Cultural Studies and the Urgency of Interdisciplinarity:
Sooner, not later, we're going to need a Cultural Science.

JOHN HARTLEY*

ABSTRACT
Most of the creativity in the digital universe passes unnoticed by the industry practices and policies, and it isn´t taken into account in the cultural and economic strategies of the creative industries. We should find ways to catalyze this creative production, showing how the user´s contribution may contribute to social learning, cultural and economic advancement. To that effect, we must know what is a open creative system and how it works. Based on this diagnosis, the author claims that interdisciplinarity is urgent and that there is also a need for a science of culture. What is at stake is a strategy of integrated development, as regards the upcoming innovation in its complex, productive and learning aspects.
Keywords: Cultural Studies, Communication, Culture, Science Culture, interdisciplinary

PART ONE: GAME OVER?

The International Communication Association's 61st annual conference (2011), held in Boston, USA, offered *master classes* for the first time. ICA president Larry Gross asked me to be among the first batch of *mature* scholars to try out the format. Without thinking of what I had taken on, I agreed. Given that these were uncharted waters, problem number one was: How to conduct a *master class* at such an event as the ICA conference? As many will know, it attracted over 2500 scholars from many different countries and disciplinary backgrounds. Among such a disparate group, where attendees may share little in common, there is no agreed craft of which everyone ought to become a *master*. People affiliated with one of the ICA's divisions (say, Mass or Organizational Communication) may have strong methodological differences and even opposing purposes from those in another division (say, Popular Communication or Philosophy of Communication). In such an uncertain context, a session where I tried to explain who I was – going

* **John Hartley AM** is Distinguished Professor of Queensland University of Technology, and Editor of the *International Journal of Cultural Studies* (Sage Publication, London). His most recent books are: *Digital Futures for Cultural and Media Studies* (Wiley-Blackwell 2012); *Communication, Cultural and Media Studies: The Key Concepts* 4th edn (Routledge 2011); *The Uses of Digital Literacy* (UQP 2009; Transaction 2010); *Story Circle: Digital Storytelling Around the World* (ed., with K. McWilliam, Wiley-Blackwell 2009).

through my greatest hits for the benefit of youngsters who'd never heard of me – held little appeal. But in such company, *not* giving some account of my work was not an attractive option either: how else would we establish a basis for discussion?

I wanted to talk about my *home* disciplinary field of cultural studies. But here arose problem number two: cultural studies is not very prominent on the radar of most communications scholars, especially those from the US positivist tradition that is so well represented at the ICA. Indeed, for many of them it would hardly count as a field of study at all, having been, for all they knew, discredited and abandoned after the *culture wars* of the 1990s and celebrated academic scandals such as the Sokal hoax (Sokal, 1996, and see Bérubé, 2009). In such a context it might seem reckless to open up a critical discussion about a field that many present may already have derided, dismissed or forgotten. It would be like going *into the lion's den to flog a dead horse*. Looking for ideas, I checked how the master class format was billed in the conference program. It wasn't very forthcoming: *Master classes* are being introduced this year in which senior scholars will briefly speak about their work and be available for conversation and exchange.

The salient terms seemed to be *brief*, *conversation* and *exchange*. One way to be brief while provoking conversational exchange would be to issue a challenge. So I decided to do that. However, I also wanted to explain what is at stake. In the event, therefore, I settled for a hybrid performance, where I did indeed issue a challenge to those interested in the fate of cultural studies, but also took seriously the *class* bit of *master class*, by working through some of these disciplinary issues in more detail. Pressed for a title for the master class by Popular Communication Division chair Paul Frosh and after discussion with session chair Jonathan Gray, I came up with *Cultural Studies – just kidding; or infantile disorder?* That's what went into the ICA program. Professor Maria Immacolata Vassallo de Lopes was among those present at the session and she kindly asked me to write it up for publication. This paper is the result: First, the challenge to cultural studies; second, the reason why I think it's urgent.

The challenge: 'Cultural Studies – just kidding; or infantile disorder?'

Just Kidding?

The *just kidding* part is a reference to cultural studies own youthful disruptive playfulness, back in the 1970s and 80s when I was first attracted to it. The work of writers like Paul Willis (*Learning to*

Labour) and Dick Hebdige (*Subculture*), both associated with the Birmingham Centre for Contemporary Cultural Studies, showed how youth culture and style could – and should – emerge as a focus of cultural critique. This interest in young people's cultural agency joined with Saussurean and Derridean linguistic theory, aided and abetted by such literary luminaries as Mikhail Batkhtin (1993) on the carnivalesque, Roland Barthes (1973) on the pleasure of the text (*jouissance*) and Umberto Eco (1987) on *faith in fakes*, to provide a theoretical justification (or, literally, a *pre-text*) for all kinds of discursive and semiotic exuberance – the *play* of signifiers became *Cultural Studies 101*.

Unfortunately for cultural studies, taking play seriously was not widely accepted *scientifically* during that period, in the way that is now prevalent among evolutionary bioscientists for instance (see Konner, 2010). In any case, scientists were not readily open to instruction by non-scientists, least of all from the likes of formalists, structuralists, Marxists, deconstructionists and those such as myself, who Toby Miller (2009, p. 187) has dubbed "a hitherto semiotic romantic". Thus, the playful impulse, and the impulse to value playfulness, that characterised early cultural studies led *internally* to innovation and a disruptive new field of study (Lee, 2003), but *externally* to the charge of "inconsequentiality", where "just kidding" = "not serious" (e.g. Morrison, 1998). It was a short step – one eagerly taken thereafter by assorted scientists, journalists and others – to the dismissal of cultural studies altogether, as an *anything goes* enterprise, with tenuous links to the real and *relativist* values that owed nothing to Einstein. End of story? Is it really *game over* for the *just kidding* approach?

Infantile Disorder?

Meanwhile, the *infantile disorder* part of my title referred to V. I. Lenin's (1920) pamphlet, *Left-Wing Communism: an Infantile Disorder*, where Lenin berates those Leftists around the world who refuse to compromise their theoretical purity, or to participate in the existing institutions and circumstances of their country (e.g. trades unions, parliaments), preferring to associate only with like-minded comrades, thereby to keep action directly linked to theory. Lenin dismisses such purism as infantile when compared with the grown-up politics of knowing sufficiently well what you stand for and what the goal is, thereby to be able to work with – and within – any given organisation or conjuncture in order to advance the cause. Lenin quotes an exclamation from Engels: What childish innocence it is to present one's own impatience as a theoretically convincing argument!

That sentiment sums up some of my frustration with the gestural or rhetorical politics of academic leftism in the cultural field (just to be clear, the frustration is with the gestural part, not the leftist). No matter what one's own motivations or affiliations, reading them *into* the object of study, such that *a theoretically convincing argument* can be recognised by reference not to the object of study but to the political stance of the analyst, is a continuing problem for cultural studies. It is certainly not confined to that field alone. It has become a habit of thought, a trick of rhetoric, a generic norm – and thence a kind of requirement placed on any participant – in academic writing across the humanities and social sciences, certainly in the Anglosphere. It is a literal form of prejudice (pre-judgement), where one knows in advance who the good and bad guys are. At a certain level of theory, an author's name may be enough to determine that an argument is acceptable. [1]

In such a climate, rhetorical shorthand is all that's needed to replace evidence with values. Among the faithful, the word *neoliberal* bypasses any need for further investigation. Whatever is associated with that is self-evidently irredeemable. Knowing that we live in *late* capitalism or even *late* modernity is another example of wishful thinking (capitalism isn't showing much sign of being *late*). Blanket opposition to *the* market is assumed (except the part of it that results in book-sales, job-offers or consultancies for the analyst). This kind of politics, among what Miller (2009, p. 191) calls the "comfortably pure ultra-left", is perilously close to bad faith.

A recent variant of the purist *infantile disorder* requires analysts to find the downside of any emergent capability. So, new game-changing technologies, e.g. digital media and the internet, may be accepted with alacrity by early-adopter critics, who quickly use them to publish papers on the harm done to more vulnerable others by these very affordances – people in developing countries, or unfavoured social groupings, or simply *consumers* en masse (an example being *precarity* and creative labour: see Neilson & Rossiter, 2005). This is an ironic replay of the very same will to pathologise everyday life that early cultural studies opposed in US-based positivist social-psychology. The purists

[1] For a *top 50* of canonical Cultural Studies *Good Guys*, what better than to turn to a US graduate university's *Cultural Studies Qualifying Exam*? To pass, students must choose 30 of the 54 prescribed works by: Adorno & Horkheimer, Agamben, Althusser, Anderson, Ang, Anzaldua, Arendt, Barthes, Bobo, Butler, Bourdieu, de Certeau, Chow, Clifford, A Davis, Dubois, Fanon, Fiske, Foucault, Gilroy, Gramsci, Grossberg, Habermas, Hall, Hebdige, hooks, Laclau, Lipsitz, Lowe, McRobbie, Mulvey, Penley, Radway, Rancière, Rosaldo, Rose, Said, Sedgwick, Spivak, Storey, Venturi, Warner, R Williams, J Williamson and Zizek. You probably wouldn't find many of these works branded as *just kidding* or *infantile disorder*, at least in a Qualifying Exam – but therein lies the very problem facing cultural studies. (Source: Claremont Graduate University: Available from: http://www.cgu.edu/pages/1.asp.

see criticism as a professional duty, without any obligation to admire or even admit the improved capabilities extended to millions of users through such inventions (Hartley, 2009; Potts et al., 2008). The emergence of the new is no more than an excuse to retell a familiar narrative of capitalist exploitation.

No Future?

Cultural studies can be characterised by a tension between these playful and purist tendencies. It is at least partially *constituted* in them; continuously caught between the Romantic optimism of the new (let's play!) and the Faustian pessimism of the known (this'll end in tears!). Perhaps it is time to admit that both tendencies may be a problem: neither type turns *evidence* into *knowledge* that *works* beyond the academy; both turn anecdotes and *one's own impatience* into value-statements that serve to reinforce in-group solidarity in a circuit of mutual citation, but don't explain what's going on in the world.

Further, others do the *playful* better than we do. Note for instance the amazing number of current and former comics, many of them British, who now front educational and documentary TV: Tony Robinson, Michael Palin, Stephen Fry etc. Meanwhile, new-generation networked social enterprise and creative start-ups make a mockery of class-war or anti-capitalist politics, combining making a living with making a difference. Examples even include *companies* that work to fix the global *precarity* problem by bringing "dignified, computer-based work to women, youth, and refugees living in poverty" (e.g. www.samasource.org; crowdflower.com).

So the provocation intended by my title is twofold – that cultural studies in its playful mode is inconsequential, except as a disciplinary irritant (Lee, 2003); and that cultural studies in its purist (or paranoid) mode is a serious strategic mistake, except as a disciplinary apprenticeship for tenure-seeking theorists. The purpose of this provocation was to open up a conversation about possible futures for cultural studies. Will the tussle between play and purism cause it to decline from a *knowledge* discourse to a *values* one? It need not. As Lenin pointed out, the real world is not pure, so it must be taken as it is found:

> We can (and must) begin … not with abstract human material, or with human material specially prepared by us, but with the human material bequeathed to us by capitalism. (Lenin, 1920).

The real question, also famously posed by Lenin (1902), is: "What is to be done?" What should cultural studies knowledge look like; what should its activism *do*? It's an old question, but it remains urgent. My own answer is implied in what has been said so far – cultural studies is in need of a makeover, but it can only achieve this successfully with assistance and collaboration from the outside. The need now is for *interdisciplinarity*; for what E. O. Wilson (1998) calls "consilience" between the arts and sciences, which in this context takes the form of what I'm calling *cultural science*. The second part of this paper will describe how I have come to that view.

PART TWO: GAME ON?

Nothing new about urgency

The urgency of interdisciplinarity has been intensifying throughout my career, so it is urgent in the way that scholarly reform generally is – i.e., you have to wait 25 years, or however long it takes for old professors to die, before you can achieve anything *new*. By which time you are yourself an old professor, and renewal is urgent again. Thus, although I do want to claim that interdisciplinarity is urgent, right now, I wouldn't want you to think that there's anything new about that.

Before I arrived at QUT (Queensland University of Technology in Australia) in 2000, my previous career was devoted to the cause of the so-called *new humanities*, helping to establish the new fields of communication, media, TV, cultural, and journalism studies, none of which existed in the UK when I graduated from the University of Wales in the 1970s with a degree in English Language & Literature.[2] These new fields were founded in interdisciplinary thinking, bringing together rationales from social and textual theory, literary and visual arts, social psychology and political economy, not to mention both technological and practice elements, creative and vocational, often delivered by industry practitioners.

Institutionally, even though there was strong confidence among those involved in the *new humanities* that we were on to something, and had access to conceptual, empirical and practice-based approaches to prove it, we faced an uncertain and often actively hostile reception, not least from the

[2] The English Department at Cardiff was already old-fashioned when I studied there. Its head was Gwyn Jones, Knight of the Icelandic Order of the Falcon. He had been in place for thirty years, and to that date had never appointed a woman to the staff. This was infertile ground for disciplinary innovation. To achieve it I had to move to another institution (the Polytechnic of Wales), and assist in setting up a different departmental structure (Communication Studies).

old humanities (English Literature, History, Philosophy etc.). There were (and still are) many in the arts and social sciences who regarded the media as an unworthy object of study, leading to Mickey-Mouse qualifications for contemptible jobs, in a sector that needs no encouragement from universities; quite the reverse. Thus, we were not successful in transforming existing disciplines directly. More commonly, refugees from a number of different departments clumped together to start new ones, often with hybrid and unstable identities (thus, every position and every department I've ever studied or worked in has had a different name).[3]

Intellectually, interdisciplinarity involved weaknesses and threats as well as strengths and opportunities. As always, it posed intractable problems of method. How could we combine all these elements: humanities-based critical readings; a teaching tradition based upon forming moral judgement among students; social-science-based empirical research; and industry-based craft skills, technological know-how and creative practice? This is to say nothing of the methods associated with theoretical innovation, political engagement and community advocacy that motivated many early media analysts, in the days when structuralism, Marxism, continental philosophy and the democratisation of higher education were in the ascendant. All these are urgent issues still – or again – but for me personally they go back to the 1970s, so *urgency* may describe a continuing condition, in which equilibrium can never be achieved, rather than a fixable problem.

After nearly half a century, media, communications, cultural, and journalism studies still don't amount to disciplines in their own right. They retain the qualifying term *studies* to distinguish them from proper disciplines or sciences. Even so, from their humble beginnings in unglamorous polytechnics and utilitarian technical institutes, they have established themselves both intellectually and institutionally throughout higher education globally, even at posh universities (except Oxbridge).

Creative industries 101

Coming from such a background, I was ready for the challenge of the *Creative Industries* initiative when I arrived at QUT in 2000 as the new – and last – Dean of Arts. Within the year we

[3] In order: School of English & American Studies at the University of East Anglia (1967-8); Department of English at University College Cardiff (1969-75); School of Social & Behavioural Sciences, and then Communication Studies, at the Polytechnic of Wales (1975-84); School of Human Communication at Murdoch University (1985-95); Dept of Media Studies at Edith Cowan University (1995-6); School of English, Communication and Philosophy, and then School of Journalism, Media and Cultural Studies, at Cardiff University (1995-2000); Faculty of Arts, and then Creative Industries Faculty at QUT (2000-11).

launched the world's first Creative Industries Faculty (CIF), launched by the Premier of the State of Queensland, Peter Beattie, in July 2001. As Foundation Dean, I had a chance to respond to trends and changes in the external environment, where globalised culture, new media forms, market-based creative practice, and computational scale were transforming the domain of knowledge as well as the working environment that would face our graduates.

Needless to say this venture was interdisciplinary from the start. Three contributing fields (each of which was already multidisciplinary) were crash-merged:

- Media and communications (as above);
- Creative and performing arts (including screen production);
- Digital design and human-computer interaction.

In the event, even these near-neighbours found it had to get along with each other. Despite my best endeavours to construct a *one-school* faculty, they quickly retreated into mini-schools with no less than eleven *disciplines*[4], whose main purpose seemed to be to repel boarders, especially any who may have issued from the dean's office. But we persevered. CIF is now more than ten years old, and interdisciplinary tensions are still prominent, but between us we have managed to achieve the highest accolade for excellence that is available to a disciplinary cluster in Australia – top marks in the ERA (Excellence in Research for Australia) assessment[5]. Operated by the Australian Research Council for the Federal Government, ERA "assesses research quality within Australia's higher education institutions using a combination of indicators and expert review by committees comprising experienced, internationally-recognised experts". Across the full disciplinary array from arts to sciences (apart from Medicine), broad fields of research are assessed (*two-digit codes*) as well as specialist areas (*four-digit codes*). Scores range from 5 (*well above world standard*) down to 1 (*well below world standard*). Our disciplinary array scored as follows:

[4] These were: Media and Communications, Journalism, Creative Writing, Film & TV, Acting & Technical Production, Dance, Drama, Music, Communication Design, Visual Arts, Fashion Design. A full decade later, in 2011, university restructuring brought the School of Design together with the Creative Industries Faculty, adding Architecture, Landscape Design, Urban Planning, and Product and Industrial Design to the mix. To date the School of Advertising, Marketing and PR has resisted any temptation to move across from the Business Faculty, where it remains the only one of the creative industries cluster of disciplines offered at QUT that is not integrated into that faculty.

[5] Available from: http://: www.arc.gov.au/era/default.htm; Available from: http://www.arc.gov.au/era/outcomes_2010/Institution/QUT; Available from: http://www.theaustralian.com.au/higher-education/elite-eight-head-university-research-ratings/story-e6frgcjx-1225997293930

Two-digit field: Language, Communication and Culture = 5
Four-digit specialism:
Communication and Media Studies= 5
Cultural Studies = 4
Film, Television and Digital Media= 3
Journalism and Professional Writing= 3
Performing Arts & Creative Writing= 3
Visual Arts and Crafts = 2

We achieved the only '5' in any 2-digit field across QUT; and our total of two 5s, a 4 and three 3s helped the university as a whole to achieve an overall 3 (*at world standard*) and 10th place among all Australian universities, the highest of the '*new*' universities.

But even with this success, interdisciplinarity is not firmly entrenched, either at QUT or, more significantly, in ERA, whose scoring methodology discourages cross-disciplinary work. We still have a long way to go.

Phases – disciplinary and real

Institutional ripples

Despite institutional successes (and difficulties), the need for interdisciplinarity has not abated. Instead, it has extended. Since the Creative Industries Faculty was established in 2001, interdisciplinary collaboration at QUT has rippled ever further away from the *home* creative disciplines in a series of stages:

- *Integrated disciplines for creative education*. This is the initial CIF proposition: media & communication + performing arts + computer design; to supply knowledge and graduates to the creative sector;

- *Multidisciplinary solutions for business, policy and consumer-based creative innovation*. The establishment of two top-level research centres in 2005 (CCI and iCi)[6] formalised collaboration among five QUT Faculties – Law, Business, Education, Science & Technology, and CIF – to address problems on the *pathway to market* or the *creative value chain* for business strategy and public policy;

- *Conceptual problems of interdisciplinary research*. Uncertainty about the role of individual creativity in globally networked societies raised a question for my ARC Federation Fellowship on the uses of multimedia:[7] How can cultural values (the elaborate production of meaning) and economic values (the efficient production of goods) be reconciled? This led in turn to what proved to be a conceptual

[6] CCI = the ARC Centre of Excellence for Creative Industries and Innovation: www.cci.edu.au/. iCi = the QUT Institute for Creative Industries and Innovation: www.ici.qut.edu.au/. CCI is an ARC-funded national research centre; iCi is a QUT-wide research institute.

[7] Retrieved from http:// www.arc.gov.au/ncgp/fedfellows/ff_default.htm; Available from: http://www.arc.gov.au/pdf/FF05_Selection_Report_15Jun.pdf; Available from: http://www.arc.gov.au/pdf/Fed_Fellow_summaries_Oct2005.pdf

breakthrough, in which creativity (both human and economic) could be rethought from first principles, via an unlikely dialogue between evolutionary economics and cultural/media studies;

- *Cultural science*.[8] It soon transpired that there is an urgent need to learn from disciplines even further away from *home* – the evolutionary and complexity sciences, and systems or network thinking. This is where we are now; at the beginning of an interdisciplinary arts/science adventure that promises to provide some real answers to the problem of creativity and innovation.

As I see it, this is a story of sustained effort to reform the nineteenth-century disciplinary order so that it can face the educational, economic, intellectual and scientific challenges of a world increasingly characterised by the interactions of individual agency (including applications of creative talent) with global networks and markets sustained by rapidly evolving media technologies.

Humanities in flux

I also see it as an attempt to reconnect the humanities – perennially concerned with *meaning, identity, social relations*, and the creation of *cultural and human values* – with the growth of knowledge more generally, especially in the natural and evolutionary sciences. My fear is that without this *consilience* (in E. O. Wilson's terms) the humanities may indeed be consigned to the policy bonfire, even though these disciplines remain popular among undergraduate students. But equally, the sciences will struggle to solve the problems that they have identified if they don't address the human and cultural dimensions of large-scale systems, processes and trends.

The inter- or trans-disciplinary flux now perturbing the humanities provides a new opportunity to address problems of meaning, identity and social relations (in the creation of human and cultural values) by linking these concerns to a new understanding of the dynamics of change in global markets and among new technologies (i.e. the creation of economic values), in the context of the growth of knowledge as an evolutionary and complex-system process.

External phases: creativity – 'where the bloody hell are you?'

Turning to the *creative industries* themselves, before the 1990s this term was almost unknown. Since then, it has provoked heated debate, much of it stemming from definitional disagreements, conceptual confusion and compromised institutional purposes. In other words, the idea – the very identity – of the creative industries emerged not from disciplinary epistemology but from the cut and

[8] Available from: http://cultural-science.org

thrust of business strategy, public policy, and, perhaps most influential, regional and national competitive jostling.

Thus, the still uncertain identity of the creative sector has been forged by dynamic change in technological, economic and cultural development and by the clash of incompatible purposes among the various agents and agencies. The debate thus far has focused on two intractable problems: first, what *are* the creative industries (what do they have in common); and second, what is their *extent* (what different phenomena are required to characterise them)?.

As far as definitions go, at last count, my colleague Jason Potts (2008) had identified seventeen, including one from classical or Treasury economists who say … there's nothing to see here at all., (i.e. the creative industries are just like any other).

SEVENTEEN DEFINITIONS OF THE CREATIVE INDUSTRIES
1.Cultural industries
2. DCMS creative industries
3. Copyright industries
4. Creative economy
5. Trident model
6. Creative class
7. Core-periphery model
8. Special economics
9. Service economy
10. Schumpeterian growth
11. Markets & market institutions
12. Social network markets
13. Attention economy
14. Multiple games & identity
15. Creativity, process & identity
16. Intellectual property
17. Nothing interesting

Potts and Cunningham (2008) counted four types of economic policy response to this definitional soup:

1. *Market failure* (arts subsidy and *welfare* policy);
2. *Competition* (standard industry policy);
3. *Growth* (investment and growth policy);
4. *Innovation* (innovation policy).

Despite this analytical progress, it will clearly be hard to develop a science out of such a confused field. It certainly exhibits the necessary conditions of contested knowledge. But even though iterative improvement is building new knowledge, as yet there is no agreed object of study, no compelling theory or conceptual starting point, and no agreed methodology. On the contrary – there's an urgent need for interdisciplinarity.

Industrial ripples

Meanwhile, the extent of the creative industries has also proven hard to measure. The journey to achieve conceptual clarity and cut-through analysis must take account of a dynamic and turbulent environment, where the creative industries as such (not just the interdisciplinary study of them) are rippling out from an initial industry cluster towards a much wider context, both economic and cultural. I have identified four phases of the creative industries (Hartley, 2010):

1. *CI-1 Creative clusters* (closed expert pipeline). The initial *industry* definition of the creative industries: 14 or so sectors producing creative outputs (DCMS, 2001);
2. *CI-2 Creative economy* (open expert system). Creative inputs (b2b services) add value across the economy; businesses in all sectors add value through creative innovation;
3. *CI-3 creative citizens* (open innovation network). User-created content, consumer entrepreneurship, open source movement, cloud culture, DIY culture, micro-productivity;
4. *CI-4 creative cities* (emergent adaptive system). Self-organising systems for managing complexity and innovation, both incremental (specialisation) and arbitrary (change brought about by chance, clash, conflict *between* systems). Cities (where now more than half of humanity resides)[9] are the places where creative industries, economy, culture and innovation *interbreed*, and where Schumpeterian entrepreneurship thrives.

This is where we are now. Such a history is not clear-cut and certainly not progressive in a linear way, since each phase supplements rather than supplants the one before, and some jurisdictions never make the shift from one phase to the next, or they don't make connections among the various stages. There are real tensions here too. The industry cluster of CI-1 generates a completely different model of intellectual property compared with the user-based culture of CI-3, for instance, resulting in very different approaches to copyright, digital rights management, and regulatory requirements (see Smiers & van Schijndel, 2009). Similarly, there are big differences among creative industries considered as

[10] According to the UN's *State of World Population Report* (2007): 'In 2008, the world reaches an invisible but momentous milestone: For the first time in history, more than half its human population, 3.3 billion people, will be living in urban areas. By 2030, this is expected to swell to almost 5 billion.' Available from: http://www.unfpa.org/swp/2007/english/introduction.html.

global media markets, as public-good arts practice, as user co-created content, and as locality-based urban scenes.

Nevertheless, I am proposing that the four phases noted above also form four distinct models of creativity. These are not based on trying to define ever-more tightly how creativity *is an industry* but, on the contrary, on showing how it needs to be accounted for at *ever-increasing distance from industry*, even though each successive model, which in scope and social reach encompasses the one before, can be seen to be an ever-widening economic model of creativity:

1.*Clusters:* Industry (CI-1)
2.*Services:* Economy (CI-2)
3.*Citizens:* Culture (CI-3)
4.*Cities:* Complexity (CI-4)

It is not until you reach stages 3 and 4, where creativity reaches cultural dimensions located in cities, rather than being confined to production processes located in firms, that the connections between culture and economy, individual talent and societal scale, can come into focus. This insight squares with Patrik Aspers conceptualisation of markets as economic "partial orders" (2010, p. 9). Aspers argues that "the components that are central for the understanding of markets – identities, values, social structure, and culture – are co-constructed" (2010, p. 171). Those for creative markets are co-constructed in CI-3 and CI-4.

Furthermore, it is only at that point that you can take account of the growth of ICTs, digital media and the internet. In other words, if you confine the notion of creative industries to the traditional (often *analogue*) creative disciplines and their industrial or occupational form, you will never be able to account for the importance – both economic and cultural – of consumers as agents, of user-created content and the burgeoning scale of computer-enabled social networks. Since these are clearly important drivers of the creative industries, we need *all four* models before we can begin to develop a science that will explain creative innovation, never mind the integration of cultural and economic values.

Cultural science

How to bring creativity to account? It is at once a personal human attribute (individual inventive talent), an institutional source of cultural value (the creative and performing arts), and a national

economic resource (the media and creative industries). Although these are understood to be linked, little progress has been made to unify the concept, which remains chaotic, commonsensical, and context-dependent. *Cultural science*, an initiative of mine at the CCI since 2008, attempts to systematise it from first principles, following work in evolutionary, complexity and network theory; for instance, Arthur (2009), Anderson (2006), Barabási (2002), Beinhocker (2006), Lotman (1990; 2009), Zittrain (2008), among many others.

One possible starting point is the work of Nobel prize-winner Elinor Ostrom (see e.g. Poteete, Janssen & Ostrom, 2010; Hess & Ostrom, 2006). Hers is a model for the elucidation of the *design principles* and rules for creativity as a *common pool resource* in the "evolution of institutions for collective action" (Ostrom, 1990). While Ostrom's work has been concerned with the governance of common pool resources, cultural science traces the rules for emergence and organisation of creative action in mediated systems, where language, symbol and communication are manipulated to link individual identity and expression with cultural, social and economic purposes.

This trend is in line with my own longstanding interest in "semiotic democracy" (Fiske & Hartley, 1978, pp. 193-4; Fiske, 1987), a term recently revived by Harvard law professor Terry Fisher (2004, p. 133) to oppose the *disastrous* restrictions that prevent people making *creative uses* of media. If semiotic democracy is "the single most important ideal cited by scholars who imagine a utopian relationship between law, technology, and democratic culture" (Katyal, 2006), then the *common pool resource* of the internet offers an unprecedented opportunity to transform this ideal into everyday reality.

CULTURAL SCIENCE
'Design principles' and rules
▪ creativity as a 'common pool resource'
▪ 'evolution of institutions for collective action' (Ostrom)
Rules for emergence and organisation of creative action
▪ Semiotic democracy
▪ Creative productivity
▪ Social learning

Focusing on the notion of *creative productivity*, which can be defined as *creative work put to new uses by others*, cultural science uses an integrated cultural and economic approach to study agency, choice, and the generation and emergence of novelty in communicable media, especially online digital networks. Using this approach, creative productivity can be mapped coherently across three levels of complexity, with multiple practical implications (Dopfer et al., 2004):

- *Micro:* the personal
- *Meso:* institutional
- *Macro:* city/regional or population-wide

Disciplinarily, many observers maintain that there is a fundamental division between arts and culture on the one hand, and the economy and market forces on the other (Gray, 2010; Hutter & Throsby, 2008); and that ordinary people act mainly as onlookers and consumers, resulting in their exclusion from independent agency by powerful or elite interests (Deuze, 2007; Ross, 2009). That stand-off, which at its most militant is an example of the *infantile disorder* mentioned earlier, is derived from a modernist critique of mass society (O'Connor, 2009; 2010). It remains academically forceful (Gibson, 2007; Miller, 2007; Turner, 2010) despite social and technological change.

But as I've argued above, staging a struggle between culture and the market produces only impasse: neither side has a stake in rethinking our overall conceptualisation of creativity. Hence, most creative ideas emerging from lay populations are neither valued nor counted. They are not systematically harnessed, coordinated and brought into further utility in an overall process of innovation in society. Cultural science aims to make analytically visible and thence to bring to account these significant but hitherto untapped creative resources.

Users as agents of consilience: the 'participatory turn'

There are already many pointers to how user-creativity can become a driver of both cultural and economic enterprise (Leadbeater, 2008; 2010), but these cases have not been mined for common rules that will enable coherent description and analysis, not least because the cultural field is well-populated with special interest groups claiming exceptional attention for their own activities against the claims of others. Meanwhile, the increasingly blurred boundaries between producer and consumer, professional and volunteer, expert and amateur, analyst and activist, are subject to further claims-based contestation, when what is needed is a *model* for *coordinating* the activities of all *sides* into mutually

enhanced productivity, as occurs in sciences like astronomy where amateurs and professionals are happily co-dependent (Schroeder, 2007; Meyer & Schroeder, 2009).

Cultural science needs to develop a *general theory of creative productivity* to clarify where resources and investment, both public and private, will do most to stimulate a creative and competitive future for individuals, organisations, and cities/regions. To put this important point another way, cultural science seeks to link micro-explanations of creative productivity (cultural productivity of meaningfulness, social relations and identity in ordinary life) with the *meso*-level explanations that are familiar in economics and policy-making (economic productivity of firms and institutions). At once, it is evident that although disciplinary knowledge is plentiful at both levels, different disciplines are involved and they have no tradition of talking to each other, let alone translating each other's insights. The micro-level has been taken up in the arts and humanities as the study and practice of individual talent and its productivity; the meso-level is studied in economics and social sciences. Each disciplinary cluster is ignorant of and even hostile to the methods, insights and purposes of the other. But they are *partial orders*, devoted to the study of other *partial orders* at different levels of complexity. We need to model that.

However, hitherto attempts to account for creative productivity from either of these disciplinary stances have persistently left something out of account, something that we might need to think of as the *dark matter* of the digital universe; i.e. most of it, which however remains unseen using existing technologies of observation. The arts-humanities disciplines are interested in individual talent, certainly, but not in *just anyone's*. To be noticed, individual creative productivity has to be charismatic in some way, either as an expression of Kantian genius, or as a winner in the contemporary *economics of attention* (Lanham, 2006) that transforms individuality into celebrity. The arts and humanities, in short, rarely consider creative productivity as an outcome of what *whole populations* do. Similarly, there is a blind-spot in economic-sociological accounts of creative productivity.

For instance, in the context of a decade's work on the creative economy (DCMS 1998; Bennett et al., 2008; Hartley, 2005; Cunningham, 2011), progress has been made in understanding, measuring and harnessing creative productivity at the meso-level, among firms and cultural institutions (e.g. the GLAM sector). Much less progress has been made, either theoretically or in applied policy and enterprise, to take account of what *ordinary individuals* do, in social networks and social network

markets (Potts et al., 2008), with the almost immeasurably enhanced communicative and creative resources at their disposal in the course of everyday life.

There is widespread recognition that media audiences and consumers are no longer (if they ever were) passive recipients of centrally-controlled messages (Gauntlett, 1998; 2005). Many studies have shown that consumers also act as producers, as publishers, and in self-organising networks; the *participatory turn* has been widely noted (Uricchio, 2004, Jenkins, 2003; 2006; 2007; 2009). But despite many small-scale or narrow-horizon case studies (e.g. Burgess & Green, 2009; Bruns 2005; 2008), there is still no integrative account of everyday mass creative productivity. Neither arts policy nor economic strategy seeks to exploit or extend it. Using their inherited disciplinary apparatus (as opposed to their human experience, perhaps), the best minds in the humanities and in economics don't even know it's there.

Even so, its value is daily on show, and not just in the florescence of user-created content on the internet, although this makes it easier to see. A topical example to hand in my own neighbourhood has been the spontaneous self-organised teamwork among thousands of citizens in the wake of the 2011 Queensland (Australia) floods, who treated the local community itself as an Ostromian *common pool resource* in terms of the volunteering effort. Mass *micro-productivity* swung into action. It was successfully linked in with the coordinated efforts of meso-level official agencies, including the police and emergency services, to help flood victims. 55,000 volunteers turned up to clear away the mess.[10] Instant online organisations like *bakedrelief.org* or *Truck-of-Hope* sprang to life and to action, and myriad uses of social media like Facebook and Twitter enabled formal and informal groups alike to share information and coordinate participation (Cheong & Cheong, 2011).

Here, I would argue, is an instance of something more general: that the disciplinary impasse in understanding creative productivity has been *solved* in practice by users themselves, in self-organised (unmanaged) spurts of agency that demonstrate a lived *consilience* between spontaneous creativity (arts & humanities) and organised productivity (economics). The affordances of culture as well as technology – *technologically equipped culture*, if you like – bring together micro-productive agency and meso-institutional forms. Our disciplinary protocols need to learn from field experience: individual

[11] Available from: http:// www.smh.com.au/environment/weather/salvation-comes-with-brooms-and-gumboots-20110115-19rv6.html.

creative agency and system-level productivity can be understood and investigated using the same model.

Micro-productivity

Taking a 'turn'

Media and communications research, now more than a generation old, has developed a toolkit of concepts, approaches, methods and case studies that demonstrate the centrality of technologically mediated communication among the ordinary population in modern society (Baym, 2009; Bird, 2003; Papacharissi, 2010a; 2010b). It has been effective in delineating the *politics* of ordinary mediated life, but less interested in its *productivity*. There remains a failure to apply its explanatory power to current policy and business strategy; and reluctance to update politicised models of communication to take account of the technologically enabled transition from one-way influence and effects to participatory and user-created media.

At the same time, media research does not stand alone; it is influenced by trends that flow across many otherwise distinct knowledge domains. They often go through common intellectual transformations. The sciences took the *cultural turn* in the late twentieth century; social theory took a *participatory turn* more recently (Bonnell & Hunt, 1999; Jacob, 1999). Now, it seems that a new *turn* is sweeping through diverse disciplinary domains, including economics. It can be called the *micro-productive turn*.

- Perhaps most famously, this began with *microfinance* (Grameen Bank);
- A similar impulse can be traced through the concept of *micro-work* or values-based outsourcing in organisations like SamaSource and CrowdFlower, where digital tasks like data entry or data-mining are broken down and distributed to a global *on-demand* labour force, including marginalised people, e.g. in refugee camps;
- It is becoming prominent in energy with experiments in *micro-generation* of electrical power (Martin 2009);
- It is has affected the realm of intellectual property, once the preserve of firms but now suffusing the minutiae of everyday life, impacting all who use an electronic device (Montgomery, 2010; May & Hearn, 2005). Some firms already seek to monetise "*micro-copyright*", giving rise to a new politics of intellectual property (Smiers & van Schijndel, 2009);
- Its future may be discerned in what is known as desktop- or *micro-manufacturing*, arising from 3D- and bio-printing, including household fabrication using networked code, for personal use or as part of a distributed digital craftwork (Craft Australia, 2010; Rosas-Guyon, 2010).

Thus a general trend towards the exploration of *micro-productivity* is observable across economic, environmental and creative life. But this is currently the least investigated aspect of *creative* productivity. Scholars with a media background tend to see *productivity* as the outcome of media or textual *production*, which is *productive* of *meanings.* Economists see it in the way that the Productivity Commission does – as industrial *efficiency*.[11] Despite their different histories and uses, both notions of productivity are useful, with overlaps as well as differences (von Hippel, 1988). Given the growth of global networks like the internet, micro-productivity can be harnessed by an *efficient distribution system*, in common with other engineered systems like power, electronic data etc. (Barabási, 2002).

Creative micro-productivity

The investigation of creative micro-productivity in media, arts and social networks offers an experimental field of great dynamism that may yield principles for understanding how myriad individual agents contribute to the creation of new meanings and values across large-scale complex systems. Combining media and economic perspectives, a definition of *creative micro-productivity* for cultural science may be attempted. It is the generation and emergence of novelty and variety, as innovation, in multi-agent, multilevel, multivalent, technologically equipped complex systems, combining:

- *cultural* productivity (creating meanings, identities, relationships) with;
- *economic* productivity (efficient distribution systems and social networks)

at three levels of complexity:

- personal (micro) CI-3
- institutional (meso)CI-1 and CI-2
- city or regional (macro) CI-4

The conceptual quarry here is the emergence and productivity of *innovation and discovery* (Leadbeater, 2008, 2010; Leadbeater & Wong, 2010; Shirky, 2006); not simply that of production efficiency in existing processes.

[12] The Productivity Commission is an Australian government agency whose purpose is to 'improve the productivity and economic performance of the economy, reduce unnecessary regulation, [and] encourage the development of efficient and internationally competitive Australian industries'. See: Available from: http://www.pc.gov.au/about-us/principles

Social learning

Micro-productivity requires *social networks*, real and virtual. Given that new ideas are not innovative until implemented, *innovation* is therefore heavily reliant on "social learning" (Thomas & Seely, Brown 2011; Lanham, 2006), via widespread participation in mediated interaction, including DIY-DIWO culture (Kera, 2011). In turn, social learning itself is a powerful force in the spread of ideas – people copy, use, repurpose and communicate ideas that they find useful, thereby spreading the ideas and attendant activities.

The actual process of social learning through the communication and indiscriminate uptake of ideas using available media is perhaps as old as our species. What's new is the scale at which spreading ideas is now possible, using the internet and other digital applications. Because of this, it is also newly possible to trace the actual process of social learning by means of data-mining within social media and networks. Thus, where *micro-productivity* identifies creative agency at the micro scale, *social learning* indicates how it works at meso (organisational) and macro (coordinated system) scale, which is where innovation can be observed. Thus we need to identify the extent to which *micro-productivity* and *social learning* together form a field for experimentation, adaptation, and emergence for networked systems.

In practical terms, this is also where the economic and cultural potential of infrastructure investments like fast broadband (in Australia, the NBN or National Broadband Network) can be understood as more than just another distribution system to convey products to consumers (NBN, 2010, p. 12). It can be re-imagined as a system for sharing both creativity and learning among many (scale-free) productive sites and agencies, going beyond firms and professionals to *whole-of-population* productive agency, some located in households or as sole-traders, some emerging from the very dynamics of the network itself, and some harnessing *distributed expertise* from multiple sources (crowdsourcing) to include the productivity of users. Fast broadband can help to release and develop the creative potential of the ordinary population, but only if the process of creative emergence and productive organisation is properly understood, nurtured, and coordinated as part of a larger shift towards user-centred innovation (von Hippel & Chen, 2008).

The oldest model of such a *system* is the language system or, more exactly, the semiosphere (Lotman, 1990). The oldest model of such *agency* is play (Konner, 2010; Lotman, 1977; Thomas & Seely, Brown 2011). In other words, the resources for innovation, the rules for its organisation, and the means by which sense is made of it across whole systems were already part of *cultural studies 101*.

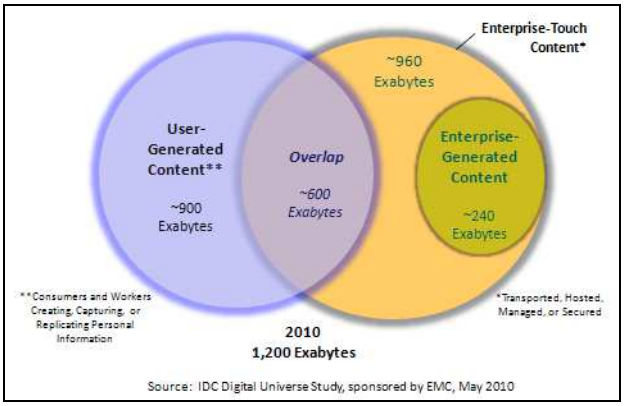
Work that was thought to be either too theoretical (structural-formalist linguistics) or too inconsequential (play) for the liking of positivist social science and neoclassical economics became core when connected to the *evolutionary* agenda. Language is simply the most elaborate and evolved Barabasian network for micro-productivity that you could think of; and play is a proxy for social learning, naturalistic experimentation, learning by doing and by copying, used by everyone for developing and maintaining social networks and collaborative/competitive relations as part of individual and group identity formation and reinforcement. Thus:

SOCIAL LEARNING SYSTEMS
Learning is a property of systems not individuals
•**Ideas are output** (system-generated) **not input** (rational individual)
•**Learning occurs within and through changing networks**
•**Connectivity and technology are learning resources**
Innovation depends on the cultivation of the imagination
•**Importance of play**: interactive, relationship- and identity-forming, rich in meaning
•**Play as social learning for emergence of the new**
Creative industries = social network markets
•**Individual choices are determined by the choices of others**
•**Leisure entertainment is the playpen of innovation**

A priority for future research in cultural science, therefore, is to identify where and to what extent practical innovations may result from the combination of digitally equipped sense-making micro-productivity and playful social learning, to add to an *innovation ecology* that to date recognises only science-and-technology and firm-based innovation (i.e. an *expert pipeline* model). We need to find out how such innovations emerge and operate across three interconnected levels of complexity: personal (communication), institutional (media) and place-based (cultural). Again, these are *core* questions for cultural studies as well as for economic and complexity sciences.

Integrated creativity in a technologically equipped culture

This 2010 diagram from industry analysts IDC shows both the *potential of creative agency* and the *scale of digital connectivity* in what they call the *Digital Universe* (IDC, 2010).



The diagram makes clear that most of the creativity in the digital universe remains as dark matter – it is unknown to *Enterprise*, and firms are not the agents of innovation that they once were. But the mediated enterprise of self-directed creative interaction among all the agents in a system escalates year-by-year (Halavais, 2009). The growing scale of user-generated content means the *active audience's* own actions, not their behavioural *reactions*, are now the most important empirical field for the investigation of dynamic change in media/ cultural systems.

The urgency of interdisciplinarity

This kind of work urgently necessitates interdisciplinary and inter-sectoral collaboration, of the kind that the CCI has pioneered among media, law, education, business and IT specialists, both local and international. Further, it needs now to push on, to an attempt at *consilience* between cultural and economic sciences, not only at the intellectual but also at the institutional level. We need to develop interdisciplinary teams, harnessing together the disciplinary inputs of:

- Creative industries (cultural, media and communication studies);
- Evolutionary economics and evolutionary science more generally;
- Complexity science and network or systems theory.

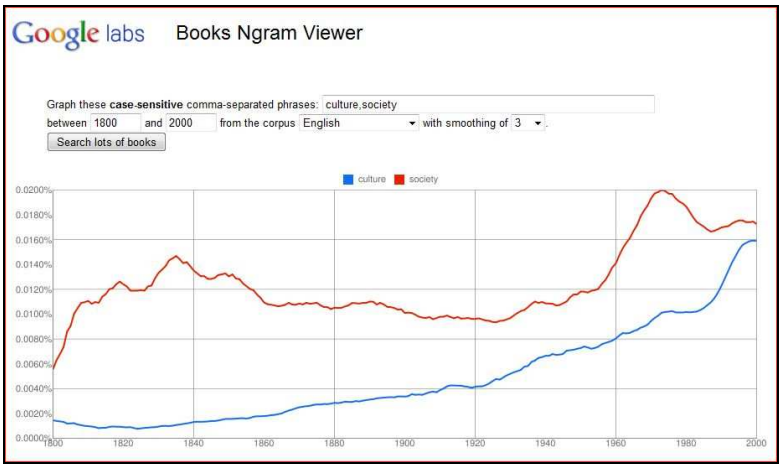
This is the foundation for cross-disciplinary and inter-sectoral problem-solving across creative, cultural, economic and consumer fields. It will also link an expanding group of local and international colleagues with partners in business, government and the creative sector. Those partners already include some significant collaborators, with whom we have worked and published since the cultural science project was launched in 2008.[12]

With such *consilience*, tools to model and measure dynamic change in creative systems can be adapted from mathematics, complexity theory, economics and game theory. One readily accessible

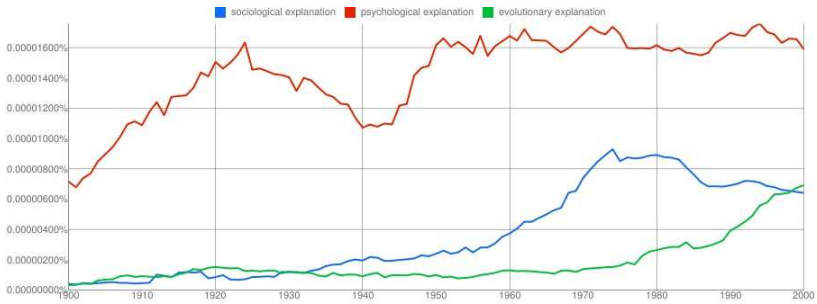
[13] Available from: http://cultural-science.org/journal/index.php/culturalscience/issue/archive.

example of what can be achieved comes from the recently announced *culturomics* approach, using the digitised archive of books compiled by knowledge giant Google. Culturomics is "the application of high-throughput data collection and analysis to the study of human culture" (Michael et al., 2010). An appealing application is to trace the relative standing of different words across immense numbers of texts and very long time periods.

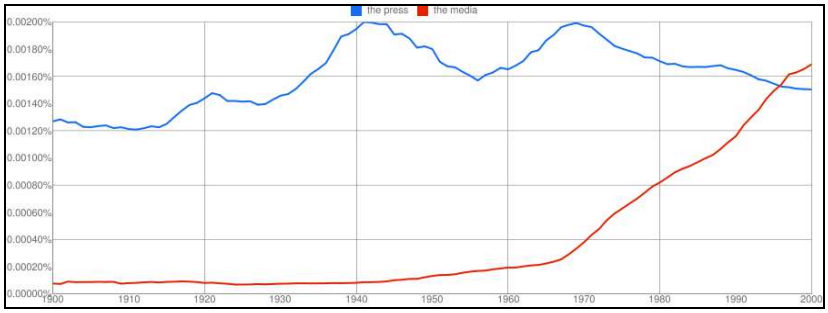
Here (below) are some widely circulated early examples. First, the career of the two words *culture* and *society* since 1800, showing *culture's* recent rapid rise to challenge *society's* hegemony as an explanatory term. Similarly, a comparison of *frameworks of explanation* derived from *psychology*, *sociology* and *evolution* respectively since 1900 shows how psychological frameworks of explanation dominate, but are now being approached – if not challenged – by evolutionary ones. And finally, it is interesting to see how the media as a term has eclipsed *the press* since 1900.



Culturomics 1: Culture and Society
Available from: http://savageminds.org/2011/01/05/culturomics/

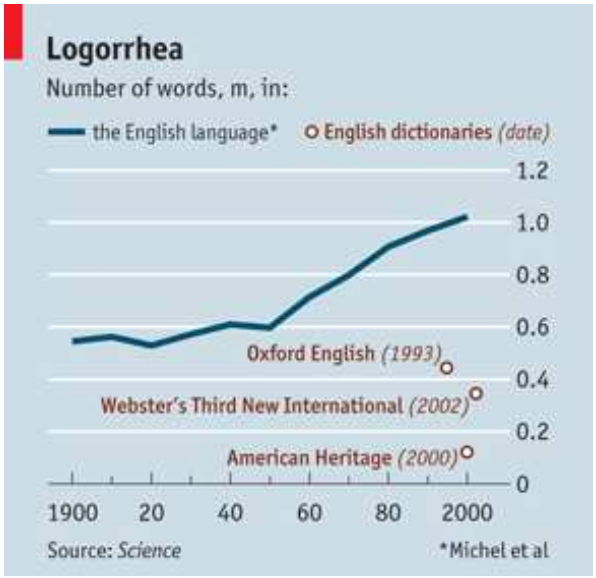


Culturomics 2: Sociological, Psychological and Evolutionary Explanation
Available from: http://gearybehaviourcenter.blogspot.com/2011/03/culturomics.html



Culturomics 3: The Press; The Media
Available from: http://blogs.crikey.com.au/fullysic/2011/02/18/culturomics-and-google-books/

Reporting on the launch of culturomics under the challenging headline *Science invades the humanities*, *The Economist* (2010) ran a story on the scope of the English language as captured by lexicographical compared with culturomic methods. The latter was used to isolate *1-grams* (lexical strings – phenomena previously known as words), thereby revealing that English is twice a big as is captured in the *OED*, the most comprehensive lexicographic dictionary; and – more interestingly – that it has doubled its vocabulary since 1950.



Available from: www.economist.com/node/17730198

The implication of such experiments for my *home* discipline of media and communication studies is that, instead of remaining satisfied with *imagined* communities (Anderson, 1991), *behavioural* influences or contested media *effects*, it is now possible to develop and test the concept of

social learning to *replace* that of media *influence* or *effect*, because the scale and choices of mediated communities can now be measured and analysed, not simply imagined, as was always the case for notions like the *reading public* or the *public sphere*. Combined with the concept of *micro-productivity*, this offers an integrated cultural and economic approach to the study of agency, choice, and the emergence of novelty in systems that operate at both personal and population-wide scale.

All types of country; all policy agencies

The outcomes will be critical for policymakers, not only in advanced countries where internet use is already ubiquitous if not universal, but also in emergent and developing countries, across this gradient:

- *advanced* (e.g. Australia, UK)
- *emergent* (e.g. China)
- *developing* (e.g. Indonesia, Thailand, Philippines)

Many international agencies are active in planning creative economies. They include UN bodies like UNDP, UNESCO etc., as well as quasi-UN bodies like WIPO, the IMF and the World Bank. Private consultancy firms are active, from global brands like KPMG, McKinsey and PwC,[13] to domain specialists like BOP Consulting or think-tanks like Demos and the Work Foundation. This is the energetic interdisciplinary arts/science interface where cultural and economic values converge and integrate, and not just for the already-rich.

Emergent innovation

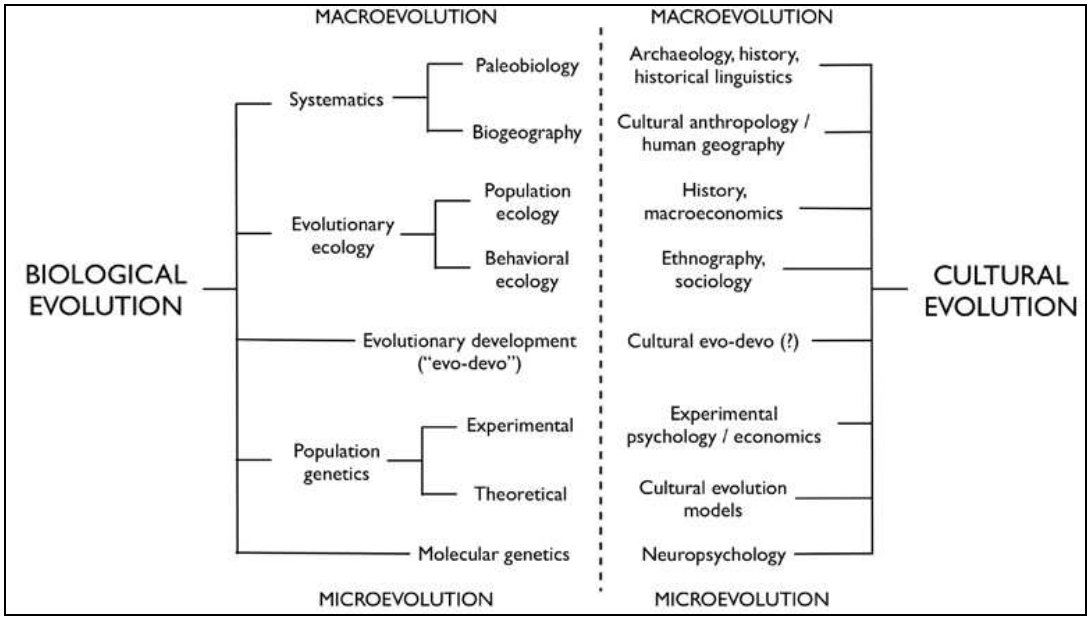
At stake is an integrated development strategy for emergent innovation at all levels:

AN ANALYTICAL MATRIX FOR CULTURAL SCIENCE		
Level of Complexity	Type of Productivity	Realm of Learning
Micro – persons	emergent	language
Meso – institutions	| elaborate	media
Macro – cities	complex	culture

This is why interdisciplinarity is urgent; and why we need a cultural science sooner, not later. *Most of the creativity in the digital universe goes unobserved in policy and industry practice and is not taken into account in cultural or economic strategy for the creative industries*. We must devise ways to catalyse this creative productivity, showing how user innovations contribute to social learning and

[14] Available from: http://www.pwc.com/gx/en/global-entertainment-media-outlook/index.jhtml

economic and cultural advancement. In order to do that, we need to know what an open, creative innovation system is, and how it works, both culturally and economically. So far, the humanities-based *creative interdisciplines* have been unable or unwilling to tell us. So we need to talk seriously to the sciences. They too have been transforming rapidly in the wake of evolutionary, complexity and computational advances over the past few decades. They are progressively developing a *knowledge tree* of their own approaches to cultural evolution at both micro and macro levels of analysis (Mesoudi, 2010, p. 9, see figure, below), where the structure of the biological sciences following the evolutionary synthesis (left-hand side) is shown alongside an equivalent structure for an evolutionary cultural science (right-hand side):



Alex Mesoudi's knowledge-tree for the evolution of cultural science
Source: http://cultural-science.org/journal/index.php/culturalscience/article/view/35/109

Alarmingly, humanities-based approaches appear nowhere on this tree (see also Mesoudi, 2011). The knowledge of culture produced to date by cultural studies is not significant or visible enough even to count as knowledge in current best-practice scientific inquiry into culture. That situation should not be allowed to continue unchallenged, because cultural studies does have something to offer. If we can succeed in linking humanities-based appro aches to identity, relationship and meaning with science-based understandings of network, scale and change, we ought to be able to recognise, and then to

harness, the creative productivity of all the agents in the system, not just the experts who've benefited from disciplinary exclusiveness in the past (Shirky, 2010; Hartley, 2012, ch. 4). In other words, the *dark matter* of the digital universe – population-wide creative productivity –becomes visible, countable, and (in the best sense of the word) *exploitable*. The chances are it will take us another thirty years to get it on the knowledge radar; so there's no time to lose.

REFERENCES

Arthur, B. (2009). *The Nature of Technology: What it is and how it evolves.* London: Penguin; New York: Free Press.

Anderson, Benedict (1991). *Imagined communities: Reflections on the origin and spread of nationalism*, 2nd edn. London: Verso.

Anderson, C. (2006). *The Long Tail: How endless choice is creating unlimited demand.* London: Random House.

Aspers, P. (2010). *Orderly Fashion: A Sociology of Markets*. Princeton & Oxford: Princeton University Press.

Bakhtin, M. (1993[1941, 1965]). *Rabelais and His World*. Trans. Hélène Iswolsky. Bloomington: Indiana University Press.

Barabási, A-L. (2002). *Linked: The New Science of Networks.* Cambridge, MA: Perseus Publishing.

Barthes, R. (1973). *Le Plaisir du Texte*. Paris: Éditions du Seuil (English translation published by Hill and Wang, NY, 1975).

Baym, N. (2010). *Personal Connections in the Digital Age*. Cambridge: Polity Press.

Beinhocker, E. (2006). *The Origin of Wealth: Evolution, Complexity and the Radical Remaking of Economics.* New York: Random House.

Bennett, T., L. McFall & M. Pryke (2008). Culture/economy/social. *Journal of Cultural Economy*, 1:1, 1-7.

Bérubé, M. (2009, Sept 14). What's the matter with cultural studies? The popular discipline has lost its bearings. *The Chronicle of Higher Education* (*Chronicle Review*). Available from: http://chronicle.com/article/Whats-the-Matter-With/48334/

Bird, S.E. (2003). *The Audience in Everyday Life: Living in a Media World*. New York: Routledge.

Bonnell, V. & L. Hunt, eds., (1999). *Beyond the Cultural Turn.* Berkeley: U California Press.

Burgess, J. & J. Green (2009). *YouTube: Online video and participatory culture.* Cambridge: Polity Press.

Bruns, A. (2005). *Gatewatching: Collaborative Online News Production*. New York: Peter Lang.

Bruns, A. (2008). *Blogs, Wikipedia, Second Life, and Beyond: From Production to Produsage*. New York: Peter Lang.

Cheong, F. & C. Cheong (2011). Social Media Data Mining: A Social Network Analysis of Tweets during the Australian 2010-2011 Floods. Melbourne: Available from: http://projects.business.uq.edu.au/pacis2011/papers/PACIS2011-036.pdf

Craft Australia (2010). Networked Production: On Making with Bits and Atoms. Available from: http://www.craftaustralia.org.au/library/review.php?id=networked_production

Cunningham, S. (2011). The Creative Cities Discourse: Uses and Abuses. Cultural Policy and Governance in a New Metropolitan Age. In H. Anheier & Y. Isar, eds., *The Cultures and Globalization Series, Vol 5*. London: Sage Publications.

DCMS: Department of Culture, Media & Sport [UK Govt.] (2001). *Creative Industries Mapping Document* [first edn published 1998]. London: HMSO.

Deuze, M. (2007). *Media Work*. Cambridge: Polity Press.

Dopfer, K., J. Foster & J. Potts (2004). Micro-Meso-Macro. *Journal of Evolutionary Economics* 14, 263-279.

Eco, Umberto (1987). *Travels in Hyper-reality*. Trans. W. Weaver. London: Picador.

The Economist (2010). Reading by numbers: Science invades the humanities. Dec 16. Available from: http://www.economist.com/node/17730198

Fisher, W. (2004). *Promises to Keep: Technology, Law and the Future of Entertainment*. Stanford: Stanford University Press.

Fiske, J. (1987). *Television Culture.* New York: Routledge.

Fiske, J. & J. Hartley (1978). *Reading Television*. London: Methuen. 2nd edn published 2003 by Routledge.

Gauntlett, D. (1998). Ten things wrong with the "effects model". In R. Dickinson, R. Harindranath & O. Linné (eds) *Approaches to Audiences – A Reader*. London: Arnold. Available from: http://www.theory.org.uk/david/effects.htm

Gauntlett, D. (2005). *Moving Experiences, 2nd edition: Media Effects and Beyond.* London: John Libbey.

Gibson, M. (2007). *Culture and Power: A History of Cultural Studies.* Oxford: Berg; Sydney: UNSW Press.

Gray, J. (2010). Entertainment and media/ cultural/ communication/ etc. studies. *Continuum: Journal of Media and Cultural Studies*, 24:6, 811-817.

Halavais, A. (2009). *Search Engine Society*. Cambridge: Polity Press.

Hartley, J. (2009). *The Uses of Digital Literacy*. St. Lucia: University of Queensland Press; New Brunswick NJ: Transaction Publishers.

Hartley, J. (2010). Tricksters and Cultural Science. *Cultural Science Journal* 3:1. Available from: http://cultural-science.org/journal/index.php/culturalscience/article/view/30/110

Hartley, J. (2012). *Digital Futures for Cultural and Media Studies.* Malden, MA: Wiley-Blackwell.

Hebdige, D. (1979). *Subculture: The Meaning of Style*. London: Methuen.

Hess, C. & E. Ostrom (eds.), (2006). *Understanding Knowledge as a Commons: From Theory to Practice*. Cambridge, MA: MIT Press.

Hutter, M. & D. Throsby (eds.), (2008). *Beyond Price: Value in Culture, Economics, and the Arts*. Cambridge: CUP.

IDC (2010, May). *The Digital Universe Decade – Are You Ready?* By J. Gantz & D. Reinsel. EMC Corporation. Available from: www.emc.com/digital_universe

Jacob, M. (1999). Science Studies after Social Construction: The Turn toward the Comparative and the Global. In Bonnell &Hunt, eds., 95-120.

Jenkins, H. (2003, 15 January). Transmedia Storytelling. *Technology Review*. Cambridge, MA: Massachusetts Institute of Technology.

Jenkins, H. (2006). *Convergence Culture: Where old and new media collide*. New York: NYU Press.

Jenkins, H. (2007, March 22). Transmedia storytelling 101. Online: Available from: http://www.henryjenkins.org/2007/03/transmedia_storytelling_101.html

Jenkins, H. (2009). If it doesn't spread, it's dead [eight parts]. *Confessions of an Aca-Fan* [blog]. Available from: http://www.henryjenkins.org/2009/02/if_it_doesnt_spread_its_dead_p.html

Katyal, S. (2006). Semiotic Disobedience. *Washington University Law Review*, Vol. 84, No. 2, 2006. Available from: http://ssrn.com/abstract=1015500

Kera, D. (2011). Grassroots R&D, Prototype Cultures and DIY Innovation: Global Flows of Data, Kits and Protocols. In: *Pervasive Adaptation: The Next Generation Pervasive Computing Research Agenda*. Available from: http://www.perada.eu/research-agenda#item:69 (and see: www.pervasive.jku.at/fet11/RAB.pdf#page=51)

Konner, M. (2010). *The Evolution of Childhood: Relationships, Emotion, Mind*. Cambridge, MA: Harvard UP.

Lanham, R. A. (2006). *The Economics of Attention: Style and Substance in the Age of Information*. Chicago: Chicago UP.

Leadbeater, C. (2008). *We-Think. Mass Innovation, not Mass Production: The Power of Mass Creativity*. London: Profile Books. Available from: http://www.youtube.com/watch?v=qiP79vYsfbo

Leadbeater, C. (2010). *Cloud Culture: Promise and Danger*. British Council: Counterpoint. Available from: http://www.counterpoint-online.org/cloudculture-promise-and-danger/

Leadbeater, C. & A. Wong (2010). *Learning from the Extremes*. Online: Cisco Public Information. Available from: http://www.cisco.com/web/about/citizenship/socio-economic/docs/LearningfromExtremes_WhitePaper.pdf

Lee, R. E. (2003). *Life and Times of Cultural Studies: The Politics and Transformation of the Structure of Knowledge*. Durham: Duke University Press.

Lenin, V. I. (1902). *What is to be Done? Collected Works,* Volume 5: 347-530. Moscow: Foreign Languages Publishing House (1961). Available from: http://www.marxists.org/archive/lenin/works/1901/witbd/

Lenin, V. I. (1920). Left Wing Communism: An Infantile Disorder. *Collected Works*, Vol. 31: 17-118. Moscow: Progress Publishers (1964). Available from: http://www.marxists.org/archive/lenin/works/1920/lwc/

Lotman, Y. (1977). *The Structure of the Artistic Text*. Ann Arbor: University of Michigan Press.

Lotman, Y. (1990). *Universe of the Mind: A Semiotic Theory of Culture.* Bloomington: Indiana University Press.

Martin, J. (2009). Distributed vs. centralized electricity generation: are we witnessing a change of paradigm? An introduction to distributed generation. Paris: HEC. Available from: http://www.vernimmen.net/ftp/An_introduction_to_distributed_generation.pdf

May, H. & G. Hearn (2005). The mobile phone as media. *International Journal of Cultural Studies* 8:2, 195-211.

Mesoudi, A. (2010). Evolutionary Synthesis in the Social Sciences and Humanities. *Cultural Science Journal* vol 3:1. Available from: http://cultural-science.org/journal/index.php/culturalscience/article/view/35/109

Mesoudi, A. (2011). *Cultural Evolution: How Darwinian evolutionary theory can explain human culture and synthesise the social sciences*. Chicago, IL: University of Chicago Press.

Meyer, E. T., & Schroeder, R. (2009). Untangling the Web of e-Research: Towards a Sociology of Online Knowledge. *Journal of Informetrics*, 3:3, 246-60.

Michael, J-B. et al., (2010). Quantitative Analysis of Culture Using Millions of Digitized Books. *Science Express.* Published Online 16 December 2010. Available from: http://www.sciencemag.org/content/early/2010/12/15/science.1199644

Miller, T. (2007). *Cultural Citizenship: Cosmopolitanism, Consumerism, and Television in a Neoliberal Age*. Philadelphia: Temple University Press.

Miller, T. (2009). Can Natural Luddites Make Things Explode or Travel Faster? The New Humanities, Cultural Policy Studies, and Creative Industries. In J. Holt & A' Perren (eds.), *Media Industries : History, Theory and Method.* Malden, MA: Wiley-Blackwell, 184-98.

Montgomery, L. (2010). *China's Creative Industries. Copyright, Social Network Markets and the Business of Culture in a Digital Age.* Cheltenham: Edward Elgar.

Morrison, D. (1998). *The Search for a Method: Focus Groups and the Development of Mass Communication Research.* Luton: Luton UP.

NBN (2010). *Corporate Plan.* Available from: http://www.nbnco.com.au/wps/wcm/connect/eea11780451bd3618ebfef15331e6bbb/101215+NBN+Co+3+Year+GBE+Corporate+Plan+Final.pdf?MOD=AJPERES

Neilson, B., & N. Rossiter (2005). Multitudes, Creative Organisation and the Precarious Condition of New Media Labour. *Fibreculture Journal*, 5. Available from: http://five.fibreculturejournal.org/

O'Connor, J. (2009). Creative Industries: A New Direction? *International Journal of Cultural Policy*, 15:4, 387-402.

O'Connor, J. (2010). *The Cultural and Creative Industries: A Literature Review*, 2nd edn. Newcastle-upon-Tyne: Creativity Culture and Education. Available from: http://www.creativitycultureeducation.org/data/files/cce-lit-review-creative-cultural-industries-257.pdf

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Papacharissi, Z. (2010a). A *Private Sphere: Democracy in a Digital Age*. Cambridge: Polity Press.

Papacharissi, Z. ed., (2010b). *A Networked Self: Identity, Community, and Culture on Social Network Sites*. New York: Routledge.

Poteete, A., M. Janssen & E. Ostrom (2010). *Working Together: Collective Action, the Commons, and Multiple Methods in Practice*. Princeton & Oxford: Princeton University Press.

Potts, J. (2008). Creative industries & cultural science: A definitional odyssey. *Cultural Science* 1:1. Available from: http://www.cultural-science.org/journal/index.php/culturalscience/article/viewArticle/6/16

Potts, J., S. Cunningham, J. Hartley, P. Ormerod (2008). Social network markets: a new definition of the creative industries. *Journal of Cultural Economics*, 32, 167-85.

Potts, J. & Cunningham, S. (2008). Four Models of the Creative Industries. Available from: http://www.feast.org/workshops/creative2008/StuartCunningham.pdf

Potts, J. & T. MacDonald (2011). Why the bloody hell live there? First estimates of a Cultural Consumption Price Index by Australian region. *Australian Policy Online*: Available from: http://www.apo.org.au/research/why-bloody-hell-live-there-first-estimates-cultural-consumption-price-index-australian-regi

Rosas-Guyon, L. (2010). Bioprinting and Micro Manufacturing. Available from: http://blog.r2computing.com/2010/04/bioprinting-and-micro-manufacturing.html

Ross, A. (2009). *Nice Work If You Can Get It: Life and Labor in Precarious Times*. New York: NYU Press.

Turner, G. (2010). *Ordinary People and the Media: The Demotic Turn.* London: Sage Publications.

Schroeder, R. (2007). *Rethinking Science, Technology, and Social Change*. Stanford: Stanford University Press.

Shirky, C. (2006). *Here comes Everybody: The Power of Organizing without Organizations.* NY: Penguin.

Shirky, C. (2010). The Shock of Inclusion. *The Edge World Question Center*: Available from: http://www.edge.org/q2010/q10_1.html#shirky

Smiers, J. & M. van Schijndel (2009). Imagine there is no copyright and no cultural conglomerates too... Better for artists, diversity and the economy. Amsterdam: *Institute of Network Cultures*. Available from: http:// www.networkcultures.org/_uploads/tod/TOD4_nocopyright.pdf.

Sokal, A. (1996). Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity. *Social Text*, 46/47, 217-252. [hoax article]

Thomas, D. & J. Seely Brown (2011). *A New Culture of Learning: Cultivating the Imagination for a World of Constant Change*. USA: CreateSpace. Available from: http:// www.newcultureoflearning.com/newcultureoflearning.html

Uricchio, W. (2004). Cultural Citizenship in the Age of P2P Networks. In I. Bondebjerg & P. Golding, eds, *Media Cultures in a Changing Europe*. UK: Intellect, 139-164.

Von Hippel, E. (1988). *Sources of Innovation*. New York: Oxford University Press.

Von Hippel, E. & Chen Jin (2008). The major shift towards user-centred innovation: Implications for China's innovation policymaking. *Journal of Knowledge-based Innovation in China*, 1:1, 16-27.

Willis, P. (1977). *Learning to Labour: How Working Class Kids Get Working Class Jobs.* Aldershot: Gower, 1977 (published in the USA by Columbia UP).

Wilson, E.O. (1998). *Consilience: The Unity of Knowledge*. New York: Alfred A. Knopf.

Zittrain, Jonathan (2008). *The Future of the Internet – and How to Stop It*. New Haven, CT: Yale University Press.

Article received on 20th August 2011 and approved on 24th September 2011