the point of technology. It thereby allows examination of how persons and groups with common economic and/or political intentions appropriate technology development to effect changes beneficial to their interest. Here researchers are interested principally in the way technologies are appropriated and re-appropriated by political and economic interest groups in ways that diverse from the initial intentions of designers or the stated claims made about it (see Pfaffenberger 1992). Prominent examples of the political economy approach to technology include Edwards' (1996) work on the relations between the political discourse of the Cold War and the attendant computer designs of the era, as well as Herb Schiller's (1995) work on the role of the military/scientific/transnational corporation nexus in the development of various new technologies. In terms of technology and young people, my own work examining the discursive construction and positioning of the 'child computer user' has highlighted a clear link with the ongoing political-economic construction of the UK as an 'information society' whilst obscuring the key actors and power relations behind this process (Selwyn 2003).

Another prominent example of the social shaping approach which seek to document what Ruth Schwartz Cowan (1987) terms 'the consumption junction' in relation to the development of technology is that of the '**domestication**' of ICTs. A host of sociology, media and communications researchers over the last two decades have explored the ways in which ICTs are appropriated and incorporated into households (see Berker et al. 2006). This work has detailed how technologies are appropriated into the domestic sphere through ongoing processes of gaining possession and negotiating 'ownership', 'objectification' within the spatial and aesthetic environment of the home and 'incorporation' into the routines of daily life (Silverstone et al. 1992, Silverstone and Hirsch 1992). In contrast to some SST studies which focus on the development and design processes the domestication approach focuses more on how new technologies are constantly being interwoven with domestic life (Silverstone 1993). This approach has allowed researchers to examine 'how objects move from anonymous and alien commodities to become powerfully integrated into the lives of their users' (Lally 2002, p 1) as well as asking questions of how people 'make sense of, give meaning to, and accomplish functions through technical objects' (Caron and Caronia 2001, p 39).

As the domestication approach implies, it can be argued that many SST studies perhaps underestimate the nature of user interaction with, or via, certain technological devices. Indeed, within the anti-determinist school-of-thought a growing number of researchers have asserted the need to recognise the enabling as well as constraining importance of materiality. In particular, growing interest has been shown in requisitioning of the evolutionary psychological notion of '**affordances**'

(Gibson 1979) as a means of reconciling the opposing poles of pure realism and pure constructivism at the heart of the (anti)determinism debate. Setting a position apart from the 'technology as text' metaphor, it has been argued that acknowledgment should be given to affordances which constrain the ways in which technologies can be written and read, and thereby frame the possibilities that they offer for action. As Hutchby (2001, p.44) reasons, 'affordances are functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object'.

It should be noted that Hutchby's use of the notion of affordances contrasts with the mainstream socio-constructivist view in educational technology research where tools and/or environments have concrete technological 'affordances' located within them for certain performances. This use of the concept ignores the self-referential and subjective nature of these opportunities. Thus in the anti-determinist sense, affordances are *perceived possibilities* for action, referring to what people perceive and signify during their actual interaction with a technological artefact (Vyas et al. 2006). Used in this way the notion of affordances allows a consideration of the obvious material enablements and constraints of technologies, without recourse to an essentialist analysis. In particular, it is argued that using the notion of affordances in this way allows social researchers to move beyond the known 'big issues' of representation, interpretation and negotiation which typify SST studies. Instead it allows closer examination of those actions and interactions between humans and technologies which are more mundane, occasional and local. As Hutchby (2003, p 582) reasons, using the notion of affordances refocuses the sociological gaze towards 'the empirical question of

embodied human practices in real time situated interaction involving technologies'.

Aside from these examples, a number of other theoretical approaches can be located within the SST family of social theories of technology and society. For instance much interest was shown throughout the 1990s in the applicability of **Actor Network Theory** to technology use (Latour 1987, 2005; Law 1987). ANT is seen to allow researchers to take a distinct material-semiotic approach to the role of technologies within social systems and, most provocatively, ascribe human and non-human (technological) actors equal agency in their interactions with and (re) inscriptions of technologies. There are also a number of distinct **(cyber)feminist** approaches to addressing technology and society which seek to highlight the ideologies imbued in technologies and identify the potential for new technologies to allow marginalised groups to control and (re)construct their bodies, identities and political positions (see Wajcman 2004). Of late the notions of **mediation** and **remediation** have received growing academic attention with researchers investigating how 'new' digital forms both borrow from and seek to surpass earlier forms (Bolter and Grusin 1999). Also of growing significance are **critical realist** approaches towards technology (Mingers 2004, Fairclough et al. 2002) which provide recognition of a transitive and intransitive dimension to reality. As the complex nature of these latter brief synopses suggest, there is neither the physical or intellectual space to present a full exposition of all these theoretical standpoints. At best this paper can only signpost the theoretical opportunities on offer to those willing to look beyond the usual user/technology focus of much work in the area of young people and new technologies.

In highlighting these examples we recognise that there is no one 'correct' theoretical stance for social researchers to adopt when looking at young people and technology.

Conclusions

In highlighting these examples we recognise that there is no one 'correct' theoretical stance for social researchers to adopt when looking at young people and technology. Indeed, the theories presented above are in no way consistent in their portrayal of technology and society. For example, all differ in their characterisation of the malleability of technology and the significance attached to the relative importance of large-scale social and economic structures as opposed to the activities of individuals and groups. As such it is certainly not this paper's intention to cultivate theoretical divisions within what is currently a relatively harmonious area of research. Yet it would seem worthwhile for researchers to at least *consider* the general issues raised by the anti-determinist take on technology and young people and, in particular, give some thought as to how best account for the increasingly complex social settings within which technologies are produced and implemented.

Of course proponents of SST can not claim any kind of theoretical superiority over other approaches to young people and technology. Most of the theories outlined above have been roundly contested since their inception and all are certainly limited in their scope. For instance, the argument has often been made that social constructivist accounts of the negotiated nature of new technologies tend to over-concentrate on the processes through which technologies arise but ignore the processes through which the technology is used and shaped in *situ*. Indeed, as Winner (1993) and others have pointed out, such studies over-privilege the processes of design and development whilst underplaying the (re)interpretations of users. Similarly, political economists can be accused of over-conflating the influence of policymakers and trans-national corporations, whilst overlooking

the roles that local political interests play in the interpreting of technology. Perhaps most criticised of all these approaches, has been actor network theory – not least in terms of its over-descriptiveness and attribution of equality between all actants.

Yet as a whole, the collection of anti-determinist theories presented in this paper remind us that a full analysis of the ways in which a technology is used by a young person requires a deep understanding of the social and interactional circumstances in which technologies exist, and through which they attain their meaning(s). Thus the power of the theoretical approaches outlined in this paper lies in the big questions they allow to be asked about young people and technology – in particular the connections that can be made with wider social concerns of globalisation, the knowledge economy, and so on, as well as how individual technologies fit into wider technological systems and networks. The theoretical approaches of social shaping also allow an easy 'way in' to understanding the often unseen, mundane, prosaic and perfunctory social processes which underpin young people's technology use.

Our concern in making these points is not merely one of academic one-upmanship and point scoring. We would argue that academic researchers need to highlight the social shaped nature of the technological as a much-needed corrective to the ever-declining quality of contemporary public and political debate over technology and young people. Indeed, the current discourses surrounding young people and technology are being steered by policymakers, industry, content producers, and other information society stakeholders who do not have the time or energy to deal with the social nuances of technology, and who are content to deal

In many instances, technology is seen by these stakeholders as a closed black box whose 'effects' cannot be easily controlled.

in/with impacts, causes, effects and hard technological determinism regardless of what gets lost in the process. In many instances, technology is seen by these stakeholders as a closed black box whose 'effects' cannot be easily controlled. Yet only by exploring and exposing the social roots of technology can we hope to make the technological amenable to democratic politics (Bijker 1995). With this in mind, a final challenge for academics to address is how to reconcile the everyday hard technological determinism of the real world with the softening theoretical conceits outlined in this paper … this, however, is perhaps best addressed as another question for another seminar.

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Discussant

Bill Dutton, Oxford Internet Institute, University of Oxford

Setting out the range of theoretical perspectives on the societal implications of information and communication technologies is valuable, and this paper does an excellent job in reviewing these alternative perspectives. However, I think it is useful for social scientists to distinguish between the rhetoric of politicians and practitioners, seeking to support e-learning initiatives, which convey an optimistic view of the outcomes of technical change, from the beliefs of an increasingly sophisticated research community.

For example, there is a long history of recording no statistically significant difference in the impact of technology on classroom performance (as compared with face to face communication), that education researchers are well aware of. Margaret Brown's work on the numeracy was mentioned as an example of a strategy which has made little difference, and Impact2 showed very little impact. The fact that the Press has a tendency to highlight strong findings, and promotional rhetoric is less of a problem with researchers in the field of education than our ability to convey the findings of research to a broader public.

There are different theories within social shaping of technology, and there is considerable value in bringing different communities together. And many social theories of technology are not the focus of attention with the discipline of education, where there are stronger traditions focused on the design of instructional technology. Therefore, bringing a range of socio-technical theories to a multi-disciplinary group of researchers interested in youth is all to be applauded.

I would stress two points.

One is that the study of technology in young people merits less theory and more empirical data. There is a need for more empirical data and theoretically driven empirical research. As this paper shows, we have a wealth of alternative theoretical perspectives, but very few facts.

Secondly, are we looking at the wrong outcomes for judging the impact of technical change? In my opinion, ICTs are transformational in reconfiguring access, changing how we get information, but also what we know? Changing how we communicate with one another, but also with whom we communicate. In short, much empirical research is following a simple substitution paradigm, versus a more transformational view of technologies reconfiguring access to information, people, services and technology (Dutton 2005). Such a perspective would lead us to study developments outside as well as inside the classroom, such as, for example: One laptop per child. Is this a good idea, and if so, why?

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Paper 3

Theories of formal and informal learning in the world of web 2.0

Charles Crook, Learning Sciences Research Institute, University of Nottingham

I think my task is to reconcile established theorising about the nature of learning with the emergence of new internet tools for education. This novelty around internet is sometimes termed 'Web2.0'. What it comes down to is a more *participatory* experience for the user. This is largely about making more opportunities for the user to publish and communicate. It is about uploading rather than downloading. About coordination, rather than delivery. So, for learners: it's about more audience, more collaboration, more resource.

The educational debate around Web 2.0 is often crystallised by reference to the distinction between learning that is formal versus informal. First there seems to be a modern distaste for the formal. At the same time, there is a romantic ambition that Web 2.0 will helpfully dissolve this distinction altogether, making all learning sweetly 'informal'. In this manner, Web2 will contribute to a deschooling of society, leaving learners in their appropriate state of nature.

I am going to doubt this. Although I do believe we must welcome the direction Web2 has taken the internet and we must welcome its creative and expressive potential for learners.

First of all, dichotomising does not help. The contained nature of schools may too easily encourage this contrast of formal/informal. Yet we all know plenty of middle class families where the conversation echoes much of what happens in classrooms. And not just when the homework comes out after dinner. The reality is that what is meant by 'formal' here is simply a certain manner of talking and acting. This may occur both inside and outside of classrooms. The core issue is one of people's *intent* as they interact with others. So: in certain modes of talk and action we are *trying* to make learning happen. Classrooms are simply a device for intensifying and regimenting such experiences. I suggest that we shall continue to use them – just as we are using one here today. The useful debate is more about the design that they should take.

To understand better these 'learning interactions' on the formal/informal continuum, we have to recognise two things about human mentality – as revealed to us by developmental and evolutionary study. The first concerns the *representational* nature of our intelligence. The second concerns the deeply social nature of our intelligence. I am going to associate these two accounts of ourselves with two authors and, in particular, two books. Merlin Donald's 'Origins of the Modern Mind' and Mike Tomasello's 'Cultural Origins of Human Cognition'. Oddly, these two influential historical accounts are rarely integrated.

Donald dwells on the evolution of remembering. In particular, he highlights a type of human remembering that involves *actively* bringing the past into the present: recalling things. He documents the likely role in evolution of, first, gesture and, then, sound in achieving this deliberate human re-presentation of absent things or events. And he argues for the profound impact of a human transition into the creation of *externalised* forms of such representation. That is, material and lasting artefacts that invited exploration and reflection on things that were merely re-membered. Let's call this 'culture'.

Meanwhile, Tomasello rehearses an argument that creates a central evolutionary place for profound changes in our understanding of other people. To be sure, many species gain strength from coordinating with others. But *human* social action goes far beyond the mechanical arrangements of ants and bees. Human beings have evolved a capacity for

interpreting and (in particular) anticipating the behaviour of others. Moreover, this has evolved into a kind of 'theorising' about those around us. We each recognise our *own* beliefs and desires (that is, our 'subjectivity'). But we also recognise these psychological states in others and, in this way, we theorise how the actions of other people must be caused by these (hidden) beliefs and desires. Let's call this '*inter*-subjectivity'.

Now, these two themes illustrated by Donald and Tomasello can be integrated. We need to do this in order to see how the representational constructions of culture – the intelligent stuff left around by others – can come to be economically shared with cultural newcomers (say, children). It is our capacity for intersubjectivity that makes this transmission of culture possible. Anticipating and understanding the actions of others – intersubjectivity – is what makes collaboration work. But is also what makes instruction work. Indeed, the apparent species-specificity of intersubjectivity explains why human beings seem to be the only species that *deliberately* teach their young.

At this juncture let's therefore declare that it is the act of deliberate teaching that 'formalises' learning. But deliberate teaching is complemented by deliberate learning. Ideally, both parties in the educational contract have a degree of this intent – albeit not equally well or equally enthusiastically developed. One contemporary vision is that the deliberation of learners can be such as to make the involvement of teachers less significant. One expression of that vision is 'Education 2.0' or the spontaneous appropriation of Web 2.0 technologies by learners.

In a nutshell, my own view is that we can and do achieve a certain autonomy as learners. But the apparently sociable nature of Web2 does not promise that this technology will be dramatically liberational in relation to accelerating this achievement. It would be a mistake to assume that the particular interactive affordances of Web2 offered a *replacement* for the interpersonal interaction that characterises traditional educational practice. These new media merely change the nature of the arena into which those interactions socialise us.

In the remainder of this talk, I wish to foreground those social interactions, by considering how they feature in four influential theories of learning. (Although I think we would do better to call them 'frameworks' rather than theories.)

First behaviorism. For the first half of its history, the discipline of Psychology was virtually synonymous with 'learning theory'. The dominant tradition of behaviorism believed in a kind of biological continuity for learning. All species learned in the same way and so the psychologist's role was to understand the principles that underpinned this learning-by-association. Behaviorists had a basic insight – namely, that the consequences associated with actions influenced whether those actions occurred again. But dwelling on the contingencies of association didn't take them very far. In fact, I think behaviorism was more a *teaching* theory than a learning theory. This was because of what they called 'shaping'.

Psychology undergraduates of this era may recall the satisfaction arising from their laboratory ritual of teaching a rat to press a lever. This 'shaping' exercise was

a potent experience. But the behaviorists dwelt on the analytic reductionism that defined a shaping trajectory and failed to theorise the reinforcement of successive approximations that guided a hapless rat along that pathway.

The point is that rewarding each successively closer approximation to the goal of lever pressing exemplified the profoundly *social* nature of learning. Simply because its success depended on the sensitivity and judgement of the undergraduate 'shaper'. That's why it was such fun. However, the rat doesn't have to enjoy intersubjectivity, it is because the undergraduate does that the learning works. Although behaviorism didn't realise it, it was a deeply social theory of learning.

So is our second theoretical framework: constructivism. But constructivists didn't realise theirs was a social theory either. For me, Route One constructivism is most clearly illustrated in Piagets 'Origins of Intelligence' book, where he describes the exploratory intelligence of his own three infants. Yet his finely-crafted natural history simply fails to record his own role in *orchestrating* the blocks, bricks, and pipe cleaners that constitute the elements of his children's constructive learning. In all this, Piaget (and Mrs. Piaget) are rendered mysteriously invisible. Recently, there has been growing recognition of just how much human effort must be invested in arranging the furniture of exploration for the constructivist learner. So now we have 'social constructivists'. But 'social' here usually means 'facilitate' or 'design' rather than 'interact'. I would want to argue that it must mean more, in this sense of interacting.

Our third learning framework is cognitivism – the perspective that displaced behaviorism in psychology.

The computational metaphor of information processing does take us usefully beyond a singular preoccupation with behaviour. Instead, cognitivism conjured up a space of mental actions: attending, recalling, categorising, hypothesising, inferring, integrating, and so on. The prior dominance of 'learning' in psychology gave way to a concern for the hidden mechanisms and structures of attention, memory, and reason. However, the 'baby' of social interaction was thrown out along with the 'bathwater' of behaviour.

It is our final learning framework – the socio-cultural perspective – that might allow cognition to be reconnected with the formative impact of social interaction. Vygotsky's device for achieving this was within the notion of internalisation. He proposed that all hidden mental actions were first experienced within the external plane of joint activity. So, at first, attending, remembering and reasoning are things done between people. Most powerfully, they are done between experts and novices; teachers and learners. This compelling idea gained more appeal through the suggestion that such internalisation occurred through a process of teacher-learner *scaffolding*. This move thereby opening up an empirical space in which the social dynamic of instruction might be investigated.

The rise of the 'social' within cognitive psychology is to be welcomed. For, as declared at the outset, human mentality is profoundly intersubjective as well as profoundly representational. But how has is this social turn getting played out as a research imperative and how does it harmonise with Web2?

Education, it is argued, must reveal disciplinary knowledge as communities of practice into which learners may be immersively placed.

Arguably, renewed concern for the social nature of learning currently is now more vigorously expressed in the idea of learning as a process of membership: and knowledge as a community of practice (to which the membership is addressed). This in turn shifts interest to the informal end of the formal/informal continuum as learning is idealised through the popular model of the child learning a first language: an immersive experience of participation. Education, it is argued, must reveal disciplinary knowledge as communities of practice into which learners may be immersively placed. The space of Web2 offers tools and designs that can be part of such community membership.

There is much to be welcomed here. But it seems to me there are also problems. In a short paper, I can only raise these 'problems' briefly and, therefore, dogmatically. I will raise two broad concerns, one pointing more at the learner and concerned with a stress on the *collaborative* experience of learning; the other pointing at the teacher and concerned with changing perceptions of their role.

Our intersubjective nature does not make collaboration a natural good – something that all learners must crave. Intersubjectivity equips us for collaboration but it also equips us for competition. In fact there is surely a tension between our appetite for agency and autonomy on the one hand our appetite for coordination and community on the other. The fact is that learning collaboratively can be both a blessing and a nuisance. Web2 technology enlivens *some* collaborative work but it may disrupt other. For example, I find myself increasingly seduced into so-called 'collaboarations' whose viability seems to depend mainly on the ability to spit out regular emails and upload files to shared work areas. It seems that

technology takes the intersubjective pleasure of conversational exploration and replaces it with an intermittent but relentless low bandwidth exchange that is more 'coordination' than 'collaboration'. The participatory promise of Web2 design is not itself enough to ensure a strongly felt collaborative experience of learning. We need to understand more about how technology works to our affective and cognitive advantage here.

Turning to the teacher's perspective, the social turn to community conceptions of educational practice has cultivated the notion of learning as needing to be 'situated'. That is, the community of practice works as a setting for learning because it delivers on the necessary requirement that learners are able to participate in the 'situations' of authentic learning. On this model that teacher can be marginalised to a fate popularised in the phrase 'guide on the side'. But surely the extraordinary achievement of human beings is the ability for *un-*situated learning. We can learn by being *told* things – way outside of the times and places (the 'situations') where those things are experienced. The challenge is a matter of integrating that teaching which is dismissively termed 'delivery' with authentic involvement in the situations being articulated in such delivery. In short, managing what Bransford and Schwartz call 'a time for telling'.

We surely must aim for learners whose cultivted autonomy involves equipping them with both the ability to learn by organising participation and exploration as well as the ability to learn by organising some reading and listening.

But if this is not convincing and you teachers still prefer guiding from the sidings, then let me conclude on a final personal note and warn that in relation to Web2 the term 'guide' should not suggest a cosy, in-the-background time. I equip my Masters education students with blogs, wikis, podcasts, eportfolios, and so on. Don't expect that the job ends there, that the spontaneous appetite of the digital native will be enough to get things up and going. It doesn't take off easily. There is much for the teacher to do.

Moreover, I am currently managing a Becta-funded project on Web2 in secondary education. All my discussions with innovating teachers convince me that the exploitation of these exciting new tools calls on a great deal of design, patience and enthusiasm from teachers. Indeed that is why most teachers are currently cautious onlookers rather than enthusiastic innovators. And it is not helpful to chastise them for their caution.

In sum, and to conclude: evolutionary psychology warns us that we will need a *social* theory of learning. Behaviourism described one but didn't realise it. Constructivism assumes one, but didn't notice it. Cognitivism needed one but didn't bother with it. It is from the socio-cultural movement that we get the concepts to integrate all these shortfalling alternative frameworks. Yet the direction of socio-cultural thinking has migrated to the communal and the situated at the expense of 'social' as an 'interpersonal dynamic'. Web2 has much to offer that is potentially consistent with the social turn. But its deployment in that spirit needs to be handled in a way that protects and cultivates the interpersonal relations of learning.

Discussant

Diane Levine, Becta

I'm not a psychologist and personally found Charles' paper most interesting, particularly as the evolutionary argument for social learning is such a compelling one. But I'll offer the group my thoughts as a 'middle grade civil servant', and in my world the first question is 'what to do with all this?'

Well, to answer that, we must first consider what kind of world we want. And consider how this vision actually relates (or doesn't relate) to both the functionality and the usage challenge Web 2.0 presents in the educational context. I'll offer a couple of scenarios as food for thought.

Scenario 1

In this scenario, the learner is equipped for collaboration and competition – Charles' intersubjectivity. This results in:

- A healthy balance being struck, where the learner can negotiate between the two, knowing when the right time is to engage in collaboration, and when to compete. For example, they know how to use their LinkedIn contacts to further their careers, but they're aware of how persistent infomation held online is and are careful about how they share that information.

- This hypothetical learner is fascinated by the world, seeks to develop their own understanding and loves a conversation with others, online or offline, to further that understanding.

The thing is, for this to work there would need to be an absence of discrepancy in social or cultural capital – dystopian, or utopian depending on your perspective.

Scenario 2

In this scenario, too, the learner is equipped for collaboration and competition – this results in:

- A challenging, but potentially stimulating life where a lack of trust arises because we're never quite sure when we should be in competition and when we're in collaborative mode? The learner isn't always sure what information we should be sharing with whom, when, or how persistent it is likely to be. Crucially, the learner isn't equipped with the capital to address this lack of surety.

- Learner is fascinated by the world, seeks out their own understanding, and loves a conversation with others to further that understanding. But because the learner isn't confident in trust terms, he or she isn't sure when to be critical and when to be accepting and enthralled.

What these two scenarios highlight is that without capital, social and cultural certainly, but also economic, the benefits outlined in Charles' paper are unlikely to be enjoyed by all learners and their teachers.

2. What about specific groups – leading on from the point above?

So moving from the position that it is unlikely we'll see a society in which social and cultural capital are a) disjointed from economic capital and b) no longer an issue, I'm now concerned by the specific groups we might see advantaged or disadvantaged by his proposed approaches.

In a world of cultivated autonomy, expressed through the functionality that Web 2.0 arguably offers, what would happen to the power balance in educational contexts? Would we see a genuine shift towards *all* individual learners moving beyond coordination towards genuine collaboration? Do they *want* to move towards this collaboration? Or would we see chasms grow and shift direction?

> **There is no need for a teacher to be either guiding from the side, or acting as amanuensis, but the challenge would be (as it has been for centuries) to understand when to act in which role.**

With these thoughts in mind, I'd like to provoke you all by suggesting that we could start to set aside the formal/informal debate, and start thinking about communities; how they interact with one another, online, offline, second life, third life. There is no need for a teacher to be either guiding from the side, or acting as amanuensis, but the challenge would be (as it has been for centuries) to understand when to act in which role. When to pass a book to a child at exactly the right time, whether that be Rosie's Walk or Spinoza. When to share a story about a personal experience. Or when to set them up with a blog so that they can share with others their response to a concert, or their views on the changing environment. Arguably, this challenge is best understood within a pedagogical community that could be facilitated by Web 2.0, fostering community-based dialogue and focusing actively on disadvantaged communities.

Certainly the politics of the Internet is likely to continue to be a rapidly changing field, characterized by Chadwick's 'uncertainty, paradox, overstatement and understatement'. The evidence of the impact of web-based community learning networks is not systematic, but there appears to be sufficient small scale work (e.g. the Blacksberg Electronic Village) to give an indication that there is some promise there, to overcome the work-related, consumerist, social capital, personal and built environmental constraints that, according to Tonn and Petrich, contribute to poor participation in lifelong learning and the citizenship attached to it, and are likely to continue to affect us whether Charles' proposals come into being or not.

Discussion from the Panel and the floor

From the point of view of 'industry' there is the question of what impact an organisation such as HP can have on the world. Technology implies services that add value (rather than hardware). What is the difference between adults, young people and children in terms of how they access technology? How can we change communities?

The view that schools are not ideal learning environments. But what can take their place?

The problem of conflating education and learning/education and schooling.

Schools are facing a kind of crisis, and tend to embrace a somewhat authoritarian model of teaching and learning, and regulatory frameworks of the curriculum. The question of social justice comes in, and the need for schools to be universal in=situations (we cannot rely on the home as a learning environment).
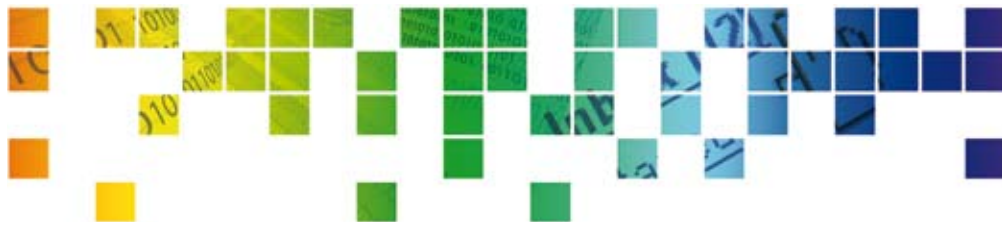
Example of young people learning from websites, and reverse learning i.e. what are we learning from young people? What will be 'literacy' in the 21st century? How can technology support learning?

We need a theory to understand the relationship between technology and society, and we need to think of new technologies together (i.e. mobile phone, radio, TV, internet) as tools.

But there remain inequalities, by gender, class and in terms of resources. The digital divide is still strong in the UK, in terms of class and inequalities.

There is a problem of a lack of a coherent strategy in UK in relation to new technologies. The government tends to lurch from trend to trend rather than developing any even medium-term strategy. To what extent does the government micro-manage all areas of life?

Seminar participants

Chris Abbott	King's College London
Panagiota Alevizou	LSE
Shakuntala Banajii	Institute of Education, London
Cary Bazalgette	European Media Literacy
John Coleman	Department of Education, Oxford
Steve Crane	Hewlett Packard
Sue Cranmer	Institute of Education, London
Charles Crook	University of Nottingham
Chris Davies	Department of Education, Oxford
William Dutton	Oxford Internet Institute
Sarah Eagle	Graduate School of Education, University of Bristol
Rebecca Eynon	Oxford Internet Institute
Keri Facer	Futurelab
Russ Francis	Department of Education, Oxford
Martin Garthwaite	Institute of Education, London/ Knowledge Lab
Anne Geniets	Department of Education, Oxford
Jenny Good	Department of Education, Oxford
Sara Grimes	Simon Fraser University / LSE
Ellen Helsper	Oxford Internet Institute
John Holmes	University of York
Diane Levine	Becta
Sonia Livingstone	LSE
Avril Loveless	University of Brighton
Ingrid Lunt	Department of Education, Oxford
Jackie Marsh	University of Sheffield
Liz Masterman	University of Oxford

Guy Merchant	Sheffield Hallam University
Bill Osgerby	London Metropolitan University
Caroline Pelletier	Institute of Education, London
Vanessa Pittard	BECTA
Alan Prout	University of Warwick
Tim Regan	Microsoft
Neil Selwyn	Institute of Education, London
Jane Shuyska	Department of Education, Oxford
Bridget Somekh	Manchester Metropolitan University
Elisabeth Staksrud	University of Oslo / LSE
Vivi Theodoropoulou	LSE
Judy Wajcman	Oxford Internet Institute
Yinhan Wang	LSE
Rebekah Willett	Institute of Education, London
Yangqui Zhang	Communication University China / LSE
Jingjing Zhang	Department of Education, Oxford

Speaker biographies

Sonia Livingstone

Sonia Livingstone is Professor of Social Psychology in the Department of Media and Communications at the London School of Economics and Political Science.

She is author or editor of ten books and 100+ academic articles and chapters on media audiences, children and the internet, domestic contexts of media use and media literacy.

Recent books include Young People and New Media (Sage, 2002), Audiences and Publics (edited, Intellect, 2005), The Handbook of New Media (edited, with Leah Lievrouw, Sage, 2006), and Public Connection? Media Consumption and the Presumption of Attention (with Nick Couldry and Tim Markham, Palgrave, 2007).

Having recently directed the research project, UK Children Go Online, for the ESRC's e-society programme, her current projects include an ESRC-funded study of the public understanding of risk and regulation and a thematic network, EU Kids Online, for the EC's Safer Internet Plus programme.

She serves on the UK's Home Secretary's Task Force for Child Protection on the Internet, the DCSF's Ministerial Taskforce for Home Access to Technology for Children, Ofcom's Media Literacy Research Forum, the Board of the Voice of the Listener and Viewer and, until recently, the Internet Watch Foundation. She is currently President of the International Communication Association.

Rebekah Willett

Rebekah Willett is a lecturer at the Institute of Education, University of London, where she teaches on the MA in Culture, Language and Communication. She is also a researcher at the Centre for the Study of Children, Youth and Media, which is based at the London Knowledge Lab.

Her research interests include gender, digital technologies, literacy and learning, and she has conducted various research projects on children's media cultures. In addition to publishing articles and chapters on the subject, she has also co-edited two books: Digital Generations: Children, Young People and New Media (2006) and Play, Creativity and Digital Technologies (2008).

Judy Wajcman

Professor Judy Wajcman is at the Research School of Social Sciences, Australian National University and is a Research Fellow of the Oxford Internet Institute.

She is currently a Visiting Professor at London Business School.

Most recently, she co-edited The Handbook of Science and Technology Studies: Third edition (MIT Press 2008). Her current research explores how mobile devices influence working time and work life balance.

William Dutton

William H. Dutton is Director of the Oxford Internet Institute, Professor of Internet Studies, University of Oxford, and Fellow of Balliol College, Oxford. He was previously a Professor in the Annenberg School for Communication at the University of Southern California, which he joined in 1980. In the UK, he was a Fulbright Scholar 1986-87, and was National Director of the UK's Programme on Information and Communication Technologies (PICT) from 1993 to 1996. Bill is also Co-Director of the e-Horizons Project of the 21st Century School at Oxford, Director and Principal Investigator of the Oxford e-Social Science node within the UK's National Centre for E-Social Science, and Principle Investigator for the OII's Oxford Internet Surveys (OxIS).

Charles Crook

Charles Crook is Reader in ICT and Education at the University of Nottingham. He has a doctorate in experimental psychology from Cambridge University, has been a Research Fellow at Brown and Strathclyde Universities, a lecturer in Psychology at Durham and a Reader in Psychology at Loughborough Universities. His main interest is in the psychology of human development, with special concern for young people's use of new technologies. He has published a number of papers developing a cultural psychological approach to education and developmental psychology. He wrote one of the early books on what has become known as 'computer supported collaborative learning' and has published empirical papers in most of the major journals of developmental psychology. He is currently editor of the Journal of Computer Assisted Learning. He takes an active part in disciplinary matters and is currently Chief Examiner of the British Psychological Society Qualifying Examination.

Stephen Crane

Stephen works at Hewlett-Packard Laboratories in Bristol, UK, where his research interests include management of personal identity, trust and security, including privacy. He is currently involved with the EU-funded PRIME and PICOS privacy projects and within HP focuses on security and trust for the individual.

Stephen joined HP Labs from Abbey National Group plc, where he was Principal Information Security Consultant with responsibility for security architectures, policies and standards for financial sector security. Prior to this, Stephen was employed by HM Government in various technical and information security roles.

Stephen received his MSc in Information Security from Royal Holloway, University of London. He is a Chartered Engineer, and member of IET and the BCS.

John Coleman

Dr John Coleman trained as an educational psychologist. He was for many years a Senior Lecturer in Psychology in the University of London, after which be became the Director of the Trust for the Study of Adolescence. Since 2006 he has been a Senior Research Fellow in the Department of Education in the University of Oxford. He has written widely about adolescence, and is the author of 'The nature of adolescence', now in its third edition. His most recent books include 'Adolescence and health' (John Wiley, 2007) and 'Adolescence, risk and resilience' (John Wiley, 2007). His main research interests include emotional health and well-being, the learning environments of young people, and the importance of new technologies. He was awarded an OBE in 2001 for his contribution to services for youth.

Diane Levine

Di Levine is the Head of Educational Research and Analysis at Becta, with responsibility for a number of systemic monitoring and investigative research projects. She began her working life as a teacher working with young people with behavioural difficulties, and has since spent several stimulating years in the worlds of policy, research and practice. Di has an MA by research from the University of Warwick. She has a particular interest in comparative and alternative education methods, and in the impact of technology on learners with behavioural difficulties.

Neil Selwyn

Neil Selwyn is a senior lecturer at the London Knowledge Lab where his research focuses on information technology and society. The two over-riding themes throughout his work are the place of technology in everyday life and the sociology of educational technology. He has carried out funded research on information technology, society and education for the Economic and Social Research Council (ESRC), the BBC, Nuffield Foundation, the Spencer Foundation, Becta, Centre for Distance Education, the Welsh Office, National Assembly of Wales and various local authorities.

Neil's research has examined information technology at all stages of the lifecourse ('techno-tots' to 'silver surfers') and at all levels of education (primary and secondary schools, further education and sixth form colleges, university and adult education). He is (co)author of four recent books on technology, society and education as well as over 150 articles in major international journals and in key edited volumes. Neil has carried out professional advisory work for a number of public sector and voluntary organisations. His research has been disseminated in both the print and broadcast media including: BBC television news, BBC Radio 4, BBC Radio Wales, the Times, the Guardian, the Big Issue, the New Statesman and the Times Higher Educational Supplement.

Bridget Somekh

Bridget Somekh, BA, PGCE, Adv Dip Ed, MA, PhD is Professor of Educational Research in the Education and Social Research Institute at Manchester Metropolitan University and a former Deputy Director of the Scottish Council for Research in Education and Dean of the School of Education and Professional Development at the University of Huddersfield.

She is an Editor of the international journal, Educational Action Research, which is based at MMU, and on the editorial boards of the Journal of Technology, Pedagogy and Education (TPR, formerly JITTE), the Journal of Learning, Media and Technology, and the Journal of Teachers and Teaching: Theory and Practice. Currently she is editing, with Susan Noffke, the Handbook of Educational Action Research, to be published by Sage in 2008. She is a former member of the Council of the British Educational Research Association, and from time to time does advisory work for DG Research in the EU. She is a member of the coordinating group of the Collaborative Action Research Network, and a member of the BERA SIGs for Research and Policy Links, New Technologies in Education and Practitioner Research. Both the UK Economic and Social Research Council and the UK Engineering and Physical Sciences Research Council call on her to review research proposals.

Her research interest is the process of innovation and the management of change, in particular the impact of ICT on users and their organizations, and the ways in which learning with ICT is enabled or constrained by curricular, pedagogical and organizational factors. Since 2000, she has directed a number of national evaluations studies, including the ImpaCT2 (DfES), ICT Test Beds (DfES) and Primary Schools Interactive Whiteboards (SWEEP) evaluations of the impact of the UK government's investment in ICT for schools. She is very experienced in leading action research projects and between 2002-06 directed the Pedagogies with E-Learning Resources project sponsored by the General Teaching Council for England.

Bridget is internationally known for her work in both ICT in Education and Action Research and has been a keynote speaker at conferences in Brazil, Brussels, Hong Kong, Hungary, Norway, Portugal, Singapore, Venezuela, the UK and the USA.