

Fifth ECE Keynote - Address 2

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Killing off Mickey Mouse: Open Knowledge, Open Innovation.

The copyright world of Mickey Mouse

The theme of this presentation is the case for open access, both as a set of principles for the ways in which we use information and communication technologies for teaching, research and engagement in higher education, and also as a formative concept for the university, now and into the future.

In order to frame this question, and as a rhetorical device, I would like to set up a straw target as a caricature of what a closed system could look like. Central to the idea of a closed system is the concept of intellectual property as the equivalent of physical property, understood as owned in terms of some sort of title, either by an individual or corporate group, and available for sale or rent in order to achieve a material return on the investment. This, of course, is the classic rent seeking activity of economic theory.

This idea of intellectual property as the equivalent of physical property is best represented by the traditional business approaches of large pharmaceutical companies that depend on closely controlled innovation funnels. Large numbers of early ideas are protected by patents and are fiercely defended by rights in law. Many of these ideas fall by the wayside as concepts are tested for viability, costed, and aligned with marketing strategies. The end result is a small set of highly valuable intellectual products that are taken to market, and further defended through patent protection and licensing.

This concept of intellectual property has also come to dominate the cultural industries, whether these be in the areas of conventional book publishing, specialist journal publishing, online and electronic databases, film, music, or the by products of contemporary popular culture, whether baseball caps, T-shirts, coffee mugs, or the reproduction of protected images and ideas from almost any sphere of cultural activity.

This is the image of the eternal Mickey Mouse, whose representational lifespan is preserved by means of the periodic extension of patent protection laws that prevent the image of the Mouse becoming a free and available resource. Large cultural corporations base their revenues in the licensing of these forms of intellectual property, gamely swimming against the tide of the revolution in digital access, the availability of bandwidth in millions of homes, and the widely available technology that allows forms of peer sharing and the reproduction and distribution of an infinite number of perfect copies, whether these be favourite songs, videos, or popular cultural icons such as the ageless Mickey Mouse himself.

In this - closed system - approach to intellectual property, every intellectual construct that takes an external form can be ascribed ownership that is equivalent to the ownership of a table, chair, car or house. Such intellectual constructs include musical phrases, lines of poetry, strings of digital code or photographs. The relentless logic of closed systems and their associated constructs of legal protection, licensing regulations and rent-seeking is that every idea that we express can have the potential to be sold or rented. The politics of this approach are well known and have resulted in high profile and well-publicized cases, whether these relate to video piracy, reproduction of books, peer-to-peer file sharing, or similar situations.

Every academic is likely to have experienced, directly or indirectly, the consequences of this regime. For my part, having worked hard on a paper for several months, and pleased to have had it accepted by a leading academic journal, I was invited by the journal's publisher to pay \$3000 for the privilege of being able to distribute my own work to my colleagues without being charged a fee every time I did so. In another instance, I wanted to use as an epigraph to a book chapter a phrase from a Paul Simon song. Eventually, the

combination of anxiety by the university press publishing the book and potential cost of licensing these fifteen words led me rather to change the title of the chapter and drop the epigraph.

This copyrighted world of Mickey Mouse is, as I've already said, a straw target, a rhetorical device to help conceptualize an alternative to such closed systems. How much is this a caricature of university life today?

Universities: from public good to private benefit

It is often claimed that universities have become managerial and have succumbed to the pressures of the commercial marketplace. This is an intellectually lazy critique that fails to recognize the considerable degrees of freedom in intellectual life that are nurtured and protected today. We do not yet have the sort of controls that characterize the pharmaceutical industry, or the obsession for achieving financial returns for every shred of intellectual property that has become typical of some of the cultural industries.

At the same time, though, the last thirty or so years have seen gathering momentum towards complementing funding for teaching and research with so-called third stream income that is based on gaining a commercial return for our activities. In the United States, this tendency was signalled by the Bayh-Dole Act of 1980 and the attempts by many universities to gain significant revenue from patents and licensing. In Britain, the devastation caused by dramatic reductions in state support for universities in the early 1980s forced many to seek third stream income in order to survive. This was particularly the case here at the University of Salford, where the cuts imposed by the Thatcher government were particularly severe. It is now often taken as a given that universities must seek a direct financial return on their intellectual property in order to survive.

There has been a parallel tendency in teaching provision. It is now commonplace to calibrate the cost of education in terms of the return on the investment in future earnings. It now seems generally accepted that students should pay fees for education and should take loans in order to cover these costs as a matter of course. The main thrust of current debates is how large these loans should be allowed to become, rather than the principle of whether they should exist at all. Another way of looking at this is to think in terms of a shift from understanding education as a public good, to seeing it as a private benefit. If education is viewed overwhelmingly as a private benefit, it is logical to expect it to be paid for in the same way as any other service.

When the current pressures to preserve or increase revenues from student fees, attracting overseas students to study here, or licensing intellectual property in order to get a return are lined up, we seem to be a long way away from the principles of education as a public benefit. There is a certain poignancy to this at a conference on the historic Crescent in the heart of Salford, a street which was one of the earliest to be lit by gas lights, where Marx and Engels are claimed to have met, the site of one of the earliest public libraries, the location of Britain's first public park, and the home of the Working Class Movement Library.

It is particularly appropriate to revisit these issues now, when the prevalent gloom about the country's public finances anticipates significant reductions in public funding for higher education in the future. While it is not yet known what form these cuts could take, it seems quite probable that there will be a reduction in direct and indirect grants from government, and some form of increase in the obligations placed on students and their families, leading to a rise in indebtedness as the price for obtaining a higher education qualification.

It is also probable that there will be renewed enthusiasm for the concept of private universities. While there is nothing wrong with private provision, and while of course this already exists in many parts of the overall education system, a significant increase in privatization would further shift the overall ethic of education provision towards the concept of private benefit. It is worth pausing to consider the implications that this might have before accepting such changes as inevitable.

The market illusion

But enough of straw targets. The danger of too much dialectic is that one ends up with such gloomy scenarios that there seems little point in carrying on. For, despite the rhetoric of the last twenty years and many of the assumptions still held today, there is no true market in higher education. Provision in the United States is characterized by its diversity. Private universities with large endowments use these to craft undergraduate cohorts independent of the sticker price of study. For their part, US public higher education institutions have complex tariffs that depend on whether a student is or is not a resident in the state.

In Britain, some have naïvely assumed that the introduction of fees will create a market. All that has happened is that almost all universities have moved rapidly to charge the same maximum permitted fee. No one really knows what would happen if the cap on fees were to be removed completely. It is not at all clear that students would pay more for quality. Quite the opposite could happen; those universities that were able to offer a qualification in the shortest time possible and with the least effort could well command the highest fees. This, after all, would be the logical of retailing a service. Of course, this could be prevented by putting in place a statutory quality regulator, as the parliamentary select committee has recently proposed. But a statutory quality regulator would, of course, destroy any possibility of a genuine market.

A further point to note is that few universities have made significant income from third stream activities despite trying to do so for the best part of three decades. There are far more failed science and business park initiatives than there are success stories. Even the most successfully entrepreneurial universities do not cover more than 10% of their annual turnover from third stream income. Without doubt, licensing and patenting can be important, and spin off companies can bring considerable benefits. But these benefits rarely include genuine, unentailed, third stream income.

Perhaps most significantly, the rhetoric of the market has done little to increase participation in higher education. Over the past thirty years Britain has become steadily more unequal, to the point where Britain and the United States are now the most unequal of the economically developed countries. Not surprisingly, participation in higher education by young adults is strongly correlated with socioeconomic status. Young adults from middle to upper socioeconomic groups are many times more likely to attend university than those from poorer households. While the consumer market in a range of services and products has spread across a wider socioeconomic range, access to university remains predominantly a middle-class privilege.

The nature of knowledge

Why has the vision of the early 1980s - the concept of a more entrepreneurial higher education sector capable of generating significant revenues independent of state support - not been realised?

It seems often to be assumed that this is due to inefficiency, perhaps wilfulness, of academics who are not prepared to be part of the real world, or to a persistent tendency to appoint academics as vice-chancellors rather than having universities run by skilled corporate chief executive officers. Maybe some of these assumptions are justified. But there again, maybe not.

An alternative point of view - a starting point for a different interpretation - is to see universities as organizations that are the opposite of pharmaceutical companies and for-profit cultural corporations. Why? Because the essence of academic life is to give intellectual property away rather than to set up secretive and legally-defended systems in order to extract maximum financial returns.

Disciplines, and fields of study, are and always have been sophisticated global networks in which ideas and information circulate and are formalized. Systems of circulation include flexible and open networks of collaboration, shared databases, conferences, workshops and a wide variety of mechanisms for bringing people together to share their insights and information about commonly prioritized problems. Systems are

formalization include peer-reviewed academic journals, books by publishers with recognized academic credentials, edited collections of papers and conference proceedings.

Taken together, this is a massive, open knowledge system that has been established over several centuries and which joins together some 10,000 institutions which are recognizable as universities, as well as hundreds of thousands of libraries and other forms of knowledge repository.

What drives this network? The fundamental imperative is maintaining and advancing the reputation of individual academics and research groups. We do this through well tried systems of recognition and authentication. At the heart of the system of recognition is citation, and citation is a sophisticated form of distributing intellectual capital. A major point of our work is to have its outcomes cited with approval and respect by as many other academics as possible across the widest geographical span. Such a system of imperatives is the antithesis of the way in which a major pharmaceutical company, or indeed the Disney Corporation, is organized. Given this, it is not surprising that the majority of academics are uninspired by the call to generate third stream income, or that vice chancellors generally depend on dire institutional crises to persuade their colleagues that generating third stream revenues is fundamental to survival.

This system, of course, long predates the digital revolution of the early to mid-1990s although, as I will argue a little later, this digital revolution gives us immense opportunities to expand long established, open networked forms of academic knowledge distribution. And the university, too, is a resilient form of institution in its own right, despite the fact that every ten years or so its demise is predicted.

Why is this open academic network so resilient? Because of the nature of knowledge itself. One of the beneficial consequences of the digital revolution of the mid-1990s has been the stimulation of research into the nature of knowledge. Work in the field of the knowledge economy has shown how knowledge is best understood as a spectrum from tacit to highly codified forms. Tacit knowledge is often shared by individuals on a face-to-face basis, circulating informally within groups. Codified knowledge is expressed in ways that can be easily summarized, communicated and distributed.

The work of a typical university science laboratory illustrates the spectrum. Ideas originate in informal discussions and seminars and are tossed around until they have some valency and coherence. As this tacit knowledge takes shape, it begins to be codified, firstly as working papers and then as a formal publication. In its most advanced form, codified knowledge is expressed in the binary code that enables our digital world. The more knowledge is codified, the more it can be shared. In its codified forms, knowledge can be reproduced, potentially infinitely, without exhausting the original. The more knowledge is shared and reproduced, the more futile our attempts to contain it, or limit or own its distribution. And the more knowledge is distributed, the more likely it will be to enable and promote new combinations with their own potential.

It is clear that these particular and peculiar qualities of knowledge make it different from other categories of phenomena. The history of knowledge, and its exponential tendencies in explaining the world, can be mapped against the great inventions that facilitated communication of codified information; the printed book, the telegraph and the Internet. While we tend to think of the explosion of knowledge as a recent phenomenon, these essential qualities of knowledge have always been at the heart of the university, and have been known for a long time. It was, often all, Thomas Jefferson who appropriated the eloquent metaphor of a candle, observing that in many could light their candles from his without exhausting his flame and condemning him to darkness.

Triumph of the Commons

My argument, then, is that closed system approaches, that follow in the tradition of the large for-profit knowledge-traders of the later twentieth century, are not likely to succeed in yielding viable alternatives to forms of public funding. This is because closed system approaches are contrary to the inherent nature of knowledge itself. Indeed, some of the older for-profit knowledge models are not doing so well either – witness the tribulations of the pharmaceuticals and the failing battles of the culture industries with the easy distribution of video and music files via peer-to-peer systems. In face of these challenges, not-invented-here strategies are gaining ground.

But now the positive case: how can open system approaches do better in advancing new knowledge and therefore in taking the university forward as an institution? A useful metaphor here is that of the village commons; the communal grazing grounds that were characteristic of the British countryside before enclosure. In a now-classic paper, this metaphor was used to argue for the inherent self-interestedness of individual groups in making choices.

Imagine a common village grazing ground surrounded by households of equal stature and political authority. Each household has the right to graze its livestock on the commons. But it is evident to everybody that if this right continues to be exercised the grazing will soon be destroyed, to the detriment of all. An individual household could recognize this and reduce the amount of time its livestock use the common land. But, so the argument goes, to do so would be to advantage one's neighbours, since they would simply take up the extra capacity to make their own animals fatter for market. Because of such prevalent self-interest, the common grazing would be destroyed in any case. The outcome - the Tragedy of the Commons - is that although every household knows what is going to happen, all continue to overgraze the common land until it is destroyed, and all lose equally.

There has been a formidable body of work stemming from the original formulation of this dilemma, leading into game theory and with renewed interest in approaching major contemporary problems such as the difficulty of developing effective strategies for reducing carbon emissions. In simplified terms, though, the metaphor suggests the alternatives of regulation or shared common interest.

Most solutions to the Tragedy of the Commons tend towards regulation. Were the households to be governed effectively, use of the common grazing could be regulated and policed. Individuals may chafe against the statutes of the village, but in the end it would be for their own good. This, as we have seen, has also been the tendency when the commons comprises not grass, but rather that vast cloud of ideas, publications, papers, images, sound files and code that comprises knowledge. Rather than allowing the intellectual villages that depend on knowledge for their sustenance to graze at will, the inclination has been to restrict and control through regulation and licensing.

Of course, the knowledge cloud does not have the same properties as a field of grass. As Thomas Jefferson noted, the knowledge commons is not destroyed in its consumption and has properties of perpetual renewal that would have been regarded as miraculous by a shepherd concerned with fattening sheep for market. But the metaphor challenges easy assumptions in another way. For the particular miracle of the open source and open access movements has been the demonstration of the power and potential of shared interests rather than individual gain. Despite early scepticism and the assumptions of large closed systems corporations such as Microsoft, the open source movement has seen tens of thousands of programmers collaborate to offer robust and reliable operating systems and applications that have rivalled closed systems competitors for quality and versatility. Increasingly, closed systems software producers have to rely on legal protection to maintain their market position; an irony, since the need for such protection hardly demonstrates the supremacy of the free market in driving forward innovation and the improvement of quality. Similarly, open access knowledge systems have shown how a vast contributor community can develop and function. Taken together, the infinite renewability of the knowledge commons, combined with the pervasive respect for

shared interests that has driven forward both the open source and the open access movements, turn this old metaphor on its head. Where there was tragedy there is now triumph.

New possibilities

Full explication of the triumph of the knowledge commons awaits its ethnographers, sociologists and philosophers. But there is a line of continuity between the vast cloud of digitized knowledge that we work with today and the scholarship centred on printed books and journals that defined all academic work until the last decade of the last century. Then, as perhaps now, practitioners sought and gained respect from their peers, whether other specialists in Medieval poetry or fellow hackers demonstrating their prowess by discovering a new hole in the Windows operating system. As with traditional academic networks, mutual respect is a form of reputational capital that has various forms of value for those who hold it.

This Triumph of the Commons offers immense possibilities for universities. If we think of the immense cloud of digital information that is our contemporary shared resource not as something new, an invention of the past decade, but rather as a continuation of the open systems that have been at the heart of academic life in the universities of the world's major intellectual traditions, then we can see new ways of taking the strengths of traditional disciplinary networks and knowledge systems forward.

The digital revolution is essentially an advance in technology and technique, rather than in conceptualization. Contemporary methods of coding complex knowledge structures in binary form take us further along the exponential track that is characteristic of the longer history of knowledge. Just as the invention of the printing press freed knowledge resources from the constraints of handwritten copies, so the Internet allows infinite and perfect copies of the original that can be distributed almost instantaneously. While twenty years ago a group of scholars working on a common problem would have the expense and inconvenience of intercontinental air travel to enable their collaboration, so virtual environments allow online, real-time collaboration. While until recently we were dependent on commercial publishers to print and distribute the fruits of our labour, today we have all the technology we need to set up shared electronic databases of peer-reviewed publications without the need for profit-seeking intermediaries.

Beyond these instrumental advantages in the digital commons lie intellectual possibilities that are on the cusp of being fully realized. As Bruno Latour and others have argued, modernist concepts of science and truth may prove to be limited in their ability to respond to the extremely complex problems that characterize the contemporary world. This is central to knowledge work because today's big problems are too complex to solve within the boundaries of conventional disciplines. Issues such as climate change, understanding global financial systems, effective and inclusive public health systems and, closer to home, designing and implementing urban regeneration plans that do not have perverse consequences have proved to be resilient to established, conventional and discipline-based approaches. This is probably because both analysis and problem solving fall across disciplinary boundaries and require new combinations of knowledge. In the same way that distributed computing has used the capacity of thousands of linked processors to solve complex problems in astrophysics, so connecting the vast array of intelligence that makes up the knowledge cloud has the potential of addressing extremely complex problems that are not amenable to solutions from conventional research teams working within the boundaries of disciplines and individual institutions.

Whether or not some of these complex problems can be solved by means of these knowledge networks, what is clear is that reversion to old, closed system thinking will deny any real possibility of advancing understanding. For example, tackling climate change must involve a full array of natural and physical scientists, economists, sociologists and political theorists. Imagine a situation in which physicists would not make available the latest research on carbon reduction to policy analysts lobbying for political positions without the payment of licensing fees. Multiply this a hundredfold, add a clutch of regulators and a squad of highly priced patent lawyers, and take into account that, if an increase in global warming of less than 2° is to

be achieved, this has to be within the next five years. I would not give closed system, rent seeking approaches to managing the creation of new knowledge much chance of success. Looked at another way, if global warming does go much over 2°, Botswana will probably disappear beneath the sands of the Kalahari Desert. With the stakes this high, I believe that we need to look very carefully at the approaches that we take to organizing the use of the knowledge that we have, and the approaches that we take in seeking new knowledge.

Open systems approaches to knowledge have to be funded; and my presentation today began with the challenge of financing research and teaching in the face of a crisis in public finances. I've argued that the promise of third stream income generated through copyrights, patents and licenses may be an illusion. But is there any better prospect for developing ways of funding open systems?

A first step in developing viable funding models is to regard knowledge networks as tangible assets with capital and renewal requirements and running costs, that can be subjected to the discipline of full economic costing. Most universities continue to restrict their concept of assets to buildings, equipment and conventional paper-based libraries. In this resourcing approach, the costs of maintaining networks tend to be regarded as expenses, or even as perks of the job. Increasingly, though, the viability of universities will come to depend on their effective role as nodes in multiple knowledge networks. Unless these networks are fully incorporated into our financial systems, we will not establish a proper basis for funding open system knowledge work.

Once appropriate financial models are in place we will be able to see how costs and benefits can be properly matched. We already know a good deal about this. Remember that, only ten or so years ago, the Internet was regarded as "free". Teaching that made use of e-mail or early webpages was assumed to require no additional resource. We now know that online learning solutions, whether asynchronous or blended, have high or very high upfront costs and low or negligible marginal costs. Remember also that it is still often assumed that research collaboration using shared databases or online collaboration can be sustainable through mutual goodwill and by squeezing a little extra time out of already busy days. But emerging models of good practice show that these forms of open system management require active intermediaries in order to maintain and advance the daily operation of the network, its documentation and validation, and its interfaces. It does not seem to me that this is inherently more difficult than costing the operations of a traditional research laboratory. Once we have conceptualized the network as a core asset, all else follows.

Once the costs of networked knowledge systems are known and accepted, protocols for fair use and an appropriate currency to cover costs will be required. Again, much of what is required here is already known. Protocols for acknowledging the authorship of sources that are used and cited in open systems are well-established and have been in use for several years. Because open systems depend on reputational capital, all participants have an interest in correct acknowledgment and citation. This, after all, is why plagiarism is one of the most heinous sins in academic life. Because reputational capital can be taken away as well as granted, it is not difficult to imagine a broadly accepted system of peer management for covering fair costs of usage. Anyone who has become addicted to buying and selling on eBay will know the consequences of not honouring an online deal. Such approaches seem ready-made for the self-regulation of peer-to-peer transactions to cover the costs of sharing knowledge.

My argument, then, is that we already know how to fund open system approaches to knowledge. Once we have made the conceptual shift, we will be able to redirect the considerable wasted resources that go to unnecessary duplication, legal protections, and to all the unnecessary involvement of the profit-seeking publishers to whom we currently cede our intellectual work for nothing, only to buy it back for our libraries at considerable cost. Taken together, this reconceptualisation of knowledge, combined with a new approach to funding, will extend the Triumph of the Commons and will open further the potential of universities to contribute to some of the most complex challenges of our times.