RESEARCH PAPER

Disruptive innovation, the episteme and technology-enhanced learning in higher education

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ABSTRACT

This paper combines the theory of disruptive innovation with Foucault's concept of the episteme, in order to analyse the extent to which the integration of Foucauldian analysis clarifies understandings of disruptive innovation; the process by which innovation happens; and its applications in higher education. The theory of disruptive innovation is summarized, as is the episteme, and the idea of skeuomorphic design is used to link disruptive innovation and the episteme, showing how innovation can happen. Disruptive innovation, the episteme and skeuomorphic design are applied to three, specific technologies – Second Life, the massive open online course and the virtual learning environment – arguing that all three offer little or no innovation. The paper contributes to studies on innovation in technology-enhanced learning by applying a novel theoretical framework with the potential for new and predictive insights. The paper links disruptive innovation with Foucault's concept of the episteme and with skeuomorphic design to argue for the emergence of a new, neoliberal episteme in which technology itself is central.

Introduction

The study of innovation in higher education is an emerging field (Cai, 2017): this paper offers a novel theoretical framework analysing how innovation can happen in technology-enhanced learning in higher education and how it can be facilitated. Disruptive innovation is a theory about goods and services, most closely associated with the work of Clayton Christensen (1952–2020). It shows how powerful incumbents across a range of industries can be threatened by new technologies. The episteme is a concept concerned with the limits of knowledge, devised by Michel Foucault (1926–84). It argues that distinctive epochs have limits to what can be regarded as legitimate knowledge. The specific question addressed by this research is: does the integration of Foucauldian analysis clarify understandings of disruptive innovation; the process by which innovation happens; and its applications in higher education? No previous study has linked disruptive innovation with a Foucauldian reading in relation to technology-enhanced learning in higher education.

      Foucault's concept of the episteme is combined with disruptive innovation in this paper to better understand why innovation does or does not happen and what this implies for technology-enhanced learning. Put simply, a technological innovation may have numerous qualities, but if these qualities are not aligned with the practices and infrastructure of a given context, the technology is likely to fail: handheld devices emerged in the 1990s, 'but widespread adoption of mobile computing awaited better networking, more usable interfaces, greater functionality, and people

trained to enter text with their thumbs' (Grudin, 2012, pp.62–3). An alignment between a technology and its context results in greater likelihood of the technology's success.

The paper begins by summarizing Foucault's concept of the episteme and showing how it has been developed by subsequent writers. The paper then outlines the theory of disruptive innovation. Thereafter, the idea of skeuomorphic design is used to link the two, showing how innovation can happen. The theoretical frameworks of the episteme and disruptive innovation, expressed through skeuomorphic design, are then applied to specific technologies – Second Life, the massive open online course (MOOC) and the virtual learning environment (VLE) – finding that all three offer little or no innovation. The paper argues for the emergence of a technological episteme characterized by further monetization of higher education, with educational opportunity being suborned to neoliberal ideology. According to Vallas and Christin (2018, p.5): 'Foucault was among the first social scientists to acknowledge the cultural significance of neoliberal doctrines, arguing that modernity increasingly fosters the rise of what he termed the "enterprising self".' This paper finds that a neoliberal approach can lead to a technological episteme, relegating higher education's liberating potential to *below* market values.

Foucault's *The Order of Things* and the episteme

Foucault was one of the most influential writers of the twentieth century. His work encompassed clinical practice, sexuality and judicial and educational systems. His ideas, however, are underrepresented in educational technology scholarship (Hope, 2015). In *The Order of Things* (originally published in French in 1966, with the first English translation appearing in 1970), Foucault analysed the archaeological framework underpinning modern social sciences (Gutting, 2005), postulating that humanity's centrality as an object of study was temporary and could be superseded, as previous ways of classifying knowledge had been.

In *The Order of Things*, Foucault divides the history of knowledge in Western societies into epistemes: 'there is always only one *episteme* that defines the conditions of possibility of all knowledge, whether expressed in a theory or silently invested in a practice' (2005 [1970], p.183). In a later interview, Foucault offered a more expansive definition.

> I would define the *episteme* retrospectively as the strategic apparatus which permits of separating out from among all the statements which are possible those that will be acceptable within, I won't say a scientific theory, but a field of scientificity, and which it is possible to say are true or false. The *episteme* is the 'apparatus' which makes possible the separation, not of the true from the false, but of what may from what may not be characterised as scientific. (Foucault, 1980, p.197)

The episteme frames what can be known or articulated within a given historical context. It matters for innovation in technology-enhanced learning because it creates parameters of possibility. For a new innovation to succeed, it has to be at least partly explicable and comprehensible from the perspective of current, dominant language and practice, unless it signifies the rupture of a particular episteme and the emergence of a new one.

In *The Order of Things*, Foucault writes of 'history restored to the irruptive violence of time' (p.14). History is not a smooth continuum, but experiences jolts. One system of knowledge is replaced by another: the Renaissance (characterized by similarity), replaced by the classical era (characterized by order and categorization), replaced by the modern which, for Foucault, was characterized by the centrality of humanity. The nature of epistemological development, however, implies that humanity's centrality is only a temporary state of affairs, an historically specific condition which may change. Hence Foucault's closing image in *The Order of Things* – a face traced in sand on a beach, being erased by the tide. Humanity is central but also, Foucault insists, transient.

The ongoing digitalization of human experience might suggest the possibility of a new episteme in which humankind is not the central object of study, but is superseded by technology

itself. Historically, technology is inert and has required human practice to make it operational, but increasingly sophisticated algorithms in everything from financial markets to online retailing diminish human intervention. Online retailers suggest future purchases based on past behaviour. Students' digital interactions with their universities are routinely monitored, from entering buildings to attending classes to submitting assessments. Moreover, the ongoing collection of data from individuals' interactions with educational, social and commercial systems creates a corpus which can be used to influence shopping, educational and political decisions. The firm Cambridge Analytica worked with Donald Trump's election team for the 2016 presidential election in the United States, obtaining data from up to 87 million Facebook users; academics were involved in retrieving the data (Manokha, 2018; Richterich, 2018; Žižek, 2018). Cambridge Analytica was also active during the United Kingdom's Brexit referendum on behalf of the Leave campaign (Risso, 2018). Data gathering systems are made by humans, but the labour is undertaken by technologies, and humans interacting with the technologies at the user interface are not always aware of how their data are used, or by whom. Internet searches are recorded and retained; users are subjected to what Zuboff (2019) calls 'digital strip searches' (pp.172, 521). As Zuboff (2019) explains, 'There was a time when you searched Google, but now Google searches you' (p.262).

Other writers have attempted to clarify and develop the episteme:

> Although epistemes are rarely held consciously, they exercise an all-pervasive influence . . . Each episteme prescribes rules for the ordering and classifying of our concepts, and these rules thus fix our view of the world at any given time. (Bevir, 1999, p.347)

> Foucault often seems to imply that our freedoms are illusory in that we do not truly make ourselves through our own creative activity, but rather construct ourselves in a way that is prescribed for us. (Bevir, 1999, p.354)

Gutting (2016) describes epistemes as 'conceptual systems underlying the thought and language of a given historical period' (p.63). A user of a technology, for example, can imagine new forms of usage, but the new forms are not the act of the unfettered imagination. They are historically dependent, not historically detached. The possibilities and parameters of innovation are limited by their episteme. Because the episteme effectively defines the boundaries of knowledge, technologies that cannot be accommodated within the episteme are unlikely to succeed because there are insufficient means to articulate their purpose. An initial form of usage needs to be contained and explicable epistemically. However, a technology's design need not limit the full range of its usage. Practice can create a purpose for a technology which was not a part of the technology's design.

Stark (2016) argues that the episteme, as it is an unconscious frame, percolates through into practice: 'there is an unconscious layer, whose contents are by definition hidden from actors themselves but nonetheless guide their action' (p.146). Birkin and Polesie (2011) note that 'most people work for most of the time within an episteme without being aware of it' (p.244). Reading back from the representation to the underlying conditions of the episteme is not a simple checklist because representation gets mediated. Human agency is contained by the episteme and the human subject is not conscious of it. As a result, innovation is not undilutedly creative but exists within parameters determined, in turn, by history and culture. However, if human agency is contained, it implies a boundary, and practice at the boundary can be innovative, implicitly querying and challenging existing epistemic conditions and limitations. Turner and Gassaway (2019) state an episteme is 'an era wherein power relations determine what can be recognized as knowledge' (p.383), and Kou *et al.* (2019) that 'Technology does not just mediate power relations, it is itself a form of power that disciplines the self', but Bevir (1999) suggests that 'A rejection of autonomy need not entail a rejection of agency. To deny that subjects can escape from all social influences is not to deny that they can act creatively for reasons that make sense to them' (p.358). Innovative practice is still possible.

Disruptive innovation

Kleenex tissues were first introduced in 1924 as a product for removing cold cream. Customers started using them instead of handkerchiefs when they had a cold. Kleenex repositioned the product by marketing it as 'the handkerchiefs you can throw away' (Lindsay and Hopkins, 2010, p.283). The disruptive usage occurred from the ground up and the revised narrative bridged initial design and subsequent practice, recognizing the innovation.

The theory of disruptive innovation analyses how powerful, incumbent technologies are challenged and potentially unseated by technologically inferior goods and services. In disruptive innovation, the disruption emerges through practice and is a process, not an event. The process happens because the inferior technologies appeal to a peripheral or new customer segment, one for which the existing technological solution is too costly or unattainable. Christensen (1997; see also Christensen and Raynor, 2003) distinguishes between technologies that offer a marginal improvement on existing performance, sometimes going beyond customers' requirements (sustaining innovations), and technologies that mobilize new customers leading to new forms of practice (disruptive innovations). Subsequently, Christensen introduced a third category of efficiency innovation (Christensen, Bartman and Van Bever, 2016) to describe technologies enabling existing jobs to be done with fewer resources, such as self-service tills in supermarkets removing the need for checkout staff.

Disruptive innovation theory is influential and, having originally been applied to consumer goods, such as radios and motorcycles (Christensen 1997; Christensen and Raynor 2003), has subsequently been applied to a broad range of practices, including healthcare (Christensen, Grossman and Hwang, 2009) and higher education (Christensen and Eyring, 2011). Christensen (1997, p.xv) outlines the core definition of disruptive technologies, namely that they are cheaper, simpler and more convenient than the powerful, incumbent technologies they come to threaten. Christensen and Raynor (2003) takes a jobs-to-be-done approach to technologies and to goods and services more widely. If the potential user of a technology cannot see what job the technology will do for them, better than the technologies to which they already have access, they are unlikely to use it. Conversely, if the customers understand the job the technology does and perceive it as a better means of getting the job done than the existing offering, or if the alternative is nothing at all, they will use it.

Despite its aura of modernity, technology can often be intrinsically conservative: as Lianos and Douglas (2000) argue, 'all technology is made for ordering the world and reproducing it' (p.263). Technology commonly aims for sustaining innovation or efficiency innovation. Levine (1980) offers a structured definition of how organizational innovation happens, moving from recognition of a need to formulating a solution, to initiation of a plan, through to institutionalization. However, disruptive innovation is a less structured and more serendipitous process. Innovation arises from practice more than identified need. When disruptive innovation happens, it is primarily through practice, as in the case of Kleenex tissues. In technology-enhanced learning, Wikipedia was not designed *a priori* to support study in higher education, but gets used repeatedly to that end (Kim, Sin and Tsai, 2014; Leitch, 2014). That said, disruption can be elicited through a specific form of design and through narrative, both of which can gesture towards a potential future. Practice can elude or exceed design and narrative, pushing at the epistemic boundary.

Christensen insists that the theory of disruptive innovation is predictive (Christensen and Raynor, 2003, p.55; Christensen, 2006, p.46), but, to date, disruptive innovation has not been effective as a predictive theory. Christensen cofounded the disruptive growth fund in 2000 to support and develop disruptive innovations, but it closed within a year having lost 64% of its value (Danneels 2006). Furthermore, Christensen predicted the Apple iPhone would not be successful, seeing it as a sustaining innovation on the cell phone rather than a disruptive innovation which would become people's primary means of connecting to the internet (McGregor, 2007). It is, however, possible that the predictive value of disruptive innovation can be enhanced through the addition of a Foucauldian perspective, analysing technological innovations in relation to the episteme and understanding how innovation might bridge the present to future practice.

Skeuomorphic design

Innovation can be prompted through language and design, as well as through practice, but innovation is not unfettered:

> very high degrees of innovativeness may impose too much change and discontinuity on the individual, endanger the actual *status quo*, and likely provoke initial resistance . . . companies need to develop highly innovative products that stay below a critical threshold of change and discontinuity. (Heidenreich and Handrich, 2015, p.894)

The argument recognizes that epistemic boundaries can be flexed but not broken, the latter only happening when a major, cultural disruption of knowledge takes place, shifting from one episteme to another.

An early online book seller, Book Stacks Unlimited, opened in 1992 but was overpowered by Amazon (Vidal and Mitchell, 2013), which used customer data to tailor what the customer saw each time, offering future purchases based on past behaviour. Amazon is not a disruptive innovation in the sense that it did not invent bookselling (Markides, 2006), but it changed the experience of book buying. It was a disruptive innovation because it was cheaper (at least initially) than bricks-and-mortar shops and offered free delivery; the customer did not even need to leave home. Amazon offered convenience because books did not have to be in stock, as they have to be in a bricks-and-mortar shop. That said, buyers on Amazon would still encounter a picture of the book cover on the web page. They might also be invited to sample some free content. It felt like buying a book. The new practice bridged from the old. It was experientially familiar, though technologically innovative. Amazon was disruptive, but presented itself in sufficiently familiar terms. It changed practice, but was not explicit about doing so.

Disruptive innovation changes practice. This applies from the electric light bulb (Hargadon and Douglas, 2001), which initially and deliberately resembled the existing solution of gas lighting, to online retailing. However, to articulate disruptive innovation *a priori* is to describe a state that does not yet exist: Gutting (2005, p.28), from a Foucauldian perspective, argues 'any language that we can actually use has to be at some specific point in its historical development and will have limitations accordingly'. If language cannot articulate disruptive innovation satisfactorily in advance, the disruption has to arise from practice, or be prompted, elicited, through aspects of the technology's design or how it is otherwise presented to its potential users. Douglas and Hargadon (2017) explain that 'design first domesticates its users, taming the unrecognizable by mimicking long-understood objects and deeply embedded practices – even as it seeks to transform the ways in which we interact with the world around us' (p.153). Design and language can be potential catalysts for innovation, but practice is essential to unlock innovation. Designers do not know what the future practice looks like in its entirety. Users create the innovation. The skateboard, for example, was invented by children hammering wheels removed from roller skates onto boards, the commercial development of the invention coming later (von Hippel, Ogawa and de Jong, 2011).

A new technology can be explained in an instruction manual or demonstration videos. This can also be achieved via skeuomorphs, organizing design in a way that prompts a particular usage. Hence the trash icon on a computer desktop informing the user that it is a repository for unwanted files and folders (Hargadon and Douglas, 2001). No instruction manual or video is necessary because the design elicits the intended usage. An individual can know that the cogged wheel icon for settings does not imply the presence of a literal cogged wheel inside the computer. If the individual wishes to connect to a new network, the cogged wheel condenses and abbreviates the message that the individual is in the location where the beneath-the-surface workings of the computer are accessible. Explicit, step-by-step instruction is not required: an effective image prompts a practice. In terms of the episteme, the shared knowledge of the audience for whom the technology is intended is sufficient to elicit the desired form of usage, if design is aligned with the episteme. In higher

education, there is nothing about the design of a virtual learning environment (VLE) that would, of itself, confound predigital generations of users because, commonly, a lecturer issues content on the VLE, which a student can access. The design of the VLE relocates traditional university teaching and learning online.

The language used to name technologies can also enable innovation. Words are historically loaded: they are 'like so many objects formed and deposited by history' (Foucault 2005 [1970], p.331). If words are historically loaded, readers (whether consciously or not) look for traces of old or existing meanings in new formulations. 'Every time you trace a meaning back to what preceded it – from "headphone" to "wireless", for example – it refers back to something which went before it' (Du Gay, 2013, p.14). The term 'virtual learning environment' implies something familiar transposed to the digital realm. It seems that the phrase 'technology-enhanced learning' contains 'deeply conservative assumptions' (Bayne, 2015, p.7), implying a fundamentally satisfactory state of affairs requiring only enhancement through technology. Perhaps technology-enhanced learning itself is, fundamentally, a sustaining innovation.

The language of a technology can be more than simply a label. It can imply and direct a form of usage. The name 'Wikipedia' connects a digital mode of publication with an established type of publication. Second Life implies an alternative existence, which may lead to disappointment if it is only superficially different. The acronym MOOC foregrounds the technology's scale, the letter M standing for massive. The mobile phone identified the technology's distinctiveness: the smartphone articulates the device's potential. Language can dilute the unfamiliarity and discomfort of an innovation, encouraging accommodation within the existing episteme.

The digital revolution is not revolutionary in higher education because technologies have been accommodated within existing pedagogical frameworks. The language of technology-enhanced learning strategies and the design of technologies have perpetuated the *status quo*. Practice can deviate from strategy with, for example, Google and Wikipedia being used in preference to costly institutional databases, but institutional strategy persists in its current form regardless of its disconnect with practice. A study of 44 technology-enhanced learning strategies in UK higher education, and a subsequent, international study of 84 technology-enhanced learning strategies, showed that a surface commitment to innovation was undermined by consistently conservative practice (Flavin and Quintero, 2018, 2020). Universities espouse innovation, but to what extent does the practice of universities indicate that they actually want innovation?

Marketing highlights the newness of goods and services, but genuine innovation emerges through practice. Norman and Verganti (2014, p.83) note that 'a completely novel innovation is impossible: all ideas have predecessors and are always based on previous work'. Innovation needs to move into the new from the familiar. Technology is 'a dialectical process of material and linguistic negotiation between competing social forces' (Hayes and Jandrić, 2014, pp.194–5). Ma and Cai (2021) consider that innovation can be understood as an interaction between structures, institutional rules and individuals' practice. Skeuomorphic design can facilitate innovation. In technology-enhanced learning in higher education, one of the social forces in play is conservatism, the tendency of new technologies to perform existing tasks. Conservatism competes with innovation, but the latter arises in spite of institutional edict, not because of it. Students (and lecturers) repurpose Google in preference to using costly institutional databases. Moreover, the disruptive innovation of Google has led to the sustaining innovation of Google Scholar, which is easier to access than an academic database. Over time, according to Christensen, Horn and Johnson (2008), disruptive innovations become sustaining innovations, an argument made more recently in the context of technology-enhanced learning by Yamagata-Lynch, Cowan and Luetkehans (2015; see also Flavin, 2017). According to Hargadon and Douglas (2001, p.492), 'Understanding the role of design in mediating between innovations and institutions requires recognizing the interdependent relationship between the technical and social aspects that constitute an innovation.' Innovation can proceed from the familiar to the novel. However, it can also offer the novel, yet, in practice, deliver only the familiar.

Technologies in higher education

Some technologies have failed in higher education. Second Life, first released in 2003, is a virtual world in which avatars interact. It is free to use. Second Life in higher education was the subject of many academic journal papers, though numbers declined from around 2009, suggesting diminishing interest (Wang and Burton, 2013; Flavin and Hulova, 2018). Numerous universities bought Second Life campuses, but Second Life did not transform higher education.

Part of the reason for Second Life's failure in higher education is evident from the perspective of disruptive innovation. It was free to use, but not always easy to use. A skill set had to be developed to deploy the avatars effectively and move them around. Moreover, it was not always clear what job Second Life was intended to do in higher education. An avatar could visit its campus and find a suitable location where it could watch a video clip, but the same clip could simply be made available from the university's website. Second Life offered superficially disruptive innovation, but in practice barely delivered sustaining innovation and was closer to an elaborate and unnecessary replication.

The failure of Second Life can also be viewed in relation to the episteme. Second Life is primarily about play – avatars are not subject to ageing, injury and death (Bardzell *et al.*, 2014), and assessment-driven higher education systems are not recreational by design. The promise of the technology was not fulfilled in the practice of the technology. According to Hassouneh and Brengman (2011), Second Life, unlike an online game, had no specific goal. Second Life implied a new experience, but delivered a digitized form of existing experience, idealized and sanitized through often aesthetically appealing avatars. The digital reality was a reworking of existing reality, right down to the experience of virtual shopping in designer label outlets – though virtual shopping does at least offer convenience and affordability (Hassouneh and Brengman, 2011).

Second Life features avatars and locations. The avatars are attractive people or anthropomorphized animals. Innovative usage was implied by design, but usage was not innovative. Real-world activities or simulacra thereof were offered virtually. Second Life failed to meet all the disruptive innovation criteria (free, yes; easy to use, not always) and it failed in higher education. Second Life was a poor fit for higher education, an open-ended experience in the context of a linear system characterized by a terminal assessment. Second Life could not offer innovation beyond a superficial level and had no substantial application in higher education.

The massive open online course (MOOC) was also envisaged as transformational (Gordon, 2014). However, in practice, it suffers from poor completion rates (Ng'ambi and Bozalek, 2015). The autonomy and self-direction required to steer successfully through a MOOC presupposes a skill set which is most likely to have been developed through formal study. Hence, successful completers of MOOCs feature a disproportionate number of learners who have already attained degrees or other educational qualifications (Laurillard, 2014; Conole and Brown, 2018). MOOCs are not a disruptive innovation. They were promoted as transformational, but poor completion rates deflated the hype. The skeuomorphic qualities of the design were weighted, in practice, towards users with prior experience of higher education. The innovation did not successfully bridge current and future practice for all users. In relation to the episteme, the MOOC presupposes formal learning abilities which are, in practice, the privilege of one stratum of society, the already-educated. The MOOC mistakes a fractional skill set for a ubiquitous skill set. It does not fully acknowledge that education can stratify as well as equalize.

The failure of the MOOC to transform higher education could suggest there are gradations of the episteme. The optimal, conventional conditions for the development of knowledge are not distributed equally. The notion of a generational digital divide (Prensky, 2001) is discredited (Jones and Healing, 2010), but there is evidence of a secondary digital divide (Hargittai, 2010), with effective use of the internet correlated with socio-economic status. The prior experience of higher education can produce individuals who are better placed to innovate, being familiar with higher education's conventions and its organization of learning materials. The MOOC is an innovation whose properties

and advantages are weighted in favour of individuals who have already acquired some capacity to use higher education materials effectively and innovatively.

While Second Life and the MOOC are arguably failures in higher education, the virtual learning environment (VLE) is seen as a success because of its ubiquity. A 2005, UK-based survey (Browne, Jenkins and Walker, 2006, p.8) showed sectorial growth in the use of VLEs, from 81% in 2001; to 86% in 2003; to 95% in 2005. Furthermore, Newman, Beetham and Knight (2018), in a large-scale survey of 37,720 students in the UK, showed 75% of students relying on their VLE to support coursework and, in a further large-scale survey in the UK, 72% of higher education students stated they relied on their VLE to do their coursework (Langer-Crame *et al.*, 2019). In their early days, VLEs offered the possibility of innovation, even transformation. According to Dutton, Cheong and Park (2004, p.135), 'VLE systems began to diffuse widely in the late-1990s and quickly became a status symbol of innovation'. By allowing anytime, anywhere access, VLEs had the potential to transform learning and teaching, enabling synchronous and asynchronous collaboration irrespective of spatial and temporal boundaries.

However, VLEs are often used in practice, in limited ways, to store content (Gordon, 2014; Rienties *et al.*, 2016). Newman *et al.* (2018) noted 55% of students in their sample said VLEs were well designed, but only 26% enjoyed using the collaborative features. It is possible that the conservatism of VLE design is conducive to VLE usage. By relocating the traditional features of teaching online, design enables users to engage with the medium in a way that counters potential unfamiliarity. A lecturer putting PowerPoint slides in a VLE is not dissimilar to presenting them in class. The same applies to recommended reading and bulletin board statements. The design encourages usability by remaining within a clear, epistemic framework. The VLE is efficient as a pedagogical tool within epistemic boundaries, but it is also the antithesis to disruption and transformation. The VLE converts traditional content and method into digital form. Epistemically, the VLE offers reassurance, right down to its name implying a painless relocation of the recognizable learning environment to the digital realm. The VLE is non-disruptive, even in the context of the COVID-19 pandemic, converting seminars into linguistically approximate webinars. The VLE is a sustaining innovation offering enhanced access to an established and fundamentally passive form of learning and teaching. Because it reproduces a traditional mode of instruction in digital form, it is epistemically undemanding and its reassurance is underlined by its design, which allows a teacher to issue content which students receive. The VLE is a good fit epistemically, but its convenience and ease of use undermines its innovative possibilities. It is suitable for higher education because it is a sustaining innovation, but it has failed as a disruptive innovation because it has, to date, provided learning to an established market, offering marginal enhancements along an established performance trajectory.

Conclusion

This paper is about technology-enhanced learning in higher education. It offers a novel theoretical framework in an emerging field – studies of innovation in higher education (Cai, 2017). It combines disruptive innovation theory with Foucault's concept of the episteme, via skeuomorphic design, to aid understanding of how innovation can happen in technology-enhanced learning in higher education. Three specific technologies were selected for analysis – Second Life, MOOCs and the VLE – the paper arguing that none of them offers substantial innovation. A broader survey of technologies used for learning might have produced different insights. Surveys of students and lecturers might illustrate their understanding of, and practice with, technologies, illuminating possible epistemic changes. The paper offers suggestions for what kinds of technologies might succeed in higher education hereafter, arguing for cheap (ideally free), simple and convenient technologies, with innovation arising from practice rather than design.

A new, technological episteme may be emerging, but innovation is not always good: complex financial instruments that contributed to the global financial crisis of 2008 can be regarded as

disruptive innovations (Cortez, 2014). As Birkin and Polesie (2012, p.249) say, 'Technology employed in stock markets means that major amounts of money are transferred and invested and hence intervene in the world on the basis of increasingly abstract mathematical relationships'. Financial markets are both mathematical and amoral sites (Wierzbicki and Nakamori, 2007). Innovation can dehumanize and can point towards a new episteme in which technology itself is central. A technology can indeed be a disruptive innovation, changing practice, but it can relegate humanity in the process, taking charge of practice, trading stocks and shares or gathering data on shopping patterns and political allegiances, shaping lives in the process. According to Kou *et al.* (2019), technology 'alters the external environment of the self, and thus should not go unnoticed or be taken for granted'. Technology manifestly provides greater efficiency, but the question of who controls the technology and who benefits from it can remain underexplored if data gathering is not something with which users consciously interact, but is instead buried in the settings.

However, the avoidance of technological innovation is not a credible option, not even in the inertia-prone higher education sector, where the global elite has remained unchallenged for a lengthy period (Marginson, 2013). Hoffman and Holzhüter (2011, pp.3–4) state that 'innovation resembles mutation, the biological process that keeps species evolving so that they can better compete for survival', while also arguing that the university 'has historically been slow to adopt the realities of this natural selection process' (see also Cai, 2017, p.597). It can be claimed that we do not want to change longstanding and generally efficient practices in higher education and therefore we will not. A study in the UK showed 88% of students rating digital provision at their university good or higher (Newman *et al.*, 2018). However, doing nothing ignores the fact that wider contexts do change, recognized over 80 years ago in *The Saber-Toothed Curriculum* (Peddiwell, 1939). Higher education cannot remain entirely static because economies and societies do not remain static.

Epistemic pressure is towards technological centrality, underpinned and directed by neoliberalism. Turner and Gassaway (2019, p.385) argue that 'the rise of online education coincides with the era of "adjunctivitis" . . . The university experience, once central and defining for faculty and students, is now often adjunctive' (p.385). In higher education, students may have jobs, and some lecturers undertake sessional work in more than one institution (Richardson, Wardale and Lord, 2019). Foucault notes that 'practices once specific to economic firms are increasingly applied to the individual self' (quoted in Vallas and Christin, 2018, p.10), and Vallas and Cummins (2015, p.308, emphasis in original) argue that 'powerful messages *idealize precarity*, in that they invite readers to see labor market uncertainty as providing the basis for their emancipation – if only they can shed the time-encrusted patterns of dependence on employers for their livelihood'. Technology supports life-and-education juggling, but it changes higher education in the process. If epistemic conditions are changing in higher education, they are underpinned by economic conditions, with people changing their practices in order to navigate through monetized education systems. If transformation is taking place, it is subjugating higher education to neoliberal market practices and the reconfiguration of student as customer. Students have to generate or borrow capital in order to engage in higher education in an attempt to increase their market value. Lecturers have to build their reputation through research and teaching; like other workers, they have to 'reconceive themselves as capitalist firms in their own right, establishing their own personal "brand" as a means of creating and managing demand for their own services' (Vallas and Cummins, 2015, p.295).

The episteme is not shifting towards technological liberation, but towards the application of technology in support of neoliberalism. James (2021, p.548) argues that 'Under a neoliberal rationality the individual may appear self-interested in so far that she calculates anticipated personal benefits; however, she is at the mercy of economic forces that engineered this positioning and subsequently benefit from it.' The accumulation of capital is commonly a prerequisite for engaging in higher education, or else the student is burdened with sizeable debt charged at interest. Lecturers without permanent contracts and job security need to accumulate capital to manage periods of employment uncertainty: around a third of UK academic employees are on fixed-term

contracts (Loveday, 2018). Dean (2014, p.440) argues that 'It might be that debt is the most effective way in which the contemporary arts of government have managed to limit sovereignty and close down counter-conduct and contestation and indeed, the potential temporal horizons of our societies.' A long-term indebted student body and a precariously employed teaching body are ill-placed to assert their own centrality. Foucault's modern episteme, with humanity at its centre, may no longer be sustainable.

Gutting (2005, p.42) shows the potential of studying the episteme: 'every mode of thinking involves implicit rules (maybe not even formulable by those following them) that materially restrict the range of thought. If we can uncover these rules, we will be able to see how an apparently arbitrary constraint actually makes total sense in the framework defined by those rules'. For Foucault (2005 [1970]), the core characteristic of the modern episteme is the centrality of humanity and it is therefore understandable that educational technologies do not disrupt in the modern episteme, but support. However, some technologies, primarily through practice, but also through aspects of design, have disrupted. Google and Wikipedia are used in preference to more conventional academic sources, resulting in the more efficient use of limited study time. Innovative practice with technologies leading to disruptive innovation might therefore signify the possibility of a distinctly new episteme. Alternatively, technology usage can further entrench neoliberal practices. It may be too simplistic to accept that 'Technology enhanced learning and the related domains of education, technology and business interact in a complex and contextual manner as a new emerging episteme' (Smuts, Lalitha and Khan, 2017, p.754), but digital technology has already effected significant changes. The increasing monetization of higher education in some countries embeds the language and practices of business.

Future research in this area may examine the extent to which the COVID-19 pandemic can accelerate innovation by exposing pedagogical insufficiencies in existing practices of learning and teaching: 'the greater acceptability of remote learning makes new arrangements feasible', say Ainsworth and McKenzie (2020, p.446), encouraging innovative practice. That said, as nations emerge from the pandemic, the opportunity to use technologies innovatively to support higher education will be countered by the temptation to regress to the mean, pursuing sustaining innovation or efficiency innovation. According to Meishar-Tal and Levenberg (2021), '"success" in emergency times is not experienced in the same way as in regular times, not by lecturers and not by the students'. Future research can engage with the tension between innovation and convention, analysing if the potential of disruptive innovation is fulfilled in an episteme that encourages reproduction. Future research might also critically examine the commitment of universities to innovation, and whether their encouraging rhetoric is matched by truly innovative practice. Cai (2017, p.607) believes that 'the unique empirical ground in higher education may offer opportunities for testing, enriching, and developing theories of innovation', but higher education's placement within an episteme discourages innovation, especially in higher education systems characterized by large fees, in which predictable goods and services are perceived as being a more likely means of gaining secure, well-paid employment.

The integration of Foucauldian analysis clarifies disruptive innovation because it shows how skeuomorphic design can prompt new practices. Epistemic boundaries can be challenged through practice, which does not occur spontaneously, but is elicited, whether by features of technological design or by wider economic and social forces encouraging the usage of technologies to serve greater efficiency. *The Order of Things* concludes with Foucault's famous image of a human face traced in the sand at the sea's edge being swept away by the incoming water. In one image, Foucault signifies both humankind's centrality and its ephemerality. The current, modern episteme is historically contingent. Perhaps, from a dystopian perspective, a human face can be swept away to reveal a cold and impersonal technology underneath, regulating and recording in pursuit of efficiency and profit.

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