Disciplines and the Digital: The Curricular Implications of Changes to Knowledge Online

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Abstract: The question of the structure of knowledge and the foundations required for building new knowledge in the 21st century is one receiving considerable attention and response today as universities struggle with the extent to which content should be derived from what matters in the world now, what aspects of older forms of disciplinary organisation remain relevant, and what needs to be done differently to prepare for a rapidly changing world. This paper explores the relationship of emerging debates and practices about networked knowledge creation, utilisation and dissemination to understandings of the formal disciplinary organisation of knowledge in universities in this context. It draws on two lines of theory with conflicting views about appropriate directions for knowledge and curriculum today: (1) from theorists which emphasise the emerging possibilities and more fluid spatialisation that is core to knowledge in new times, and (2) from those emphasising the destabilising of traditional disciplinary hierarchies and criticising the extrinsic forms which now govern curriculum and pedagogy. The paper outlines these debates and examines some of the existing evidence about the recent rise of Massive Open Online Courses (MOOCs) in relation to the lenses offered. In the context of these new courses, it argues that although both arguments offer valuable insights, neither position can be seen as wholly adequate for characterising the shift towards these new knowledge forms.

Keywords: Knowledge, Disciplines, MOOCs

Introduction

This paper explores the relationship of emerging debates and practices about networked knowledge creation, utilisation and dissemination to understandings of the formal disciplinary organisation of knowledge in universities, drawing on two lines of theory with conflicting views about appropriate directions for knowledge and curriculum today in the context of changing technologies, practices and university purposes. These arguments arise (1) from theorists which emphasise the emerging possibilities and more fluid spatialisation that is core to knowledge in new times, and (2) from those emphasising the destabilising of traditional disciplinary hierarchies and criticising the extrinsic forms which now govern curriculum and pedagogy. The paper outlines these debates and examines some of the existing evidence about the recent rise of Massive Open Online Courses (MOOCs) offered by or in association with prestigious United States institutions in relation to the lenses offered. At a time when much of the discussion about MOOCs is focused on technological issues and ‘what works’, this paper takes a step back to think about the significance of longer term questions about the potential for new forms of knowledge and curriculum for either strengthening knowledge for new times or undermining its traditional foundation. In the context of the new open online courses, it argues that although the two types of arguments presented offer valuable insights, neither position can be seen as wholly adequate for characterising the shift towards these new knowledge forms. It suggests that there is need for new theoretical conceptions and a broader dialogue around issues of knowledge and curriculum to enable a fuller understanding of the directions currently in train in universities.

The Nature of Knowledge as Unsettled by the Digital

As the online world becomes a more important and powerful space of interaction and engagement, there is a growing sense that the internet is transforming how knowledge is being thought about and enacted that have implications for academic organisation and practice in universities today. In The Wealth of Networks Yonchai Benkler (2006) argues that the changes brought about by the networked information environment are deep and structural, creating new
opportunities for how knowledge and culture are developed and exchanged. The decentralisation of the physical capital for the production, distribution and use of information, knowledge and culture afforded by the networked economy is seen to have caused a radical distribution of practical capabilities in these areas, creating new levels of efficacy for individuals and new capacities for loose collaborations. For Benkler (2006), changes towards openness in current modes of production and consumption symbolise a new mode of social production and a form of cultural formation that represents an alternative to capitalist forms of globalisation, leading to a flourishing nonmarket of information, knowledge and cultural production and the rise of a networked public sphere. He argues digital commons-based peer production represents a more inclusive, post-scarcity driven economics and increased opportunities for connectedness, membership and sharing, and that in response universities need to focus on managing the increasingly permeable boundaries between institutions and with the world outside them and become attuned to the need to build platforms for cooperation (Benkler 2008).

Michael Peters (2007) also draws on Benkler’s work to make the argument that the new communications environment has the potential to reshape the university as a networked environment. According to Peters (2007), the shift to a knowledge economy is leading to emerging forms of knowledge capitalism, as knowledge creation, acquisition, transmission and organisation are affected by the forces of digitization, speed and compression, but the opening up of online spaces provides potential for an alternative to the current neoliberal order. He argues that the university is currently caught “in an epic struggle between a neoliberal construction of knowledge capitalism...and ‘knowledge socialism’ based on the effective and large-scale collegial and peer production of information, knowledge and culture” (Peters 2007, 179-180).

Peters and Roberts (2012) propose the concept of knowledge cultures to promote recognition of plural institutional knowledge cultures within networked practices. Their argument is based on the idea that knowledge creation, production and dissemination requires the cultural exchange of ideas dependent upon certain cultural conditions, including trust, reciprocal rights and responsibilities between different knowledge partners, institutional routines, regimes and strategies. For Peters (2007), the open source, open access and open science movements exemplify this through together demanding and articulating a view of freedom. According to Peters and Roberts (2012, 118) open knowledge production systems embrace knowledge as a global public good and contradict the old knowledge economy and its neoliberal policy prescriptions, and open educational resources can be seen as an aspect of a wider political and philosophical movement and “an emerging political economy of social production”.

Peters (2007) argues the shifts being seen as a result of the networked environment towards openness in education have the potential to transform the concepts of readership, scholarship and authorship and in the process the concepts of the disciplines, disciplinarity and inter-/multidisciplinarity. He proposes that:

“the traditional academic disciplines will undergo rapid change as open journal systems and open conference systems become more the norm. The humanities and social sciences, their subject divisions and disciplinarity, stand before the rejuvenated question of the ‘end of the book’ and the beginning of a new digital literary culture that takes different forms and implies a different configuration of the public and the private” (Peters 2007, 192).

In Peters’ view, these changes are already starting to be seen with the phenomenon of networked knowledge revolutionising “how researchers from various disciplines collaborate over long distances especially in the Life Sciences, where interdisciplinary approaches are becoming increasingly powerful as a driver of both integration and discovery” (2010, 262).

In earlier work, Lankshear, Peters and Knobel (2000) argue that rapid and far reaching technological change and assaults on longstanding narratives of foundation and legitimation have put the conditions and status of knowledge in a state of profound upheaval and destabilised questions about knowledge that in the past have been fundamental to epistemological work. They
propose that the traditional epistemological model constructs knowledge as something carried linguistically and expressed in sentences and theories, but that the internet’s radical convergence of text, image and sound is breaking down the primacy of propositional linguistic forms of truth bearing. They suggest knowledge online might be better understood as a performance epistemology, a characterisation which directly confronts the stability assumed by scientific knowledge work. Lankshear (2003) later identifies a need for ‘digital epistemologies’, arguing that traditional epistemologies based on knowledge as justified true belief and propositional linguistic forms (knowing that) are inadequate in the digital age as they are based on individual logic and cannot capture shifts towards collaborative knowledge, which he proposes has implications for moving curriculum away from discipline-based subject forms.

Weinberger (2011) also emphasises the new potentials of networked knowledge as signalling a radical break from traditional understandings of knowledge. For Weinberger (2011), our conception of knowledge is tied to its medium, which in the online environment is showing itself to be unsettled, collaborative, fallible and a product of disagreement, in opposition to a view of knowledge as capturing a containable world under (and as a product of) the paper-based model. Weinberger proposes that in the online networked world, knowledge is becoming inextricable from the network that enables it, and that as a result “the smartest person in the room isn’t the person standing at the front lecturing us, and it isn’t the collective wisdom of those in the room. The smartest person in the room is the room itself: the network that joins the people and ideas in the room, and connects to those outside of it” (Weinberger 2011, x). He suggests that knowledge is taking on the properties of the network – scientific knowledge for example is becoming bigger (as a result of data-based science), less hierarchical (due to increased communication between professional and amateur), more continuously public (with the advent of open notebooks), less centrally filtered (as a result of open access journals), more open to differences (in public debates between scientists and with citizens) and hyperlinked (in allowing connections to be made between knowledge and its source). Weinberger argues that this networking of knowledge is changing our basic strategy of knowing from knowing-by-reducing (to what fits in a library/journal) we are knowing-by-including (every idea in loose webs) and proposes that the borderless ‘shape’ of the internet means that networked knowledge lacks the notion of a foundation which we have long taken to be essential to the structure of knowledge. For Weinberger, new properties of expertise are seen to be starting to take hold, occasioning a shift from old expertise (topic based, conclusive, opaque, one way, specialised and singular) towards a new form of expertise where topics connect messily, the value is in opening things up, sources are linked and available, and expertise is multi-way, non-hierarchical and a raucous market of ideas, knowledge and authority.

In a similar vein, Land (2011) also argues that shifts from the printed text to digital forms are requiring universities to confront some fundamental notions concerning textual stability, academic authority, approaches to academic writing, and traditional ways of practising. He proposes that within a print-based culture, disciplines flourished in closed, regulated environments, but new digital environments are defying methods for imposing closure and authorial control in ways that seem to undermine the authority of academic knowledge, occasioning a shift to “openness, inclusivity, and fluidity” (Land 2011, 62). Land suggests that digital environments tend to be more concerned with image, openness, multimodality and collectivity, and foster collaborative enquiry and production, and sit uncomfortably within existing higher education practice.

The work by these scholars highlights what is new and different about knowledge creation and dissemination in online environments, emphasising radical changes to knowledge and the way it is produced, preserved and disseminated in relation to the immediacy of interaction, the scale and form of engagement and the dissemination of power and control. The work emphasises changes in how and in what ways people collaborate across time and space and identifies a shift from hierarchies to loose, networked collaborations as leading to radical changes in authority relationships. Under this view, disciplinary authority relations are seen to be dissolving but in a
way that opens up new possibilities and potentials, particularly through the opportunities for new forms of social production and knowledge cultures afforded by open online spaces.

The Continuing and Foundational Significance of Disciplinary Knowledge

These debates raise interesting questions for the organisation of knowledge within universities, but may be too quick to dismiss the foundational importance of disciplines to the development of knowledge in formal education and over-emphasise the new affordances of open knowledge production. In opposition to the literature on changing knowledge practices, work in the sociology of knowledge led by Young (2008), Muller (2000) and Moore (2007) has argued for the importance and specificity of disciplines such as history and physics, and the danger of superficiality in taking instrumental, problem-centred and interdisciplinary approaches as the organizational starting-point for university learning. Drawing on earlier work by Basil Bernstein (1996) which emphasises knowledge domains as defined by their relationships and boundaries relative to each other, these theorists see boundaries and domains as preconditions for meaningfulness and the constitution of sense, and therefore as also preconditions for the transcendence of those boundaries.

These social realists see shifts towards skills-based curricular approaches in universities as driven by external requirements rather than the internal demands of the disciplines, and as thus representing a deep opposition to the goals and traditional autonomy of discipline-based curriculum and the discipline based model of the university. Along with shifts towards greater specialism and differentiation in academic research, they negatively identify a simultaneous trend towards genericism and commonality and a global process of de-differentiation of institutions, knowledge and sites and types of learning as taking place in education (Muller 2012; Young 2010). These theorists emphasise the importance of disciplines and disciplinary boundaries for knowledge development and interpret moves away from their central organisation as a rejection of the differentiation and specialisation required for progress and innovation (Young 2012).

Work in this field thus denies changes are occurring in how epistemic authority can be established, and interprets shifts in authority relations in the higher education sector solely in relation to issues of power and institutional authority. Beck and Young (2005) draw on Bernstein’s concept of regionalisation (the changing boundary relationships between the fields of knowledge production and practice) to argue that contemporary changes to the organisation of knowledge in higher education are leading to a restriction of both the external conditions of academic practice and the core of academic disciplinary identity which for generations has centred in relationship to knowledge. They see the increased dependence on the requirements of external fields of practice as producing a fragmenting of disciplinary unity, authority and control of knowledge sequencing. These theorists therefore emphasise traditional forms of epistemic authority and do not engage with the potential for new forms of powerful or significant knowledge promoted by the work discussed in the previous section.

Curricular Implications and the Rise of MOOCS

These debates raise questions regarding new open online curricular practices, and their implications on the formal organisation of knowledge in higher education institutions. The rise of open educational resources over the last decade, including Massive Open Online Courses (MOOCS) last year, provides one significant new academic curricular practice which is being enabled by the online networked environment and is seen to be having a significant and transformative effect on universities today. MOOCS are courses which are freely available online and attract high numbers of enrolments globally. The term MOOC has been around since it was first used to describe George Siemens and Steven Downes’ Connectivism and Connected Knowledge course in 2008, but the concept has recently begun to generate significant media attention and debate with the launch of MOOCs offered by or in association with prestigious US institutions. The most prominent or these include edX, the joint venture of MIT and Harvard,
launched in May 2012 and later joined by more than 20 institutions including the University of Texas and the University of California, Berkeley; Coursera, launched in April 2012 and partnered with more than 60 institutions including Princeton, Stanford, Penn and Duke; and Udacity which was started by ex-Stanford professors in January 2012 (Daniels 2012). These programs typically have some form of (usually automated) assessment and some options for certification but normally cannot be used for credit towards standard degree programs, although options are in train for this in some US states. To distinguish them from the MOOCs originally developed by Siemens and Downes which follow a connected learning model, they have been dubbed xMOOCS and tend to emphasise a traditional learning approach based on pre-recorded video presentations, short quizzes and testing (Daniels 2012).

Public discussion of MOOCs has been typically set within a broad discourse of technological change that suggests digital technologies are driving broad social changes that have dramatic implications for the practices of the university (e.g. Pappano 2012, Shirky 2012). The academic literature on open educational resources more broadly has also tended to focus on technological developments or constraints (relating for example to issues of access, funding, economic sustainability, quality, copyright and intellectual property – see Caswell et al. 2008, Gourley and Lane 2009, Lane 2009, Wilson 2008). Amidst this discussion about ‘what works’ and how MOOCs and open educational resources can be further developed and strengthened, this paper takes a different approach as a starting point for considering their implications for broader questions of knowledge and educational purpose. The rest of the paper looks at some relevant issues that have been raised about the MOOC format and draws on these to begin to explore some of their broader implications in the context of the debates discussed above.

Firstly, the new MOOCs are touted as offering increased access to higher education but the format can be seen to primarily cater for students that are well educated, self-motivated and have the academic and ICT skills necessary to succeed in study (Ripley 2012). In late 2012 EdX released data from a survey of around 6,000 students who enrolled in their first virtual lab-based electrical engineering course Circuits & Electronics. This course began with an enrolment of 155,000 students, but only 7,000 students finished with a passing grade (the vast majority did not continue to complete the final exam), and the students surveyed were primarily those who completed the course and performed well. Of those students, it was found that 80 percent had already taken a ‘comparable’ course at a traditional university prior to their enrolment, and many had completed a tertiary qualification. About 78 percent reported they had previously taken a course on vectors or differential equations and only four percent said they had never taken calculus (Kolowich 2012a). The edX president has cautioned against leaping to the assumption that although the course was open to everyone, those who had not already paid for traditional education would struggle to succeed, but the data does raise questions about what the format means for the development of knowledge as a cumulative process.

MOOCs are yet to make a profit, but fears have been raised that if universities do start charging in future there are risks that courses will become standardised and sanitised to maximise their appeal across global markets (Edmundson, 2012). This potential for standardisation is creating concern in relation to the diversification of knowledge. According to Marginson (2012) MOOCs mean “the homogenisation (and in this case the Americanisation) of knowledge, learning and culture” – like the internet they represent both tremendous potential for the worldwide democratisation of knowledge but also an unprecedented risk of “global sameness” in higher education. He argues that “If the MOOC movement continues, universities outside the most prestigious US institutions will struggle to keep pace in the global winner-take-all market”, potentially leading to a loss in localised curricula. MOOCs promote an ideal of globalised and generalised academic content, which, drawing on Young and others, could be seen to oppose the specialisation and differentiation which has been key to the development of disciplines over the last century (Young 2012).

The ideal of pinning down the perfect introductory course for all students worldwide is also better suited to some disciplines over others as some forms of knowledge tend towards specialisation (such as the natural sciences) and others towards diversification (such as the
humanities). As James (2012) notes, generic content for arts, social sciences and humanities will be difficult to achieve as a result of the lack of paradigm and theoretical consensus, and the “more intimate associated between knowledge claims and the person making those claims” in those disciplines. The courses offered under the new MOOC format were initially overwhelming geared towards science and technology disciplines. And although both Coursera and edX offer classes in humanities and social science disciplines, courses outside scientific fields have presented problems for automated grading and assessment. Coursera has used peer assessment for some of these subjects, but issues have been raised in how this is working in relation to the variability and anonymity of feedback and the lack of community and feelings of reciprocity in the online classroom, and some subjects have since elected not to use this method of assessment (Watters 2012).

These brief examples present a system of online learning which in many ways does not express the changes to knowledge online presented by Benkler, Peters, Weinberger, and others. In opposition to a view of radical changes in knowledge production and dissemination, knowledge for the most part is presented by an authority and automatically tested by machines, networked peer production is limited and the notion of MOOCs enabling massive new markets is hampered by vast drop-out rates and data which points to prior formal study as an indicator for success. Despite Peters’ (2007) argument that open access and open education movements exemplify shifts towards the effective and large-scale collegial and peer production of information, knowledge and culture, there is little sign this is currently occurring in curriculum within the dominant MOOC environment. Although the MOOCs promoted by Siemens and Downes might better express the ideas of networked learning, these have not as yet received the kind of institutional or media attention shown to the xMOOC format and are likely to remain outside the mainstream environment.

The MOOCs discussed raise questions regarding the ability of the new format to develop knowledge in students beyond reinforcing what they are already familiar with and in disciplines outside the territory of fields which can readily employ an automated grading template and in which the specific knowledge required to progress in a field can be easily pinned down. They appear to contradict the conditions required for the development of new knowledge as posited by Young, Muller and Moore: they can be seen to represent homogenisation and genericism, rather than the deep specialisation and differentiation those theorists see as required for building knowledge within disciplines, and a form of knowledge sampling, where students can dip in and out of different domains to develop different skills, against the prolonged study required for the development of disciplinary knowledge. Moreover, their popularity with forms of knowledge in science based disciplines over the humanities suggests their increasing use could precede a loss of certain forms of disciplinary and localised knowledges.

However, the social realist view of knowledge may not sufficiently capture the changes encapsulated in these new forms of open online knowledge. The arguments posited by Young, Muller and Moore have been developed in reference to traditional forms of knowledge and do not appear to sufficiently engage with the changes to authority relations brought about by technological and communications advances described by Benkler, Peters, Weinberger and others. In a recent presentation, Chris Bigum (2012) describes the legacy effects of conventional knowledge work in education compared to the changing nature of knowledge online as highlighted by Weinberger to emphasise how we struggle to see future possibilities outside the framework of the past, a critique which might be applicable to work in this area. Social realists base their view of knowledge on realist principles of reliabilism to argue that some ways of producing knowledge are more reliable than others by virtue of how they are produced (i.e. within disciplinary communities, based on principles of peer review) (Moore 2012), but in my view do not sufficiently engage with how the production and dissemination of knowledge is changing, and how these changes might affect their theoretical position.

Although both offer valuable insights, neither position discussed in this article can therefore be seen as wholly adequate for characterising the changes to curricular delivery captured in the examples of popular MOOCs. Much of the work discussed in the first section of the paper sees...
disciplinary authority relations as being dissolved, leading to new opportunities for peer production and collaboration, but leaves open the issue of what constitutes powerful intellectual work and how knowledge is affirmed or tested in these more open and interdisciplinary relations, and could be seen to over-emphasise the demise of disciplines. And the work by Young, Muller and Moore, although focusing on what constitutes powerful intellectual work and identifying significant issues within the current MOOC trajectory, could be seen as too reliant on a backward looking view of knowledge, and as encompassing insufficient engagement with changes to its production in new times.

In drawing on this work, this paper has aimed at providing a starting point for opening up some dialogue around the potential significance of new forms of knowledge and curriculum for either strengthening knowledge for new times or undermining its traditional foundation. Overall, the paper has illustrated that there is a lot of debate about the potential for curricular and knowledge transformation offered by the new technologies but these questions are being neglected in much of the academic and public discussion surrounding open educational resources and MOOCs. In relation to the broader debates, the paper has also suggested that much of the dialogue is speculative and neither position is able to fully capture the developments occurring in relation to open online courses. This discussion points to the need for further dialogue and research on these new course forms that focuses not just on the practicalities and technological issues involved but on the substantive changes to knowledge and learning that are in train.
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