the edgeless university why higher education must embrace technology

Peter Bradwell

DEMOS

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Contents

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As usual, errors and omissions are my own.

Peter Bradwell
June 2009

Introduction

On many counts the higher education sector would appear to be in rude health. UK universities are the second most popular destination for international students, taking 11 per cent of the market share.[1] Four British institutions are among the top ten global universities – Cambridge, Oxford, Imperial College London and University College London.[2] The number of people passing through UK universities is rising: between 1997 and 2007 the number of students in higher education grew from 1.8 million to 2.4 million.[3] As institutions, universities continue to contribute to the local communities around them, to the national economy and to the vibrant cultural and intellectual life of the UK.

Nonetheless, universities find themselves in a fragile state. The huge public investment most of the sector relies on is insecure. Universities are being asked to do more for less, from meeting the needs of a larger and more diverse student population to withstanding increased competition. Current ways of working are unsustainable. We are entering a period of critical change in which UK institutions will need to adapt to survive.

The economic and social imperatives for continuous higher learning and innovation are growing more urgent just as the primary means to achieve them come under threat. Two vital public policy aspirations are jeopardised: the need to give more people the opportunity to access lifelong learning regardless of background, and the positioning of the UK as a global centre of innovation in the knowledge economy.

With an increasing diversity of students and student needs, fierce competition, and a crunch on funding, it is not surprising that some commentators are predicting the end of the university as we have known it.[4]

Why technology is changing universities

The aim has to be to make those running universities realise that technology isn't just something that means you build a room full of computers on your campus.[5]

Technology is at the heart of this story of institutional change. Universities are now just one source among many for ideas, knowledge and innovation. That seems to threaten their core position and role, but in this new world of learning and research, there are also great opportunities. The internet, social networks, collaborative online tools that allow people to work together more easily and open access to content are both the cause of change for universities, and a tool with which they can respond.

Robert Lang has used the term 'edgeless' to describe cities subject to a certain type of sprawl: 'Edgeless cities are… cities in function… but not in form.'[6] Universities too are experiencing 'sprawl'. The function they perform is no longer contained within the campus, nor within the physically defined space of a particular institution, nor, sometimes, even in higher education institutions at all.

This is driven by people finding new ways to access and use ideas and knowledge, by new networks of learning and innovation, and by collaborative research networks that span institutions and businesses. It is an increasingly international phenomenon. Across the globe, countries are pushing for greater advantages in education and innovation. There is an ever-growing environment of learning, research and knowledge exchange of which universities are one part. In the UK universities become edgeless geographically as they start to provide education outside the UK. The University of Nottingham, for example, has a campus in Ningbo, China, and a campus in Malaysia. They are becoming edgeless in research as innovation depends increasingly on collaborations between institutions and among academics. The university is becoming defined by its function – provider and facilitator of learning and research – not its form. Its influence, reach and value extend beyond its UK campus.

Why we still need universities

In the past those countries who had the raw materials, the coal or the oil or the basic commodities, or the infrastructure, the ports and the communications, were the ones that had… the most competitive advantage. Today what matters is who has the skills, the ideas, the insights, the creativity. And the countries that… will succeed in the future are those that will do more than just unlock some of the talents of some of their young people, the countries that will succeed will be those that strive to unlock all the talents of all of their people.[7]

Universities are stores of expertise and knowledge capital. Students need their learning and development affiliated with and accredited by particular institutions, and they need exposure to new thinking and people. Universities provide hubs for research and support, exposure and promotion for researchers. Universities bring great economic benefits by attracting research, enhancing the skills and education levels of the population, and connecting with the local economies and communities around them. They confer considerable economic benefits to graduates who can expect to be around £160,000 better off over a lifetime for attending a UK university.[8]

Universities provide spaces for developing expertise, validating learning and they bring prestige to those affiliated to them. This is not going to change. Instead they will have to start to open up continued learning and innovation to a wider population. Giving more people more ways to learn and research will be the only way to reconcile aspirations to maintain a world-class education system with high participation rates and moves towards equality of access.

There are already signs of this. University College London announced in June 2009 that it will publish all its research online, with free access.[9] The vast resources of a top-ten globally ranked university will be available to anyone with an internet connection. Such a move serves a number of purposes. Dr Paul Ayris, Director of UCL Library Services, described it to us thus:

In the competitive environment of a global higher education market, Open Access repositories provide a platform on which a university can showcase its

research. Open Access helps prospective students make a judgement on which university to choose, shares blue-skies research with the widest possible audience and supports outreach activity to open up higher education to new communities.

Giving access to a high volume of content can give a high profile to the quality of the institution's work. It can contribute to the wider academic and learning commons. But it raises questions about how the knowledge is sorted, how we filter such quantities of information. As Martin Weale, director of the National Institute of Economic and Social Research, said:

If you read something in the American Economic Review, there's a presumption that its quality has been examined with great care. But if you have open access, people who are looking for things... will find it very difficult to sort out the wheat from the chaff.[10]

This is where a university's values can reassert themselves. As more content is available, guidance and expertise in sorting and assessing it become more valuable. As more people seek flexible and informal learning, they will need the accreditation and support of established institutions. As researchers and learners try to acquire the skills of searching, analysing and sorting information, the expertise of academics will be invaluable. As learners look to assert the value of their learning, and researchers their work, affiliation to established institutions will signal valuable quality.

Institutions will find it difficult to continue to absorb rises in student numbers, or to pursue research excellence or handle the diversity of needs on campus. And people will continue to take advantage of more flexible opportunities to learn outside the system. This is the value of and opportunity for the 'Edgeless University'. At its most radical, edgelessness can lead to institutions exploring new ways of accrediting learning, of providing recognition of research and learning and of offering affiliation. Those in informal learning can be offered help in finding routes to formal qualification, connecting with alternative providers or alternative open learning resources and of finding new forms of course provision.

Getting the technology right

The challenge is to get the relationship between the institution and the technology the right way round. Open repositories of online content, social media networks like Facebook and the use of virtual learning can all help universities provide more flexibility and new ways for people to access scholarly and research material. Technology can help universities move from where they are now to where they need to be.

This will require a commitment to open content and shared resources, and investment in the management and curatorship of vast amounts of data and knowledge. It will also mean offering new kinds of courses, accreditation and affiliation that use informal learning and research networks and connect them to the formal system.

The public finance crisis threatens to stifle aspirations to extend yet further access to higher education and continued learning and to make background less relevant to access and achievement in higher education. But the ambition must remain. The coming years need not be just an era of low resources and stress. They can be transformed into what director of Demos Richard Reeves has called 'progressive austerity'.[11] Making strained public resources meet progressive ends in the economic hangover will require difficult choices for government.

Getting the policy right

In an expert roundtable conducted by Demos, one participant used a telling analogy to describe the current predicament of the higher education sector: 'This seminar feels a bit like sitting with a group of record industry executives in 1999.'

Technology undermined certain business models that sustained the music industry, but the threat was not to music itself, only to the way that current business models worked. New ways of creating and finding music had been made possible.

It is no use lamenting the golden age of universities (or record companies). The goals of the two 'industries' remain the same, but they must refocus on how to achieve them. Society's aspirations for the sector remain the same. The challenge for institutions is to find the way to do it.

Until now, investment in technology in higher education has been driven by the initiative of enterprising academics and advocates within institutions, backed by trenches of funding. It has resulted in innovative, often world-leading, programmes such as the JANET network, led to new ways to talk to students and introduced progressive ideas about assessment. Such investment in areas of innovation has given universities tools with which to be more effective and innovative.

The next stage of technological investment must be more strategic. The sector currently lacks a coherent narrative of how institutions will look in the future and the role of technology in the transition to a wider learning and research culture.

1 Universities challenged

The purpose of education is life-enhancing: it contributes to the whole quality of life. This recognition of the purpose of higher education in the development of our people, our society and our economy is central to our vision. In the next century, the economically successful nations will be those which become learning societies: where all are committed, through effective education and training, to lifelong learning.

Dearing Review of Higher Education, 1997[12]

Twelve years after Lord Dearing's landmark higher education review, the sector faces transformative issues. Higher education is in greater demand than ever, from a population of students more diverse than ever. Increases in funding are not matching rising costs. After a decade of high investment, money is no longer available to throw at the problem.

The funding crisis threatens the aims set out in the Dearing review and to undo what progress has been made in meeting them. It also threatens the ability of universities to maintain their status as world-leading institutions and their aspirations to make higher learning accessible to more people. In the long run it could even undermine the UK's status as a lead nation in the global economy.

Widening participation

Early on in its administration, taking inspiration from Lord Dearing's vision for higher education, the Labour government established a target for half of all 18-year-olds to start a higher education course by the age of 30, to be achieved by 2010. They also established a target for at least 40 per cent of the working-age population to hold qualifications at higher education level or above by 2020.[13]

Partly driven by this ambition, between 1997 and 2007 the number of students in higher education grew from 1.8 million to 2.4 million. In the same period, the number of part-time students grew from 618,000 to 911,000, and the number of students aged 21 or over rose from 1.2 million to 1.6 million.[14] This year, partly as a result of students looking to 'shelter' from the economic downturn and a tighter job market, a record 265,000 people have applied for a place at university – an 8 per cent increase from 2008.[15] Admissions are running at full capacity.

But improving access has not been easy. In February 2009 a Public Accounts Committee report, *Widening Participation in Higher Education*, showed that despite £392 million of widening participation funding for higher education institutions, progress towards the government's goals had been sluggish, with access plateauing at around 43 per cent.[16] The Public Accounts Committee argued, 'Socio-economic background, gender, ethnicity and place of residence all influence the likelihood of an individual attending higher education, primarily because of their effect on attainment at school.'

Widening participation is not just a 'point of admissions' problem. The problem begins with differences in aspirations and earlier educational attainment. And decisions about how to provide continued adult skills and education can have unintended and sometimes counterproductive effects. The Demos pamphlet *The Skills Paradox* noted:

This dynamic between labour markets and adult learning systems – the market and the state – produces a damaging social paradox. Those with the lowest qualifications are also the least likely to take part in formal adult learning. Despite the progressive goals of adult learning, the danger is that it leads to greater polarisation in skills, not greater equality.[17]

This is reflected in the Higher Education Funding Council for England's focus on new opportunities for progression through vocational courses and lifelong learning. For example, it has set up Lifelong Learning Network pilots to explore new routes into higher education for vocational learners.[18]

As a result, a person's background and socio-economic status still play too great a role in determining access to higher education. It has taken concerted effort and significant resources to help tackle the barriers posed by educational inequalities. It is a complex issue which, as the Public Accounts Committee report illustrates, is resistent to swift change even with huge investment. There is no easy fix for providing access to lifelong learning.[19]

We must prepare for a rethink on tuition fees. The progressive line of argument, in the light of the aspiration for wider participation, is that the tuition fees regime needs to change significantly, principally with a raising of the cap on tuition fees supplemented by renewed commitment to financial support for those who cannot afford to pay. This is a live political debate. The choice of priorities is between getting more students into higher education and trying to ensure equality of access.

Participation in tertiary education across the OECD is rising significantly, with rates of over 50 per cent for a single age cohort becoming the benchmark for most member countries.[20] As well as a moral imperative, the UK has an economic need to keep up with these trends.

Routes into higher education have not diversified to match aspirations to widen participation. Universities argue, with some justification, that it is not their job to provide correctives to educational differences between applicants. However, the problem is that there is still too much of a focus on traditional forms of access and qualification. HEFCE's work in broadening broaden routes into higher education are a tacit admission of this. Supporting and helping young people to enter a higher education system means extra remedial work and pressure on resources. This is becoming a burden the sector cannot bear.

Demographic change

As well as a huge rise in student numbers, there has been a significant change in the types of people going to university. Such expansion in participation in higher education is not limited to the UK. University programme entrance rates are up 20 per cent across the OECD as a whole.[21]

We are having to reassess the stereotypes associated with 'being a student' as something that teenagers do after school and before they start work. It's a three-year experience – you arrive with a suitcase and leave with a degree.

In fact this model of higher education – residential, full-time and pre-employment – now only reflects the experience of a minority. Two out of five higher education students are currently studying part-time; 59 per cent are mature and almost 15 per cent come from overseas;[22] and there is every indication that the student population will continue to grow and change. There is likely to be a shift away from recruiting full-time 18-year-olds in the next 15 years, although increased immigration, improved staying on rates and changes to post-16 qualifications might militate against drastic change.[23] We are likely to see an increase in the class mix of the student population along with changing birth rates among different social classes.[24] Enrolments of full-time 'stereotypical' undergraduates will plateau, while part-time enrolments will continue to increase as a result of an assumed increase in the population aged 30–39.[25]

The student body will therefore become progressively more and more diverse to include students with caring responsibilities, students with disabilities, students learning in the workplace, and students from different ethnic and religious backgrounds. This is already having a tangible affect on life on campus – as one of our interviewees told us:

A lot more students now are also working. In any university area that provides 24-hour access we've seen high access until 2 or 3 in the morning, then it picks up again around 4.

A major factor will be the rising numbers of international students. The number of postgraduates coming to UK universities from other countries has almost doubled since 1996/7, to 150,000 in 2006, while the number of overseas undergraduates has risen from 98,000 to 140,000 over the same period.[26]

A rise in the number of international students brings additional demands beyond those of teaching. Dr Shaun Curtis, head of internationalisation at Universities UK told us:

There are many more people on campus engaged in internationalisation – for example, legal and marketing teams have to get involved, and there are increased demands for pastoral care. How you manage those demands is an important strategic issue.

A diversifying student population puts new demands on institutions. Greater diversity of students places new demands on design learning around a greater range of needs – requiring what some have called a 'learner need' approach. Teachers and lecturers have to deal with a much greater range of information processing styles, cultural backgrounds and styles of learning. As a result, the ideal for teaching in higher education is now recognised to involve much more than lectures as the means of information provision.[27]

Competition and alternative providers

The number of students studying outside their home countries has been increasing for some years and continues to rise. In 1975 there were 0.6 million students enrolled in institutions outside their country of citizenship. By 2006 this had risen to 2.9 million. Dr Neil Kemp, visiting fellow at London's Institute of Education, estimates that by 2025 almost 8 million students will be educated internationally.[28] Students have become more mobile. For universities, it is becoming ever more important to attract these education seekers. The fact that overseas students can be charged higher fees continues to make them a lucrative income stream.[29]

In 2008 researchers from the Centre for Research and Evaluation and Centre for Education and Inclusion Research at Sheffield Hallam University found that 65 per cent of UK institutions currently provide some form of transnational education – meaning they provide higher education outside their own countries – to almost 80 different countries worldwide. The largest percentage of programmes is in the Asian region (44 per cent), followed by Europe (28 per cent), with no provision being offered in the region described as Australasia.[30]

New providers of higher education

Around the world more than one in three students are studying in a private institution,[31] a sector worth an estimated $400 billion worldwide.[32] The US, Japan and Chile, for example, have well-established private sectors of higher education. In the US 25 per cent of higher education institutions are private and in Japan a majority of higher education enrolments are in the private sector.[33] Private education also has a long history in Latin America where a proliferation of small, private institutions account for around half of all provision.[34]

In Western Europe it is a different story. In 2007 France's public education system was shaken up by a fundamental policy change when President Nicolas Sarkozy allowed its publicly funded universities to set up foundations to attract funding from private and corporate sources. Last June, the University of Auvergne in Clermont-Ferrand became the first institution in France to set up a private foundation, helped by the presence in the city of the Michelin tyre manufacturer.[35]

In the UK the private sector has focused on specialised or niche markets rather than providing mass higher education. BPP Professional Education, for example, provides specialised accountancy and law courses. In 2007 it became the first for-profit company to be given degree-awarding powers. Holborn College, a foundation member of the Association of Independent Higher Education Providers,[36] offers a range of courses in law, business and accounting.

The University of Buckingham, which has topped student satisfaction surveys for the past three years, offers students the chance to do a three-year degree in two intensive years with flexible start dates.[37] The vice-chancellor, Dr Thomas Kealey, believes this protects their independence: 'This is the third year that we've come top because we are the only university in Britain that focuses on the student rather than on government or regulatory targets. Every other university should copy us and become independent.'[38]

Funding

The flexibility and focus offered by alternative providers offers a challenge to the state sector. Higher fees may not necessarily put students off attending university entirely – a recent study by UK Universities suggests that a rise from £3,000 to £5,000 in tuition fees would not deter students[39] – but it is likely to hone students' desire to get a good return from the higher education they are paying for. An indication of this comes from the 2009 Higher Education Policy Institute survey of the academic experiences of higher education students in English universities:

UK and EU students – who were at that time paying only £1,000 or so per year – were fairly positive. But 30 per cent of overseas students – who were paying many times more – were dissatisfied with the value for money of their course.[40]

The same poll found that further education finance is one of the three topics that respondents said they would like to learn more about at school.[41] Young people are concerned about debt and their return on investment in continued education. New survey data released in March 2009[42] showed that 65 per cent of teenagers think further education is not worth getting into debt for.

Funding is therefore an explosive issue. Rising demand, expectations and diversity are confronting a shortfall in funding. The next two years are likely to see state funding fall by at least 5 per cent and the higher education sector has been told it will have to make a £180 million savings by reducing universities' administrative costs.[43]

Funding pressures are having a tangible affect on universities' ability to carry out their core tasks and meet public policy aspirations. Unsurprisingly, there are questions about the 'best' use of funding. Science Minister Lord Drayson has signalled a desire to look at the strategic focus of resource allocation, suggesting there are 'difficult choices' to be made about what funding is for. With an eye on a highly competitive international research environment, it is more likely that public money will be tied to national strategic decisions.[44]

The effects of a funding crunch are already felt directly on campus. In his letter to the heads of higher education

institutions in the UK, the chair of HEFCE's Financial Sustainability Strategy Group Professor Steve Smith laid out the three main areas where teaching is coming under particular strain: 'access to, and feedback from, academic staff who are established in their field; infrastructure for teaching and learning; and student support services'.[45]

Already, at a time of record numbers of applications, a limit of 10,000 is in place on the number of additional places to be offered for the year 2009/10. Oxford University's vice-chancellor, Dr John Hood, has suggested that Oxford loses up to £8,000 per student a year.[46]

A perfect storm?

The forces now confronting higher education have been called 'a perfect storm'.[47] They are serious challenges. Universities must offer more varied provision to a growing number of students in an era when they can no longer depend on ever-increasing allocation of funds. These are challenges to institutions set up to cater for a different age.

The challenge is to find ways to make available resources match society's unchanged aspirations for education. In Britain this challenge is twofold: maintaining a continued international reputation for excellence in teaching, research and innovation; and continued progress to eradicate inequality of access.

2 Technology as cause: information technologies, learning and collaboration

One of our roles has always been to make knowledge more visible to a large number of people. And collaborative technology just gives you another way to do that. People worried about me when I first started saying this. But now people come to me and ask how they can do it too.

Dr Michael Wesch[48]

The spread of internet access, and more recently broadband, the phenomenal popularity of social networking sites and the use of 'collaborative' tools have been connecting people in new ways. They have generated self-expression, conversation and creation on an unprecedented scale. As a means to facilitate collaboration, these new information technologies have been drivers of economic and social innovation.

As universities feel the impact of the 'perfect storm' of increased demands and fewer funds, these technologies are changing how people can learn and research. Higher education institutions are now one source among many for ideas, knowledge and innovation. Google opens up vast resources to many more people, but at the same time it undermines the role of universities as stores of knowledge.

The implications for universities are enormous. Open and collaborative learning and research might seem a threat to universities (since both can be done outside such institutions) but it can also emphasise their importance. The noise of information and knowledge needs filtering; students need guidance and expertise. They also need the 'brand value' of institutions and the validation they provide. Universities have to capitalise on the connections and relationships made possible by the new information technologies.

Information for free

The percentage of households with access to the internet in the UK stands at around 65 per cent; 56 per cent of all UK households had a broadband connection in 2008, rising from 51 per cent in 2007.[49] Having access to the internet is now seen as a necessity for everyday life, not a luxury. Home access is just the tip of the iceberg. Mobile handsets are ubiquitous – in 2007 there were more mobile phone subscriptions than people in the UK (118.47 mobile subscriptions per 100 people). The International Telecommunications Union estimates that the number of mobile subscriptions worldwide recently surpassed 4 billion.[50]

Such connectedness makes it easier to utilise the collective imagination of more people in the development of an idea, service or product.[51] There are obvious implications for education. Universities were once the primary portal for anyone wishing to pursue a subject in any depth or to engage in collective research endeavours. Now, scholarly journals can be a Google search away, rather than a 20-mile journey and requiring membership of an academic library.

A Google search for 'Plato Republic' yields more than 370,000 results. A search for 'Plato Republic commentary' yields more than 18,700 results. Searching for 'Plato Republic free essay' provides 68,500 leads, many of which link to sites such as 'megaessays.com' or 'goldenessays.com'.

Open access

It seems odd to think that, until very recently, the physical limitations of storing information and helping people access it were real problems. They have melted away. Information management deals with the consequences of the ubiquity of information, of it being readily available, not its inaccessibility. Students can and increasingly do look to new spaces like Google to access, sort and organise information.

Information is not just more available – it is more *searchable*. Searching is a constantly evolving service, becoming 'smarter', more able to provide us with the kind of information we are looking for. For example, Google is working to make its

results personal by fitting someone's search profile, while new sites such as 'Wolframalpha', whose stated goal 'is to make all systematic knowledge immediately computable and accessible to everyone', are taking new approaches based on automating the process of computing data.[52] An emerging phase is the linked data and information of a 'semantic' web. This is a disputed term, but at its simplest it provides new ways to sort huge amounts of seemingly difficult to navigate information. It combines information given meaning through the way people describe it with technologies that can process and filter the resulting connections.

These initiatives extend beyond written material. Technology, Entertainment and Design conference (known as TED) began uploading videos of its talks a few years ago. The website quickly gained cult-like status in those interested in ideas. More than 400 videos are now available under a Creative Commons Licence, including speakers as varied as Al Gore, cutting-edge researchers from MIT, and the television and film producer JJ Abrams. TED claims the site attracts millions of users.

When services such as Google Books and Google Scholar are coupled with the vast array of audio, visual and secondary sources available online, the traditional idea of the library stacks seems quaint.

Learning in an immaterial world

Second Life, an immersive virtual world in which people control avatars (digital projections of themselves), has been accorded much attention; for example its local currency, the Linden Dollar,[53] has generated news stories about the large amounts of money that exchange between participants. Second Life is an example of technology bringing people together from disparate places to communicate 'synchronously'.

Social networks are more everyday examples of this. Twitter, the 'micro-blogging' site, is developing past its 'what I ate for breakfast' phase into a useful resource for sharing links, brief ideas and commentary. It forms part of a suite of often free

to use online learning tools. The website aMap, for example, allows people to create their own visual 'mind maps' of their arguments and ideas for others to see and debate.[54] EduFire is a tool to help teachers run live video classes with one or many students at the same time, with groups set up around topics.[55] Initiatives like Bettr provide a hub for this activity, by facilitating meet ups and best-practice sharing for those developing educational tools.[56]

Using the internet to get offline

Many of the most compelling examples of social media do not involve *replacing* real world communication with online forums. They use the network technologies to make offline meetings and interaction happen. Many of the most innovative applications of technology are taking place in this field. For example, there are many location-aware applications which can help people use maps and location information combined with contextual details. Google Latitude allows users with mobile phones to see where friends are. Technology in this case is specifically changing or supporting interaction in the real world, rather than providing online spaces to replicate or replace it.

Such social media create an enthusiastic culture of informal learning, whether through book clubs, public lectures or social networks. Sites like Meet Up and UpComing are encouraging groups to form and organise around common interests. Meet Up provides calendars, message boards, member profiles and the ability to share files. There are over a thousand Meet Up groups in London, ranging from large language and cultural exchange groups like the London Japanese Language Group and the London Life Drawing Society, through to the London Semantic Web group. All are based around a passion or hobby or field of work. You could see them as bespoke, self-organised course modules or as book club culture on steroids.

Some sites are dedicated specifically to education. The School of Everything, for example, helps people who want to learn something find those who can teach it, as does EduFire.

Such social networks are designed around the specific purpose of connecting learners and teachers. The searching happens online, but the teaching and the interaction usually happen offline. The technology is in the service of the relationship, rather than defining how it works.

It is hard to imagine a topic on which there is not a range of instructional material, videos and openly available knowledge easily available. And it is equally hard to avoid finding people who want to tell you more about a subject, and learn it with you.

Collaborative research

We can now see the tangible and significant effects of the new collaborative technologies as people find ways to create and find information and ideas, and connect with people to get things done. Only recently this would have seemed the vague wishes of a techno-utopian. In the pamphlet *Network Citizens*, Demos reported that companies reap huge benefits from finding ways to capitalise on networks of people who may not formally sit within their organisations. As one interviewee for the research said:

The idea really is that Einsteins live everywhere, but you don't necessarily invite them to your meeting. They might be junior, ex-employees, associates or outside your organisation. But you need to engage them.

Matt Chapman, Imaginatik[57]

Collaboration has had an immediate impact on research, since researchers have found the tools to develop their existing propensity to work together.[58] That has seen the emergence of virtual research communities, which are helping collaborative research flourish. Demos' Atlas of Ideas project mapped the changing landscape of innovation and science. It found that the landscape of research is being redrawn. Companies are setting up huge R&D facilities in India, China and Korea. In Daejon in South Korea geneticists equipped with the latest gene-sequencing machines are generating world-class stomach cancer research after three years.[59] The report noted:

We used to expect new ideas to come from the universities and research laboratories of major companies in the US and Europe. Technology flowed from this innovative core to the technologically dependent periphery. No more. The core and periphery are being scrambled up.

What does this mean for universities?

Initiatives like InnoCentive are pushing the collaborative ideal and networked infrastructure to a new level. This 'open research community' connects enterprises looking to solve research problems with a network of more than 175,000 researchers. 'Seekers', often corporations with large R&D budgets, post innovation challenges in the InnoCentive Marketplace, where 'Solvers' – engineers, scientists, inventors, business people and research organisations in more than 175 countries – work to solve them. There can be significant financial rewards and prestige for successful participants.

Businesses are coming to terms with the need for collaboration and universities need to encourage similar networks. Collaboration across institutions and types of organisation as well as across borders are now driving the development and implementation of new ideas. Dr Shaun Curtis, of Universities UK, told Demos: 'If you have aspirations to be a world-class institution, then there is an acknowledgement that no body of knowledge resides in one institution or in one country.'

Take the case of Pippa Buchanan. She says she has been learning all her life and that she wanted to continue that learning in Berlin while she looked for work; she wanted to combine her varied and broad interests with the difficult pressures of a busy life. Luckily she had ideas about learning outside institutions, and had seen the vast resources universities were putting online to be accessed by people such as her. So she set about a 'DIY Masters', piecing together learning at her own pace, at times convenient to her, covering topics specifically in line with her interests.[60]

Buchanan's main resource was the ocean of material available from universities or other sources of learning content.

The TED website, for example, has grown into a hub for the sharing of ideas. Other new environments for the sharing of knowledge – the most exciting of which encourage tangible, real-world networks which spur ideas, exchange and action – are springing up. Spaces like The Hub bring together these networks.[61]

What effect does this have?

In the early Noughties we awaited in breathless anticipation the next stages of the internet and network revolution. Now focus has shifted to working out what it means in practice. Non-institutional knowledge creation, facilitated by open and collaborative technologies, does not just offer new ways of teaching on campus. New spaces of value and knowledge creation are emerging as resources are channelled to looser groups of researchers and learners, groups which do not need the associated set-up and overhead costs of large institutional environments. Start-ups such as the School of Everything[62] demonstrate how technology facilitates collaboration outside institutions.

Knowledge is no longer restricted within the boundaries of universities and higher education facilities. These institutions no longer have a monopoly on where good ideas come from, nor of how information and knowledge is used. They cannot control how the knowledge they help to create is used and where it is accessed.

But this does not mean that we can do without such institutions. They, too, have to be open to new spaces of learning and research. They have an important role in helping such spaces flourish. Universities are becoming partners in learning and research rather than sole providers. People need their resources, for example to spur learning. They look to their expertise and their recognition to validate learning. Their reputations, networks and spaces are a driving force for research and collaboration.

This is the way in which universities are becoming 'edgeless'. They are not disappearing, either into the virtual

world or out of existence. They are present in new places, in new ways. Far from being undermined, these new networks can reinforce their importance. Their value is their institutional capital – the spaces they create for learning, the validation they provide for learning and research, and the returns people get from it. One of our interviewees explained it as follows:

If you want a degree because it is currency in the labour market, then you are still going to need to go to university to at least signal to other people that you are qualified to that level.

Universities have to rediscover their value to knowledge-seekers in a world where information is ubiquitous. Their presence across these networks of learning and research remains vital and influential.

3 Technology as a solution: becoming edgeless

Of course there's a lot of knowledge in universities: the freshmen bring a little in; the seniors don't take much away, so knowledge sort of accumulates...
A. Lawrence Lowell

Some institutions already share knowledge and communicate with their students in alternative ways, opening up new approaches to learning and research. Some universities distribute lecture recordings for free on iTunes U, or use virtual learning environments to complement modules and courses. Some are experimenting with bringing learning to virtual worlds such as Second Life. Libraries are extending the ways that people can access material.

But these examples do not add up to a sector-wide appreciation of the role technology could have in the future of higher education. In this chapter we look at some of the innovative ways that technology is already being used and why it can help universities adjust to their new roles. We show how technology can help universities to capitalise on people's need for continued learning and new networks of research. That means learning from best existing practice, finding ways to be more responsive to diverse student needs; renewing commitments to open data and research; and finding forms of provision that offer new ways for students and researchers to affiliate themselves with institutions and have their work validated and accredited.

Current infrastructure

The JANET network has given the UK higher and further education sector world-leading network capacity. It provides high-spec network access, covering a range of network services

such as video streaming through to access management of resources. The network serves 18 million users across all educational levels and has become central to the way educational institutions and researchers communicate.[63] This networked infrastructure has facilitated information exchange and availability on an unprecedented scale.

JANET has also encouraged experimentation in how to use technology in education and is part of a set of tools that higher education in the UK could use to lay the groundwork for IT innovation. In the case of experimentation with virtual research groups, for example, the Working Group on Virtual Research Communities, for the Office of Science and Innovation (OSI) e-Infrastructure Working Group, reported: 'The UK is well advanced in its understanding of the area and has the world's best structured programme of developments under way.'[64]

The infrastructure is in place. British universities have done the groundwork and recognised that the current system is unsustainable. But is there yet a clear vision of what comes next?

Being more responsive to students needs

The problems of how to use technology to boost educational performance and satisfaction of both staff and students are still very much there. Technology is part of people's daily life in a university, I would say everywhere except in the classroom.

Interviewee[65]

Universities are dealing with an increasingly diverse population of students who approach university at all stages of their lives and who will require different ways of learning. To remain attractive to students, retain reputations as excellent places to learn, and also to meet these new learning learning needs, universities must get better at understanding exactly what it is these students need. That does not mean bending to their whims, but understanding what their incentives for learning, needs for development and wishes for change are.

New kinds of teaching

Social media tools enable *collaborative* teaching. Michael Wesch from the University of Kansas in the US has pioneered and championed collaborative learning in higher education lecture halls. He told us how he redesigned his teaching method to promote collaborative learning and research. He does this by using online tools to make student coursework team-based and collaborative. These include sites such as Netvibes,[66] which aggregates multiple news, comment and content sources into customisable space, Yahoo's Pipes[67] and Diigo,[68] a research tool which allows users to comment and highlight websites and share this with others.

Dr Wesch has changed the presumption that he is in a lecture hall to impart information to his students. He now sees himself as a guide and facilitator, helping his students to understand how to sort, understand, interpret and use the vast amounts of information they have access to:

Now I enter the classroom and I think, most of the content that I have to deliver and a whole lot more, is floating around them right now. What I need to do is inspire them and give them the tools to harness that information and harness the skills of other people to do the things they want to get done. And that transforms the way you approach the classroom.

Dr Michael Wesch[69]

The student of today arrives at university, whether direct from school or after some years out of school, having already assimilated the internet and connectivity into their everyday lives. That demands new learning and teaching techniques.

There has been a strong uptake of technologies such as virtual learning environments (VLEs), which concentrate content and discussion around a course or module. Moodle.org is perhaps the most famous example.[70] Further, there have been moves to use these tools, along with others such as NetVibes, to develop collaborative 'learning spaces', in which students work more closely with each other on their coursework and learning tasks. The Joint Information Systems Committee (JISC) report *Higher Education in a Web 2.0 World* found that the UK is as advanced as any nation in the adoption of social

media in higher education, and that use tended to revolve around five areas:

- blogs (reflective journals)
- wikis (collaborative content creation or supplementary lecture information)
- social bookmarking (expanding reading lists with social references and commentary)
- social networking (course discussion, initiated by both students and staff)
- immersive technologies (role playing)[71]

There are other tools lecturers have been using. Some have adopted voting mechanisms and online publishing of the results. Innovations do not have to be bleeding-edge technology; others have used text-based games to help students explore new topics and ideas.

Online provision

The Open University of Catalonia opened in 1994 as the first entirely online-based university.[72] It has grown into one of the most innovative institutions in its use of online provision for education, with more than 46,000 students.[73] Its virtual campus is based around course provision and a university experience that can be almost entirely designed around a student's life.

UOC's 'virtual classroom' includes a planning section for users to plot when their study needs to happen, along with calendars of key dates. Through the communication section, students can get in touch with individuals or groups of other learners or teachers, and academics can organise forums or conversations to support the learning. The resources section provides connections to online material, and access to students' assessment progress.[74]

In the UK there have been examples of universities using virtual worlds to provide new learning environments. Such techniques can bring together students who may not otherwise be able to learn in groups. The DELVE project, for example, is

exploring how virtual environments and 3-D learning spaces can be designed for learner engagement.[75] DELVE is also evaluating the Second Life 'island' used by the Open University and the University of Nottingham's 'Mixed Reality Laboratory', which are both looking at how immersive virtual environments can be used as learning tools.

Listening to students

While teaching at Nottingham Trent University, Bob Rotheram found himself spending large amounts of time writing feedback to students. He had seen the software to record and share audio get cheaper and easier to use, and devices such as MP3 players become a part of students' everyday lives. He wondered whether these resources could help him communicate with students more effectively:

So I gave it a go using digital audio and tools like Audacity. After I'd done it a few times I realised I was saving time, and the students loved it too. So I thought: can I scale this up?

Keeping the technology simple and the costs down, both the teachers and the students gave overwhelmingly positive feedback. Among other things, they valued the 'richness' of the audio feedback. This is a small example of a trend echoed in a report by the Universities and Colleges Information Systems Association in 2008, which found that tools such as podcasts and e-portfolios had enjoyed a significant rise in use in the preceding three years.[76] Even august institutions such as the University of Oxford now produce podcasts, including one designed to give an insight into life at the University for those thinking about applying.[77]

Social media and networks also help students talk to each other about life at university. Sites such as the StudentRoom.co.uk host forums about every aspect of university life. A scan of recent posts shows debate about the threat of the British National Party,[78] whether couples should break-up before university,[79] and a post-exam discussion about home business management.[80]

This kind of peer exchange extends to feedback about other aspects of university life. For example, ratemyprofessors.com allows students to give ratings and commentary on the merits of their teachers, a little like the peer review mechanism on sites such as eBay. The new world of feedback is potentially frightening for teachers who may previously have only had to contend with drooping eyelids or low attendance. Social networks, from Facebook to Twitter, intensify the feedback loop, creating an environment of transparency. This can also help those at or approaching universities to learn more about what happens there, what they are for, and what people in them think.

How technology can help

A study by the OECD found that technology has had more impact on administrative services than on the fundamentals of teaching and learning.[81] This was echoed in our interviews, with one interviewee telling us that:

Often programmes just replicate existing practice. They're 'flat' – simply links to articles, for examples. Students do value that side of things – it helps students catch up, revise and revisit lectures and courses. But we're really encouraging other ways for technology to enhance the face-to-face contact, such as electronic voting systems in classes – to judge progress and so on – or virtual case studies and scenarios.

Interviewee[82]

Despite examples of good practice, innovations in learning are by no means the norm. While satisfaction with higher education is high, there is a need to improve how well technology is ingrained in universities' thinking about teaching and the student experience. Each subsequent generation will bring new relationships with technology and new expectations about its use. As the report *Higher Education in a Web 2.0 World* found, students are likely to become progressively less accommodating of any gaps between expectations and university capacity.[83] There are signs that universities are listening, too:

'student expectations' ranked second in the UCISA survey of the drivers for institutions' responses to technology in learning and teaching.[84]

Engaging stakeholders

Paul Bartholemew, senior academic for learning and teaching in the Faculty of Health at Birmingham City University, has been looking for new ways to make provision responsive by engaging the various stakeholders in the design of courses. His team have experimented with video tools as a way to encourage feedback from students about the design of their course, which has proved a useful means to engage new voices in the development of university provision.

Technology provides many opportunities to learn about students and understand the increasing diversity of their learning needs. New mechanisms to talk with students are becoming easier to find. Universities could make far greater use of tools such as Twitter and online forums like the StudentRoom to better understand the student experience. Such tools can also provide the means for students to talk to each other about life at university. More directly, the feedback obtained can help shape and design courses, and determine when and how teaching happens, and how life at university is organised.

Collaborative learning

Absent from a Google search is the means to analyse, filter and use the results. Students today need far more from a teacher than information. We saw an example of this in the way Michael Wesch uses new tools and techniques in his ethnography teaching at the University of Kansas. Professor Laurillard, of the Institute of Education, told us:

Teaching is really about facilitating people coming to understand different, difficult and new ideas. All the iterative processes that can help this happen – through constant interactive play that matches how we intuitively learn – can be supported and developed through technology. That includes virtual

learning environments, simulations, serious games – activities that do not replace the need for real life teaching but enhance how it happens.

Such approaches will not only facilitate more engaging learning practices. They promote skills that are necessary in a knowledge society in which there is a 'noise' of information. University teaching long ago stopped being about mere transmission. When not only source materials are readily available, but also recordings of lectures and seminars, the 'value added' of a teacher needs reassessing. There are more important skills that academics and teachers need to pass on. They can help students develop their ability to analyse and use information creatively, and to engage and work with networks of other people. These will be increasingly important skills for students and researchers, a transition that has been described as from the 'sage on the stage to guide on the side'.[85]

But radical new forms of teaching are not yet the norm. To achieve this goal, teachers need to embed collaborative learning tools into their working practices as a norm. That means developing the roles of facilitator and guide.

Adult and informal learning

Adult and informal learning is seen by the government as a means to meet some widening participation aims, opening up new channels to higher education through lifelong learning. Online learning, the use of online forums and new learning environments, and the continued pursuit of open course materials and publishing can play an important role in support of this effort.

Some of the most interesting technological developments involve tools that actually facilitate face-to-face interaction. These are blurring the boundaries between informal learning and formal lifelong learning, as they provide opportunities to connect learners and teachers more effectively. While great opportunities for self-organised informal learning are emerging through sites such as School of Everything, these new spaces do not promise to replace offline learning with virtual forums. What

they currently tend to lack is the accreditation and affiliation of public and respected institutions.

A renewed commitment to openness

A quick skim of recent scientific success from around the world suggests that people can do science anywhere. But it is too easy to ignore the huge, informal, tacit knowledge that makes science work. Science is as much about conversations in corridors as it is about papers in journals.[86]

Universities now have many more opportunities to communicate what they do and the knowledge they help to facilitate. According to a Research Information Network report, in the space of four months users at ten UK research institutions visited nearly 1,400 ScienceDirect journals, half a million times and viewed a million and a half pages. In that time, 98 per cent of those ScienceDirect journal titles were used.[87] This is just one of many examples of the digitisation of resources and research data. The InView project, for example, is digitising 600 hours of moving images, opening up new archives to new learning and research audiences.[88]

This brings huge benefits in the way that it facilitates a broader commons of accessible scholarly information. The proliferation of online journal access, for example, is already having tangible effects. The Research Information Network's study on e-journal use also found that per capita expenditure and use of e-journals is 'strongly correlated' with papers published, numbers of PhD awards and research grants.[89] The greater availability of scholarly data and research is a spur to further innovation and success. Explaining the decisions behind UCL making its research available online, Dr Paul Ayris, head of the UCL library, suggested that the current system puts up too many barriers to access. As he put it: 'This is not good for society if you're looking for a cure for cancer.'[90]

Technology has ushered in wondrous advances in the way that knowledge can be made more accessible to more people. Highwire Press, from Stanford University, provides access to a

significant range of science journals free of charge. Sites such as Scribd, a social publishing site where any writer can post their work, offer opportunities for anyone to upload and share documents for public consumption.[91]

How technology can help

Libraries 2.0

LibraryThing[92] is a website that transfers the principles of social media to the cataloguing of books. It is like opening your book collection to be viewed by anyone. Browsers can find others with similar tastes and read reviews and interpretations. As users add content, more is learned about the tastes and preferences of the readers.

As such tools emerge, and supplement sites like Amazon and Google Scholar, real questions are raised about the future of academic libraries. Many libraries have been finding new ways to capitalise on these new tools. Some have started using Twitter to send information about new services, books and news about the library to users more easily and to respond to concerns and questions. The University of Glasgow, for example, has deployed a wide range of tools to make its catalogue more searchable and accessible to students and staff. These have included podcasts to orientate users around the library, RSS feeds to inform users of updates and library news, and more complex techniques such as providing online catalogue information on tables of contents and summaries.[93]

Ian Chowcat, who has worked on a project for education and technology consultants SERO looking at the new roles for libraries and librarians, suggested that libraries will find their new purpose in the role of 'information professionals'. He told us: 'There are challenges for libraries because you can see some institutions thinking at some stage – can we do without libraries all together. Is it just to buy licences so users can access work online?'

But, as with teaching, libraries hold expertise and knowledge and resources that can determine their new roles. Simply storing information can no longer be their main

function. For librarians, there will be opportunities to develop roles as 'information professionals', helping others find and access materials. For library institutions, there are opportunities to exploit data about users' habits and behaviour with which they can help create new Amazon-style social services about what readers are seeking and what they think about their choices.

WorldCat, from the OCLC,[94] is a good example of how pooling catalogue information can create powerful tools for researchers and students. It is ostensibly a repository of information from a huge number of libraries and archives worldwide. It allows users to add factual information about items and connect with local librarians to ask, for example, about availability. In some cases the full text or material is available to see as well, opening new means of searching and finding work but also of accessing it.[95]

Universities have to continue to explore how to use services such as WorldCat to help users find new ways to search and handle information that interests them through new-style 'readers also liked' tools. Libraries cannot do this on their own, however. Such services require system-wide collaboration between libraries.

Sharing of course content

Much progress has been made towards providing greater access to course and university materials online. The Open University's 'OpenLearn' initiative provides free access to its course materials and other resources. It also provides forums where people can discuss content and courses and organise support groups around topics.[96] Further, places like iTunes U have become huge repositories of free educational content, with more institutions adding resources.

Openness with resources can boost an institution's brand, especially if charismatic or top-name academics are associated with the institution. This form of 'advertising' can attract new audiences and provide new ways to communicate their expertise.

Universities can pursue a more coordinated approach to

sharing course content. That means also developing ways for students and others to use and engage with shared course content. They can also contribute to the ocean of educational content increasingly available to people outside institutions. In the longer term there are opportunities to coordinate efforts to develop and use course materials across institutions. This would require new kinds of collaboration, but institutions would economise on time and resources.

New forms of access to journals and data

Higher education could do well to note the story of the music industry's relationship to the internet and peer-to-peer file sharing. For many in the music business, there was for too long a reluctance to work with the grain as information and music became more freely available. More fundamentally, too little attention was paid to how the music industry could support the new culture of music creation and distribution.

While much progress has been made towards open publishing, with efforts at collaboration between the various interests involved,[97] access to scholarly work outside academic institutions is often expensive and geared towards the presumption of access for those within higher education. As one example, for those not subscribed through an academic institution, purchasing 'Inflation in recession and recovery', an article by Robert J Gordon, William Brainard and Thomas Juster, in *Brookings Papers on Economic Activity*, vol 1971, no 1, costs $24 (plus tax, where applicable).[98]

We should pursue all means possible to establish a culture of open publishing. 'The Golden Route' means making available, either exclusively online or simultaneously in electronic and print form, free usage of research whose publication costs are prepaid by authors or their institutions. There are many examples of opening access, such as BioMed Central and the Digital Peer Publishing Initiative. This need not be at the expense of publishers. Many are already working towards new business models and a focus on where they add value and contribute to publishing quality remains important.

The impetus for this should come from a sustained commitment to the principle of open access to knowledge and research. This should be situated in a public value framework in which publicly funded work is presumed to pursue 'Golden Routes' to open access publication. The funding for research should be towards the production of knowledge and ideas, and the ability of others to use and build on it. This will be vital in helping to create a wider, collaborative learning community in which universities still play an important role.

New forms of provision and collaboration

The World Bank has emphasised the centrality of a healthy higher education sector to successful knowledge economies and in doing so it makes the connection between technology and new models of provision:

The emergence of new types of tertiary institutions and new forms of competition (is) inducing traditional institutions to change their modes of operation and delivery and to take advantage of the opportunities offered by the new information and communication technologies.[99]

Many of the technologies we have examined here push institutions to be more open and flexible. One of the greatest organisational challenges of the knowledge economy today is reconciling openness and collaboration with competition.[100] The same is true for universities. Our higher education institutions have to seize the opportunities to capitalise on the revolution in information provision.

There is more to going to university than getting the best learning for the cheapest price. Universities are stores of institutional capital. Affiliation with elite institutions can mean more to employers, and the networks and contacts that people are exposed to will serve an important role. Affiliation is a signal and a differentiator. Creating more university places in the UK, and extending access, has not changed that. At least in the short term there remains a strong sense of institutional affiliation that students and researchers get from the universities to which they

are attached. This is less about the pastoral care and personal development that takes place at university, and more to do with the validation that an institution can bestow on a person's work.

Experimentation and investment

In February 2009 JISC ran 'Developer Happy Days'.[101] The event brought together communities of coders and users from educational software and beyond. Similar in concept to the Social Innovation Camp, the aim is to mix people interested in civic society with those who have the skills to develop tools to encourage social change. The result is a set of simple but effective ideas for social change. The GoodGym, for example, aims 'to help people who want to get fit by giving them meaningful places to run to and by connecting them with good causes in their area'.[102] These kinds of experimentation can help uncover not only new educational tools but also new uses for educational materials, and can draw on the energy and ideas of new constituencies.

How technology can help

New kinds of provision

Universities can work to facilitate the development of more alternative forms of provision, with shorter courses and more modular-style, pick-and-mix learning. Henk Huijser has argued that those who provide courses need to think in terms of 'meals' and 'snacks', and that a mixture of both will be important for students in different contexts.[103] As people like Pippa Buchanan demonstrate, there is a market for courses and provision matched to people's differing educational interests in a more flexible and personalised way. Not everyone wants to be connected to a single institution.

Online learning has the potential to reach students who might be unable to attend an institution formally. However, online learning brings its own problems. The key is to manage successfully the relationship between learner, peers, teachers and institution.

Alternative providers

The School of Everything is one example of a start-up which has created a support mechanism for learners and teachers. It amounts to a new form of institution that helps people help themselves. Offline teaching is not replaced with new forms of online provision. Instead, the site makes it easier for people to connect with each other in new ways outside of traditional institutions. It is a model of how technology can support self-organising of learning – and help people find an education tailored to their needs.

But such learning does lack the heavyweight affiliation and accreditation with established educational 'brands'. This brand and institutional capital is 'sticky'. In the short term, new providers will struggle to displace the established reputations. But perhaps the most fundamental, and radical, opportunity involves connecting with these new spaces for learning and research and finding new forms of provision that work with their logic. If students desire affiliation and accreditation for their informal learning, then the new education spaces have to find ways of providing them.

This is not so much about using technology directly as about adapting provision to the way technology makes learning and research possible. Universities can continue to move further away from offering simply degree-based three-year courses. They could also work towards new kinds of accreditation that allow those engaged in informal learning to validate their learning by tapping into universities' institutional capital. These kind of emerging services create huge opportunities for institutions to capitalise on their value.

Meeting our higher education aspirations

Understanding this new role for universities will be the only way to pursue and maintain our aspirations for higher education. Technology does not legitimate the reduction of public spending, whether prompted by recession or changing government priorities[104] (for example, towards the problem of higher education access).

Nonetheless, technology that embraces 'edgelessness' does promise new forms of provision. It can help create an 'allocative

efficiency',[105] through which the limited resources available to higher education are put towards the most efficient pursuit of its aims: the facilitation of learning, knowledge and value creation for all who seek it.

4 Managing the edgeless University: challenges and recommendations

As they try to capitalise on technology, universities will face difficult challenges, from managing the skills of those within the institutions and the direction of investment to managing a competitive environment. In this chapter we set out these challenges and outline how the sector can respond to them.

1. Sector-wide policy

Openness versus competition

There are real opportunities to distribute quality content, from lectures to course notes, to wider audiences. This could help universities develop and emphasise their brand, as well as contribute to the store of academic commons. But this makes more sense for established institutions with robust brands such as Oxford or, in the US, MIT, than it might for other less established or high-profile institutions. For those with exceptional reputations, it is not the access to the material that attracts students so much as the signal of being accepted and included in its formal provision.

But where the material is more of a direct means to education, there will be greater need to offer a high standard of content and provide it in forms useful to the institution's own students and to others.

Reconciling informal learning with the formal system

Informal learning is growing in popularity and significance, and attracting the attention of politicians, but there are problems in reconciling informal learning with formal frameworks, and managing the relationship between institutions of higher education and the kinds of learning that happen outside them.

We have yet to find a model for collating learning from many different sources. Funding and the structure of learning in formal higher education tend to militate against this.

Recommendations

- *Degrees of difference*: Government policy must help higher education institutions develop new ways of offering education seekers affiliation and accreditation. This might include shorter pick-and-mix courses and new forms of assessment. It could involve working with providers of informal learning including such models as the free online School of Everything.[106] There are plans for £20 million investment in informal learning, which should be used as a resource for experimentation.[107] This could happen in a number of ways, for example by encouraging collaboration with informal non-institutional provision such as School of Everything and other do-it-yourself learning projects. This work could draw on new ways to accredit lifelong learning, for example capitalising on EU initiatives such as the European Credit Transfer and Accumulation System (ECTS), which is looking to help find ways for institutions to recognise and accredit formal and informal learning across institutions.[108]
- *Follow the leader*: Institutions need strong leadership from advocates of technology within the institutions. Central information officers have an important role in finding the space to articulate those benefits, and to find ways of helping others take advantage of technology. They need to be given a greater role in the way learning provision is designed and decisions about how technology can help institutions meet their core aims.
- *What students want:* Universities are already paying more attention to what students want. They should connect this with how they develop their technology policy. One way to do this could be through a student audit. This would help them provide technology that matches how students want to learn, find information and interact with each other and course tutors.
- *Use open technology*: Technology should be in the service of an

ethic of open learning. Just as technology provides ways to open up access to information, there are technological tools to close it off and reinforce existing barriers and potentially inequalities. Wherever possible investment should encourage open standards and avoid overly restrictive access management.

2. Teaching and the student experience

Student expectations and skills

Social networks, Google maps, mobile internet and the immediate availability of information have found their way into the everyday lives of those on campus, but they have not yet followed students and teachers into the classroom. Despite a rapid uptake of all the trappings of a connected world in recent years, the transfer of these technologies into a learning setting in higher education have not followed.

The skills that students lack when they arrive at university are much the same as those students have always needed to develop: the capacity to filter and analyse sources and to assess the validity and authority of material. The normalising of social networking in everyday life has not translated directly into better skills in a learning context.[109] Very familiar problems have become more noticeable.

The importance of face-to-face learning

Pippa Buchanan has learnt many lessons from the first six months of her DIY Masters. One of the most important is that online provision and virtual learning cannot entirely replace the social aspect of learning. What she misses from online provision is the network and community of learners and the support of a 'go-to teacher'. As Pippa put it:

The thing that holds digital learning back is not having a physical network of people learning things at the same time and not having a mentor to talk to every few days. If universities could provide that social learning environment then that would bring more learners into the field. It's not just going to the pub. It's sharing ideas, feedback. This is all something that

online learning ignores. I don't think Second Life solves that, despite how much money is put into it.

Across our research we heard often that students still considered face-to-face learning important. While online learning can produce good results, its real value comes in the way offline learning is facilitated. Students not only value the face-to-face experience with teachers, the peer discussions, they also require a sense of belonging to the institution. Technology does not do away with that. As Dr Shaun Curtis, Universities UK, told us: 'I'm a little bit sceptical of technology. I think students can feel isolated. You can have the lectures online, but you can't get the institutional experience online.'

This kind of online provision, Dr Curtis continued, is more appropriate for postgraduate study, and for those who have experienced traditional study at a university before. The same goes for adult and informal learning. In the recent consultation on the future of adult learning, almost all the responses raised concerns about how technology might be used as a replacement for face-to-face learning. Responding to the 2008 consultation *Informal Adult Learning – Shaping the Way Ahead*, the Association for Language Learning, for example, suggested that 'a major barrier for teachers and learners lies in the suspicion that technology is touted as a substitute for classroom teaching. Affirmation of technology as an adjunct to learning not a replacement for it would allay fears.'[110] The response from the Department for Innovation, Universities and Skills to the consultation addressed this very concern, stressing that technology would not be seen as a replacement for classroom teaching.[111]

Nonetheless it will be important to recognise that virtual forums and online courses work up to a point. As the Open University Catalonia example helps demonstrate, online provision needs to support or supplement offline provision, not simply replace it.

Knowing when to change... and when not to

The Open University of Catalonia was in several respects ahead of its time. But since it opened its web portal in 1994, it has provided some useful lessons in the problems of online provision. The most pressing of these has been the relationship between learner and institution. Dr Pedro told us:

When a university is used to students who are quite well prepared academically but often coming from affluent families, those students might not be looking for an e-learning platform. They were looking for the actual experience of being at a particular university in Barcelona. It took them a while to realise that the kind of clients or customers they have might change radically if they decided to go online under a mass education model.

Since then it has become an innovator in a kind of blended learning, with its emphasis on personalised learning and a customised timetable meaning it can provide for a wide range of student needs. For example, 93 per cent of its students work more than 30 hours a week in addition to studying.[112]

There is a danger of overstating the imperative for radical change. The need to develop new ways of working will not be the same for all institutions. Dr Pedro warned institutions not to rush into change that might actually disrupt the value that students find in attending the institution:

If you are in a well-established institution, where there is strong competition for access, you don't need to introduce radical change in the teaching. Because what people really appreciate is on the one hand the degree they get from your particular institution, and on the other the experience of... years of sharing time with very well qualified people. It will be really a mistake for these universities to change radically how they teach.[113]

The incentive to change is likely to be greater in newer, teaching-based institutions where student experience and designing provision around student need has a higher priority than at more research-led or elite institutions. The challenge is knowing what provision students want and expect.

Changing working practices

Professor Diana Laurillard strongly believes technology can be used to support learning, but she is under no illusions that this is an easy or obvious process:

Imagine putting a book in the classrooms of the 1300s. It would have been used as firewood. Or giving a video camera to a family in the 1920s, and expecting them to come up with BBC quality TV. With all technology you begin with what you are doing already – so for example we use PowerPoint instead of overhead projectors, but few people use the animation capabilities well. We use interactive whiteboards as if they are blackboards. These are simple, superficial developments of standard teaching practices. We should eventually get to a point where we come to realise what it might be possible to do differently, or in new ways. But that requires enormous amounts of support and investment.[114]

Collaborative learning tools, voting machines, interactive games and online support cannot just be dumped into classroom settings to immediate beneficial effect. Time, effort and support are needed to make them effective. While technology opens up many new possibilities, matching these possibilities with a vision for teaching and learning is the real challenge. Being able to develop new ways of teaching depends on the capacity to experiment. That requires resources, incentives and time, which are often not available.

When Bob Rotheram, who is now at Leeds Metropolitan University having led the Sounds Good project,[115] reflects on his experiments in audio feedback, he is clear about how to encourage take-up from fellow academics:

I insisted that we record straight to MP3, and use a device that has a USB connection. I'm very aware that any obstacle whatsoever will deter some. You have to be really time-savvy. Staff are very, very busy. For many of them, the first question is 'will it cost me more time?' For some, even though they see it as important, saying that it will be better for students will not be sufficient – although it is thought of as important.[116]

Many academics find it hard to envisage the possibilities that technology affords, not least because often they lack the

basic skills to use the new tools. The UCISA survey noted that staff skills were 'overwhelmingly seen as the greatest challenge for these new demands'.[117] The answer is not to barrage teachers with imperatives to change how they behave, but to help them find space and the capacity to develop new ways of working for themselves. This needs more resources, incentives and support.

In many institutions teaching is not, on the whole, accorded the prestige or rewards of career progression and status given to research. A survey of more than 2,700 academics by the Higher Education Academy found a huge gap in the perceptions of whether teaching is and should be important with regard to promotions and career progression. For Russell Group institutions, 89 per cent think it should be, while only 32 per cent think it actually is. For 1,994 institutions, the gap is 51 per cent. Significantly, the findings revealed that 'academics in research intensive institutions are as concerned as their colleagues in teaching-focused ones to see teaching rewarded through promotion'.[118] As Professor Laurillard puts it:

The Research Assessment Exercise is a major distorter in this respect. Not only does it make funding skewed much more towards research, but it creates really strong incentives for staff to focus on research rather than teaching.[119]

The challenge will be to find the support and incentives that will encourage experimentation in teaching practice.

Dealing with feedback

It can be hard to integrate the chatter and feedback from new forms of information exchange into practice. In his pilot programme, for example, Paul Bartholomew found it hard to integrate the results into the processes of course design. As Bob Rotheram's use of audio to provide student feedback, and Bartholomew's course design work both suggest, technology is only part of the story. Integrating results into the way that courses and provision currently works is the difficult part.

Digital exclusion and the 'skills paradox'

Despite the prevalence of the new communication technologies and skills in everyday life, their availability is not evenly distributed. This poses particular problems in education. According to the Office for National Statistics, those with no formal qualifications are the very people least likely to have an internet connection in their home, with the current level of provision 56 per cent.[120] A greater reliance on technology-enabled learning, especially when it involves informal or adult learning, risks exacerbating inequalities rather than addressing them. That risks intensifying what Duncan O'Leary has called the 'skills paradox' whereby those with qualifications already are more likely to get yet more.

Recommendations

- *Greater recognition of teaching*: There needs to be far greater recognition of career status and career progression for teaching academics. This could build on work by the Higher Education Academy, which affiliates those who work towards excellence in teaching with fellowships to the Academy.[121] Placing teaching on a similar footing to research in terms of career progression and funding incentives would go some of the way to creating the conditions and space for innovation in teaching styles. As Professor Laurillard puts it: 'Use rewards for teaching that academics understand. Promotions and confirmation of appointment are the most important aspects of reward'.[122]
- *Promote easy to use best practice guides*: Russell Stannard, a principal lecturer at the University's Harrow School of Computer Science, produces a series of videos for teachers that explain very clearly how technology like podcast software and social software can be incorporated into their teaching. His videos include 'How To Use Twitter' and 'Easy Podcasting', and the videos won him the 'Outstanding Initiative in ICT' award from the Times Higher Education/JISC awards ceremony in 2008.[123] There is space for the development of more sites that share the respre in easily digestible ways. These would help take the isolated tools and innovations into a suite of

options that those within higher education can see the value of more easily

- *Engage with the geeks*: The JISC Developer Happiness Days was a good example of how higher education can connect with the energy of those developing educational and social software. There is a real opportunity to engage with the energy of those working in 'social technology' to develop new ideas and resources. Individual institutions could run events and become engaged with communities of developers

3. Openness

The challenges

Several publishers have already moved to embrace open access publication, even though this is perceived as a threat to their source of income. In the natural and life sciences, several large scientific, technical and medical (STM) publishers have begun publishing their journals electronically.

Intellectual property and business models

Like any industry that deals with digitisable content, higher education is facing the challenge of reconciling the push towards openness with the current business models designed for different eras of information distribution. There has been only sluggish progress in reforming the intellectual property landscape to match the new era. A study by the Office of Science and Innovation e-Infrastructure Working Group found that:

Intellectual property rights arrangements… constitute a significant barrier to the development of effective search and navigation, complicating the route between discovery and access to source information.[124]

There are two problems. First, a move away from a traditional library means a move away from libraries as the point at which access to information can be managed, opening questions of intellectual property and access management. That not only changes the process of finding and categorising

information changes, but also of regulating and managing who has access to scholarly journals. The recent debates between Google and publishing industry representatives are a visible sign of the kind of new settlements required in an era when information becomes available anywhere.

Second, the pursuit of openness in publishing is challenging publishing business models. This requires a rationalisation of what role publishers should be playing. The value they add comes primarily from the quality of the peer-review process and the promotion and reward associated with high-calibre journals and other outputs. The associated costs of this are not insignificant. They include the editorial process, managing editorial boards, and peer review and publication costs.

A further important challenge is how researchers maintain ownership and recognition for their contributions to their field. We cannot rely on a notion of 'contributing to the public good'. Prestige, recognition and career progression are all linked to academics' publications. New access and publications models will need to ensure that the connection between research and intellectual ownership by the academics involved is maintained.

Curation of information

The sheer volume of information available online makes it hard to assess what is relevant and useful. It can seem a 'noisy' world, because of the difficulty of digesting such vast amounts of detail. It can be hard to pick up 'signal'. One of the key challenges that follows from the ability to offer research data and knowledge in more diverse, accessible formats is the way that information is managed. Finding ways of sorting, storing and providing access to the new stores of research and information is a challenge requiring considerable investment.[125]

Recommendations

- *Pushing an open door*: The direction of funding has a significant role to play in making this happen. The impact of open access on

publishers' business models and bottom lines, from a public institution and funding perspective, should only matter to the extent that this is detrimental to the quality of the output. Funding for research should encourage and facilitate open access with this in mind.

- *Promote shared resources and open course material*: The sector should capitalise on the work of institutions like UCL and MIT to distribute their content as widely as possible. There should be investment to promote the sharing of resources and the creation of stores of resources from institutions in the UK.
- *Curatorship*: The curation of that data will be vital in making it useful to researchers. This will require significant investment and innovation to develop ways of making this content available. However, this curatorship needs to be seen as a key investment in making the UK a leader in open access.

Making it happen

There would be music without the music industry. There would be higher learning without universities, but there is always a danger that we overstate how 'transformative' or 'revolutionary' technology will be. Technology does not rid us of the need for these institutions.

The catalyst for change is the economic downturn, which has given a new impetus to finding innovative ways to adapt. Phyllis Grummon of the Society for College and University Planning suggests that we are in a 'neutral zone' – a time of maximum uncertainty and time for creative possibility between the ending of the way things have been and the beginning of the way they will be.[126]

In building the e-infrastructure for higher education we should not just build around the needs of institutions as they exist already. To pursue the possibilities of the 'Edgeless University', technology will have to be taken more seriously as a strategic asset. Technology is a driver for change. But we should harness it as a solution, a tool, for the way we want universities to support learning and research in the future.

Appendix 1 Interviewees

Rebecca Atwood	Reporter, Times Higher Education
Paul Bartholomew	Birmingham City University, Centre for the Enhancement of Learning and Teaching
Bahram Bekhradnia	Director, Higher Education Policy Institute
John Brennan	Director, Centre for Higher Education Research and Information
Pippa Buchanan	DIY Masters
Ian Chowcat	Head of Learning Innovation, Sero Consulting Limited
Dr Shaun Curtis	Head of the UK Higher Education International Unit, Universities UK
Ruth Drysdale	Programme Manager, e-Learning, JISC
Professor Les Ebdon	Vice-Chancellor, University of Bedford, Chair of Million+
Lorraine Estelle	Chief Executive Officer, JISC Collections
Ian Fribbance	Associate Dean (Teaching & Learning Enhancement), Faculty of Social Sciences, Open University
Professor Brenda Gourley	Vice Chancellor, Open University

Jane Hart	Centre for Learning and Performance Technologies
Dougald Hine	Cofounder, School of Everything
Professor Peter James	Higher Education Environmental Performance Improvement
Brian Kelly	Team Leader, UKOLN, University of Bath
Sarah Knight	Programme Manager, e-Learning, JISC
Professor Diana Laurillard	Chair of Learning with Digital Technologies, London Knowledge Lab, Institute of Education, University of London
Dr Lee Elliot Major	Director of Research, Sutton Trust
Tim Marshall	Chief Executive, Ja.Net
Professor Dorothy Miell	Dean and Director of Studies, Social Sciences, Open University
Dr Francesco Pedro	Senior Analyst, OECD
Dr Malcolm Read	Executive Secretary, JISC
Bob Rotheram	Reader in Assessment, Learning and Teaching, Office of the Pro-Vice-Chancellor, Leeds Metropolitan University
Nial Sclater	Director of Learning Innovation, Open University
Graham Taylor	Director of Educational, Academic & Professional Publishing, Publishers Association
Peter Tinson	Executive Secretary, Universities and Colleges Information Systems Association

Dr Anna Vignoles	Senior Lecturer, Institute of Education
Dr Stéphan Vincent-Lancrin	Analyst, OECD
Les Watson	Freelance educational advisor
Professor Rupert Wegerif	Director of Research, School of Education & Lifelong Learning, University of Exeter
Dr Michael Wesch	Assistant Professor of Cultural Anthropology, Kansas State University

Appendix 2
Roundtable attendees

On 24 April 2009 Demos held an expert roundtable at its offices in Tooley Street to discuss the early findings of the Demos research. The seminar focused on a discussion of the challenges facing the sector as it attempts to use technology in a more strategic way.

Rebecca Attwood	Reporter, Times Higher Education
John Brennan	Director, Centre for Higher Education Research and Information
Sarah Chaytor	Research Fellow, The Russell Group
Simon Day	Market Solutions Manager, OCLC EMEA
Aaron Griffiths	Research Information Network
Dr Stylianos Hatzipanagos	King's Learning Institute
Robert Haymon-Collins	Head of Communications and Marketing Team, JISC
Dougald Hine	Co-founder, School of Everything
Dr Carey Jewitt	Reader in Education and Technology, London Knowledge Lab, Institute of Education
Inderpaul Johar	Zero-Zero research
Professor Diana Laurillard	Chair of Learning with Digital Technologies, London Knowledge Lab, Institute of Education, University of London

Tom Norton	Director, Internal Policy Development, 1994 Group
Dr Malcolm Read	JISC Executive Secretary
Dr Peter Scott	Director of Knowledge Media Institute, Open University

Notes

1 OECD, *Higher Education at a Glance 2008*.

2 As ranked by Times Higher Education and QS World University Rankings; see www.topuniversities.com/worlduniversityrankings/results/2008/overall_rankings/fullrankings/. An alternative ranking is the Academic Ranking of World Universities, compiled by Shanghai Jiao Tong University, which puts two UK universities in the top 10; see www.arwu.org/rank2008/ARWU2008_A(EN).htm.

3 Universities UK, *UK Higher Education in 2023*.

4 Taylor, 'End the university as we know it'.

5 Malcolm Read, Executive Secretary, JISC, interview for Edgeless University research.

6 Lang, *Edgeless Cities*.

7 Brown, speech on education.

8 Universities UK, *Research Report*.

9 See www.ucl.ac.uk/media/library/OpenAccess (accessed 8 Jun 2009).

10 Quoted in Turner, 'UCL to offer all research free online'.

11 Reeves, 'Progressive austerity'.

12 The National Committee of Inquiry into Higher Education.

13 Denham, 'Widening participation in HE'.

14 Higher Education Statistics Agency figures; see www.hesa.ac.uk (accessed 8 Jun 2009).

15 Dillow, 'The degree of difference in graduates' pay'.

16 House of Commons Public Accounts Committee, *Widening Participation in Higher Education*.

17 O'Leary, *The Skills Paradox*.

18 See www.hefce.ac.uk/widen/14_19/pathfind.asp (accessed 8 Jun 2009).

19 See for example figures on adult learning in the UK: Kingston, 'When a rise in numbers is actually a fall'.

20 OECD, *Education Today*.

21 Ibid.

22 Universities UK, *'Studentification'*.

23 Universities UK, *UK Higher Education in 2023*.

24 Universities UK, *The Future Size and Shape of the Higher Education Sector in the UK*.

25 Ibid.

26 HEFCE, *Higher Education in the UK*.

27 Fry, Ketteridge and Marshall, *A Handbook for Teaching and Learning in Higher Education*.

28 Dr Neil Kemp speaking at the conference 'Rethinking Higher Education', London, Mar 2008.

29 See http://dx.doi.org/10.1787/402158641726 (accessed 8 Jun 2009).

30 Drew et al, *Trans-national Education and Higher Education Institutions*.

31 Universities UK, *Private Universities and Public Funding*.

32 Spencer, 'UK: booming private sector'.

33 Universities UK, *Private Universities and Public Funding*.

34 Levy, *Access through Private Higher Education*.

35 Novakovivh, 'University challenge public–private mix?'.

36 See www.aihep.com/ (accessed 8 Jun 2009).

37 Novakovivh, 'University challenge public–private mix?'

38 Newman, 'Students more satisfied than ever before'.

39 MacLeod, '£2,000 rise in university tuition fees "would not deter students"'.

40 Bekhradnia, *The Academic Experience of Students in English Universities*.

41 Abbey National and Citizenship Foundation research – national poll of 3,000 14–18-year-olds; see www.aboutabbey.com/csgs/Satellite?c=GSNoticia&cid=1210622960660&pagename=AboutAbbey%2FGSNoticia%2FPAAI_newComplet (accessed 8 Jun 2009).

42 Ibid.

43 The Secretary of State's letter to the Chairman of the Higher Education Funding Council for England, www.dius.gov.uk/~/media/publications/H/hefce_efficiences_2010_11_letter (accessed 8 Jun 2009).

44 Corbyn, 'Science minister calls for a focus on research that boosts economy'.

45 See www.hefce.ac.uk/finance/fundinghe/trac/fssg/fssgchairsletter_12feb09.pdf (accessed 8 Jun 2009).

46 Lipsett, 'Oxford University losing £8,000 per student'.

47 Gourley, 'Dazzling technologies: seismic shifts in higher education in a fast-changing and unequal world'.

48 Dr Michael Wesch, Kansas State University, interview for Edgeless University research.

49 See www.statistics.gov.uk/CCI/nugget.asp?ID=8www.aboutabbey.com/csgs/Satellite?c=GSNoticia&cid=1210622960660&pagename=AboutAbbey%2FGSNoticia%2FPAAI_newComplet (accessed 8 Jun 2009).

50 See www.4billion.org/index.aspxwww.aboutabbey.com/csgs/Satellite?c=GSNoticia&cid=1210622960660&pagename=AboutAbbey%2FGSNoticia%2FPAAI_newComplet (accessed 8 Jun 2009).

51 See for example Bradwell and Reeves, *Network Citizens*.

52 See www.wolframalpha.com/about.html (accessed 8 Jun 2009).

53 See for example Sutter, 'Virtual currencies power social networks, online games'.

54 See www.amap.org.uk/education/ (accessed 8 Jun 2009).

55 See http://edufire.com/ (accessed 8 Jun 2009).

56 See http://bettr.org/about/ (accessed 8 Jun 2009).

57 Quoted in Bradwell and Reeves, *Network Citizens*.

58 Day and Stilgoe, *Knowledge Nomads*.

59 Leadbeater and Wilsdon, *Atlas of Ideas*.

60 See www.battlecat.net/diy-masters/ (accessed 8 Jun 2009).

61 See http://the-hub.net/ (accessed 8 Jun 2009).

62 See www.schoolofeverything.com (accessed 8 Jun 2009)

63 See www.ja.net/company/about.html (accessed 8 Jun 2009).

64 OSI, *Report of the Working Group on Virtual Research Communities*.

65 Interview for Edgeless University research.

66 See www.netvibes.com/wesch (accessed 8 Jun 2009).

67 See http://pipes.yahoo.com/pipes/ (accessed 8 Jun 2009).

68 See www.diigo.com/learn_more?p=1 (accessed 8 Jun 2009).

69 Interview for Edgeless University research.

70 See http://moodle.org/ (accessed 8 Jun 2009).

71 JISC, *Higher Education in a Web 2.0 World*.

72 See www.uoc.edu/portal/english/ (accessed 8 Jun 2009).

73 See www.uoc.edu/portal/_resources/CA/documents/memories/0708/memo_cat.pdf (accessed 8 Jun 2009).

74 See www.uoc.edu/portal/_resources/EN/demos/campus/index2.html (accessed 8 Jun 2009).

75 See www.jisc.ac.uk/whatwedo/programmes/elearningltig/delve.aspx (accessed 8 Jun 2009).

76 Browne et al, *2008 Survey of Technology Enhanced Learning for Higher Education in the UK*.

77 See www.ox.ac.uk/admissions/undergraduate_courses/finding_out_more/podcasts/index.html (accessed 8 Jun 2009).

78 See www.thestudentroom.co.uk/showthread.php?t=908230 (accessed 8 Jun 2009).

79 See www.thestudentroom.co.uk/showthread.php?t=908288 (accessed 8 Jun 2009).

80 See www.thestudentroom.co.uk/showthread.php?t=908200 (accessed 8 Jun 2009).

81 OECD, *E-learning in Tertiary Education*.

82 Interview for Edgeless University research.

83 JISC, *Higher Education in a Web 2.0 World*.

84 Browne et al, *2008 Survey of Technology Enhanced Learning for Higher Education in the UK*.

85 King, 'From sage on the stage to guide on the side'.

86 Day and Stilgoe, *Knowledge Nomads*.

87 Research Information Network, *E-journals*.

88 See www.jisc.ac.uk/whatwedo/programmes/digitisation/inview.aspx (accessed 8 Jun 2009).

89 Research Information Network, *E-journals*.

90 Turner, 'UCL to offer all research free online'.

91 See www.scribd.com/ (accessed 8 Jun 2009).

92 See www.librarything.com/ (accessed 8 Jun 2009).

93 Ugochukwu, *TILE Project: Library 2.0 survey open responses*,.

94 See www.oclc.org/uk/en/global/default.htm (accessed 8 Jun 2009).

95 See www.worldcat.org/whatis/default.jsp (accessed 8 Jun 2009).

96 See http://openlearn.open.ac.uk/ (accessed 8 Jun 2009).

97 Research Information Network, *Research and the Scholarly Communications Process*.

98 See www.jstor.org/pss/2534215 (accessed 8 Jun 2009).

99 World Bank, *Constructing Knowledge Societies*.

100 See for example PricewaterhouseCoopers, *Compete & Collaborate*.

101 See www.dev8d.org/ (accessed 8 Jun 2009).

102 See http://thegoodgym.org/howitworks.html (accessed 8 Jun 2009).

103 Huijser, 'Straddling the continuum between three course meals and snacks'.

104 Lipsett, 'Cameron strategy threatens student numbers'.

105 For example see Salerno, *On the Technical and Allocative Efficiency of Research-Intensive Higher Education Institutions*.

106 See www.schoolofeverything.com (accessed 8 Jun 2009).

107 Atwood, 'Denham puts £20 million behind the bar for informal classes'.

108 See http://ec.europa.eu/education/lifelong-learning-policy/doc48_en.htm (accessed 8 Jun 2009).

109 British Library and JISC, *Information Behaviour of the Researcher of the Future*.

110 Central Office of Information, *Informal Adult Learning – Shaping the Way Ahead: Consultation response analysis report*.

111 DIUS, 'Informal adult learning'.

112 See www.uoc.edu/presentation/ (accessed 8 Jun 2009).

113 Dr Francesc Pedro, interview for Edgeless University research.

114 Interview for Edgeless University research.

115 See www.soundsgood.org.uk/ (accessed 8 Jun 2009).

116 Interview for Edgeless University research.

117 Browne et al, *2008 Survey of Technology Enhanced Learning for Higher Education in the UK*.

118 HEA, *Reward and Recognition of Teaching in Higher Education*.

119 Interview for Edgeless University research.

120 See www.statistics.gov.uk/CCI/nugget.asp?ID=8 (accessed 8 Jun 2009).

121 See www.heacademy.ac.uk/ourwork/professional/recognition (accessed 8 Jun 2009).

122 HEA, *Reward and Recognition of Teaching in Higher Education*.

123 See www.jisc.ac.uk/news/stories/2008/10/ICTwinner2008.aspx (accessed 8 Jun 2009).

124 OSI, *E-Infrastructure Study*.

125 For more on curating online data and research, see the JISC submission to DIUS, www.dius.gov.uk/higher_education/shape_and_structure/he_debate/~/media/publications/O/online_innovation_in_he_131008 (accessed 8 Jun 2009).

126 Grummon, SCUP *Trends in Higher Education*.

References

Atwood, R, 'Denham puts £20 million behind the bar for informal classes', *Times Higher Education*, 26 Mar 2009, www.timeshighereducation.co.uk/story.asp?storycode=405931 (accessed 8 Jun 2009).

Bekhradnia, B, *The Academic Experience of Students in English Universities* (Oxford: Higher Education Policy Institute, 2009), available at www.hepi.ac.uk/downloads/40Theacademicexperienceofstudents2009.pdf (accessed 8 Jun 2009).

Bradwell, P and Reeves, R, *Network Citizens: Power and responsibility at work* (London: Demos, 2008).

British Library and JISC, *Information Behaviour of the Researcher of the Future*, CIBER Briefing Paper, 2008, www.bl.uk/news/pdf/googlegen.pdf (accessed 8 Jun 2009).

Brown, G, speech on education, 31 Oct 2007, available at www.number10.gov.uk/Page13675 (accessed 8 Jun 2009).

Browne, T, Hewitt, R, Jenkins, M and Walker, R, *2008 Survey of Technology Enhanced Learning for Higher Education in the UK* (Oxford: UCISA, 2008), available at www.ucisa.ac.uk/publications/~/media/groups/tlig/vle_surveys/TEL%20survey%202008%20pdf.ashx (accessed 8 Jun 2009).

Central Office of Information, *Informal Adult Learning – Shaping the Way Ahead: Consultation response analysis report*, Department for Innovation, Skills and Universities, 2008, www.dius.gov.uk/consultations/~/media/publications/I/IAL_consultation_response_analysis_report2 (accessed 8 Jun 2009).

Corbyn, Z, 'Science minister calls for a focus on research that boosts economy', *Times Higher Education*, 29 Jan 2009, www.timeshighereducation.co.uk/story.asp?storycode=405177.

Day, N and Stilgoe, J, *Knowledge Nomads* (London: Demos, 2009).

Denham, J, 'Widening participation in HE', speech given at Southampton University, 22 May 2008, available at www.dius.gov.uk/news_and_speeches/speeches/john_denham/adult (accessed 8 Jun 2009).

Dillow, C, 'The degree of difference in graduates' pay', *Times*, 17 Feb 2009.

DIUS, 'Informal adult learning – DIUS response to the consultation', Department for Innovation, Skills and Universities, 2008, www.dius.gov.uk/consultations/~/media/publications/R/Response_to_IALC (accessed 8 Jun 2009).

Drew, S et al, *Trans-national Education and Higher Education Institutions: Exploring patterns of HE institutional activity*, Centre for Research and Evaluation and Centre for Education and Inclusion Research, Sheffield Hallam University, DIUS research report 08 07 (London: Department for Innovation, Universities and Skills, 2008), available at www.dius.gov.uk/research_and_analysis/~/media/publications/D/DIUS_RR_08_07 (accessed 8 Jun 2009).

Fry, H, Ketteridge, S and Marshall, S, *A Handbook for Teaching and Learning in Higher Education: Enhancing academic practice* (London: Routledge, 2003).

Gourley, B, 'Dazzling technologies: seismic shifts in higher education in a fast-changing and unequal world', plenary at the Association of Commonwealth Universities Conference of Executive Heads, Hyderabad, India, 28 Nov 2008, available at

www.open.ac.uk/vice-chancellor/Speeches_3a00_Publications/Speech/Dazzling_technologies:_seismic_shift_in_higher_education_in_a_fast-changing_and_unequal_world.html (accessed 14 May 2009).

Grummon, PTH, SCUP *Trends in Higher Education* 6, no 1, Apr 2009, Society for College and University Planning, www.scup.org/asset/53017/SCUP_TrendsWeb_v6n1.pdf (accessed 8 Jun 2009).

HEA, *Reward and Recognition of Teaching in Higher Education: A collaborative investigation, interim report* (Higher Education Academy and GENIE Centre for Excellence in Teaching and Learning, University of Leicester, 2009), available at www.heacademy.ac.uk/assets/York/documents/resources/publications/Reward_and_Recognition_Interim.pdf (accessed 8 Jun 2009).

HEFCE, *Higher Education in England: Achievements, challenges and prospects*? Bristol: Higher Education Funding Council for England, 2009.

House of Commons Public Accounts Committee, *Widening Participation in Higher Education: Fourth Report of Session 2008–09*, HC 226, 2009, www.publications.parliament.uk/pa/cm200809/cmselect/cmpubacc/226/9780215526557.pdf (accessed 8 Jun 2009).

Huijser, H, 'Straddling the continuum between three course meals and snacks: the changing flavour of knowledge creation and dissemination', *Journal of the World Universities Forum* 1, no 2 (2008).

JISC, *Higher Education in a Web 2.0 World*, Joint Information Systems Committee, 2009, www.jisc.ac.uk/publications/documents/heweb2.aspx (accessed 8 Jun 2009).

King, A, 'From sage on the stage to guide on the side', *College Teaching* 41, 1993.

Kingston, P, 'When a rise in numbers is actually a fall', *Guardian*, 12 May 2009, www.guardian.co.uk/education/2009/may/12/further-education (accessed 8 Jun 2009).

Lang, RE, *Edgeless Cities: Exploring the elusive metropolis* (Washington DC: Brookings Institution Press, 2003).

Leadbeater, C and Wilsdon, J, *Atlas of Ideas* (London: Demos, 2008).

Levy, DC, *Access through Private Higher Education: Global patterns and Indian illustrations*, PROPHE Working Paper Series WP11, Apr 2008, available at www.albany.edu/dept/eaps/prophe/publication/paper/PROPHEWP11_files/PROPHEWP11_Levy.pdf (accessed 8 Jun 2009).

Lipsett, A, 'Cameron strategy threatens student numbers: vice-chancellors wary of Conservative spending curb', *Guardian*, 6 Jan 2009, www.guardian.co.uk/education/2009/jan/06/cameron-spending-lesebdon (accessed 8 Jun 2009).

Lipsett, A, 'Oxford University losing £8,000 per student', *Guardian*, 27 Apr 2009, www.guardian.co.uk/education/2009/apr/27/tuition-fees-oxford-university (accessed 8 Jun 2009).

MacLeod, D, '£2,000 rise in university tuition fees "would not deter students"', *Guardian*, 17 Mar 2009, www.guardian.co.uk/education/2009/mar/17/university-tuition-fees-rise (accessed 8 Jun 2009).

National Committee of Inquiry into Higher Education, 'The Dearing Review', 1997, https://bei.leeds.ac.uk/Partners/NCIHE/ (accessed 8 Jun 2009).

Newman, M, 'Students more satisfied than ever before', *Times Higher Education*, 11 Sep 2008, www.timeshighereducation.co.uk/story.asp?sectioncode=26&storycode=403497 (accessed 8 Jun 2009).

Novakovivh, M, 'University challenge public–private mix? The debate rumbles on', *Guardian*, 21 Jan 2009, www.guardian.co.uk/universitychallenge/public-private (accessed 8 Jun 2009).

O'Leary, D, *The Skills Paradox* (London: Demos, 2008).

OECD, *Education Today: The OECD perspective* (Paris: Organisation for Economic Co-operation and Development, 2009), available at www.oecdbookshop.org/oecd/display.asp?sf1=identifiers&st1=962009021E1 (accessed 8 Jun 2009).

OECD, *E-learning in Tertiary Education: Where do We Stand?* (Paris: Organisation for Economic Co-operation and Development, 2005).

OECD, *Higher Education at a Glance 2008* (Paris: Organisation for Economic Co-operation and Development, 2008), available at www.oecdbookshop.org/oecd/display.asp?sf1=identifiers&st1=962009011E1 (accessed 8 Jun 2009).

OSI, *E-Infrastructure Study: Report of the Working Group on Search and Navigation*, Office of Science and Innovation, Mar 2006, www.nesc.ac.uk/documents/OSI/search.pdf (accessed 8 Jun 2009).

OSI, *Report of the Working Group on Virtual Research Communities*, Office of Science and Innovation, Mar 2006, www.nesc.ac.uk/documents/OSI/vrc.pdf (accessed 8 Jun 2009).

PricewaterhouseCoopers, *Compete & Collaborate: What is success in a connected world?*, 2008, www.pwc.com/ceosurvey/pdfs/11th_ceo_survey.pdf (accessed 8 Jun 2009).

Reeves, R, 'Progressive austerity: an agenda to protect the poor', *Financial Times*, 21 May 2009, www.ft.com/cms/s/0/bfbf77da-4649-11de-803f-00144feabdc0.html (accessed 8 Jun 2009).

Research Information Network, *E-journals: Their use, value and impact*, 2009, www.rin.ac.uk/files/E-journals_use_value_impact_Report_April2009.pdf (accessed 8 Jun 2009).

Research Information Network, *Research and the Scholarly Communications Process: Towards strategic goals for public policy, a statement of principles*, Mar 2007.

Salerno, CS, *On the Technical and Allocative Efficiency of Research-Intensive Higher Education Institutions* (Enschede, Netherlands: University of Twente Publications, 2002), available at http://purl.org/utwente/44804 (accessed 8 Jun 2009).

Spencer, D, 'UK: booming private sector', University World News, 30 Mar 2008, www.universityworldnews.com/article.php?story=20080327105833225 (accessed 8 Jun 2009).

Sutter, JD, 'Virtual currencies power social networks, online games', 19 May 2009, www.cnn.com/2009/TECH/05/18/online.currency/ (accessed 8 Jun 2009).

Taylor, MC, 'End the university as we know it', *New York Times*, 26 Apr 2009, www.nytimes.com/2009/04/27/opinion/27taylor.html (accessed 8 Jun 2009).

Turner, D, 'UCL to offer all research free online', *Financial Times*, 2 Jun 2009, www.ft.com/cms/s/0/ae64837c-4fae-11de-a692-00144feabdc0.html (accessed 8 Jun 2009).

Ugochukwu, P, *TILE Project: Library 2.0 survey open responses*, 2008, http://ie-repository.jisc.ac.uk/292/ (accessed 8 Jun 2009).

Universities UK, *The Future Size and Shape of the Higher Education Sector in the UK: Demographic projections* (London: Universities UK, 2008), available at www.universitiesuk.ac.uk/Publications/Documents/size_and_shape.pdf (accessed 8 Jun 2009).

Universities UK, *Private Universities and Public Funding: Models and business plans, policy commentary* (London: Universities UK, 2008), available at www.universitiesuk.ac.uk/Publications/Pages/Publication-289.aspx (accessed 8 Jun 2009).

Universities UK, *Research Report: The economic benefits of a degree*, 2007, www.universitiesuk.ac.uk/Publications/Pages/Publication-257.aspx (accessed 8 Jun 2009).See www.ucl.ac.uk/media/library/OpenAccess (accessed 8 Jun 2009).

Universities UK, *'Studentification': A guide to opportunities, challenges and practices* (London: Universities UK, 2006).

Universities UK, *UK Higher Education in 2023: A contribution to the DIUS higher education debate*, www.universitiesuk.ac.uk/Publications/Documents/DIUS_submission08.pdf (accessed 8 Jun 2009).

World Bank, *Constructing Knowledge Societies: New challenges for tertiary education*, 2002, http://siteresources.worldbank.org/EXTAFRREGTOPTEIA/Resources/Constructing_Knowledge_Societies.pdf (accessed 9 Jun 2009).

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