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Change and obduracy in university teaching practices: tracing agency in professional development

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Abstract

Research into effectiveness of teaching practices and professional development invites questions of teaching and learning change: how it takes effect and is accounted for, and where its agency is claimed and contested across a range of institutional, disciplinary and pedagogical actors. This article investigates change in teaching practices and professional development through the notion of obduracy (Law, 2003): ordered arrangements that persist in the background and surface in a process of change. In focussing on practice as the object of inquiry, this study is part of a shift away from the study of professional learning drawing on individualist, cognitive traditions towards practice-oriented understandings of change and agency as an *effect* of social and material arrangements. The setting for this study of teaching practice is two disciplinary academic collectives, or workgroups, in one Australian university. Rather than approaching change as a human-centred and intentional process, the method of sociomaterial tracing was applied to teaching practice undergoing an institutional change process. The study highlights the process in which change is assembled, resisted or accomplished through heterogeneous networks of curriculum, discourses, technologies, and policies. Teaching and learning change, it is argued, involves recognising how obduracy is embedded in distinct networks across the university. The contribution of this study is to draw attention to the agentic role of materials and spaces in the negotiation and stabilisation of teaching practices and in approaches to professional development.

Keywords: change, teaching, practice, professional development, sociomaterial, network.

Introduction

One of the anxieties in the field of teaching and learning in higher education has been the role of educational development as a political mediator between scholarly teaching practices and institutional strategies. Educational developers, therefore, face a choice, according to Gibbs in his historical reflection of educational development, 'between having high ideals but being pretty ineffective, or being highly influential but losing integrity' (2013: 13). This

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equivocality can unsettle the kind of research questions framed for teaching and learning change, not least because it can be difficult to separate development of curriculum and teaching practices from organisation change agendas. Questions of how teaching and learning change occurs and unfolds raises issues of where to focus a research inquiry – through an individual, disciplinary or institutional lens – and how agency for change is located, enacted or contested. One of the institutional actors that embodies agency for teaching and learning change is professional development, which both performs an institutional role and takes effect in local disciplinary settings of teaching and curriculum. In its formal iterations as university teaching programs for academics, there is the risk of what Boud and Brew refer to as 'provider-capture' (2013: 210), favouring an institutional remedy rather than opportunities for critical reflection. Professional development can also encompass less formal modes, in workshops, mentoring, collegial discussion, or 'less organised activities based on naturally occurring apprenticeship and situated learning' (Leibowitz, Bozalek, Van Schalkwyk and Winberg, 2015: 316). Broadly, professional development can be understood as a gathering of activities to enhance teaching and learning that have a role in this nexus between scholarship and institutional strategy.

Researching such a diverse array of institutional actors is challenging. However, recent shifts in research into teaching and learning away from cognitive theories towards sociologically-based studies offer greater recognition of the multiplicity of activities at the 'meso-level' of the university (Hannon, et al., forthcoming; Trowler, 2008). For professional development, this opens up understandings of change in ways other than a focus on individual staff development, or on measured outcomes of institutional strategies. This may mean, for example, recognising that professional development tends to a deficit model if it is centralised rather than situated in locations of academic work in all its aspects (Boud and Brew, 2013). An emerging family of perspectives that focuses on the circulation of activities in professional settings are practice-based approaches (Reich and Hager, 2014). In broad terms, practices are a set of organised and shared activity, 'an open-ended dispersed nexus of doings and sayings' (Schatzki, 2012: 15), that are also 'inevitably, and often essentially, bound up with material entities' (2012: 16). Practice approaches, in particular from the sociomaterial perspective, draw attention to the material nexuses, arrangements or networks that stabilise the social – the doings and sayings – that become practices. They also challenge assumptions of socio-cultural centrality: a tendency to neglect the 'things' that interconnect with activity, to miss the means through which practices are held in place (Fenwick, 2010; Mol, 2010), and how change emerges from remixed and reordered arrangements (Law, 2003; 2009). Thus professional development is populated with materials that are enacted with policy documents, accreditation, courses, spatial locations, workshops, mentoring, promotional processes, and digital technologies.

The role of professional development in teaching and learning change is the focus of this paper, and arises from a concern for how 'new scholarly knowledge and know-how' is shared and put into practice in settings of academic work (Peseta, Kligyte, McLean & Smith, 2016). Trowler's (2008) notion of workgroups – the collective activity of academic work – offers a site for this study of teaching practices that are shared and mediated through the discipline. In the following sections, I will first contrast different ways of accounting for teaching and learning change in academic workgroups, and describe an alternative to

understandings of change as hierarchically driven. Drawing on interview and focus group data, I will then trace the circulation of materials and activities in professional development to examine how practices are assembled, stabilised or mobilised across de-centred networks of activities and materials. Rather than pursue teaching and learning 'change' by measures of impact, I will investigate the active role of materials in accounts of change. To do this I will use the sociomaterial notion of *obduracy* to argue against the presumption that change is a coordinated, human-centred affair, and argue for an attunement to the agency of materials in ordered networks of practice. This study aims to ground the pervasive discourse of change in teaching and learning by identifying ways in which obduracy is achieved and new practices emerge. A focus on obduracy through the material arrangements of practice raises possibilities for rethinking agency in professional development: how agency is distributed and assembled across sociomaterial networks of human and nonhuman actors.

Accounting for teaching and learning change

There is a constant rhetoric of change in higher education that highlights the pressures arising from mass education and global competition in the sector, yet contemporary discussions mask the long history of adaptation between universities and their societies. According to Orrell and Higgs, 'such calls for revitalisation and re-invention of universities have been present across the millennia' (2012: 44). A narrative of this adaptation is offered by Barnett in which a 'hybrid conception of higher education' (2014: 13) has been emerging over perhaps the last two centuries, between universities as 'externalist', outward looking and economically relevant, and as 'internalist' or oriented to the development of the graduate. Discourses of change in teaching and learning reflect this dynamic, for example, in the push for marketisation and digitisation of curriculum alongside notions of scholarship of teaching and disciplinary knowledge. It is, therefore, worthwhile to considering briefly how change is accounted for in the higher education sector, and what conceptual perspectives inform change agendas as well as professional development strategies. In a review of models of change management, Brown (2013) identified three approaches to large-scale change in universities: (i) 'top-down' or management driven approaches that are based on predictive outcomes, but may encounter resistance from staff who do not share the vision of change, (ii) 'bottom-up', participatory approaches led by innovative adopters (Rogers, 2003), where there is the risk that adoption is limited, and (iii) distributive leadership approaches, in which change agendas are distributed and managed by participant stakeholders. Brown makes the case for the effectiveness of the distributive leadership approach in large-scale university change projects, despite less predictable outcomes. Overall, he noted the complex, uncertain, risky and 'resistant' process of change in universities.

A feature common to these models, particularly when applied to university teaching and learning, is that despite encountering obstacles and resistances, change occurs through a coherent and integrated process. Organisations tend to represent themselves as unified entities embodying a hierarchical structure of distinct, yet coordinated parts. There is, perhaps unsurprisingly, a mismatch between the representation of the integrated organisation and the diversity of its institutional practices. A recurring theme in higher education literature is the

'gap' between policies and practices, or strategy and implementations, particularly in accounts of university 'e-learning' projects (Conole and Jones, 2010; Hannon, 2013). This plays out in university change strategies that contend with an array of disparate elements that interact in unpredictable and 'messy' ways, as Fenwick and Edwards set out:

> In policymaking, multiple heterogeneous actors and materials interact, assemble, disassemble, and reassemble in ways that confound conventional categories deployed in educational research (for example, federal government, administrators, parents, curriculum, outcomes, and so on) and resist analysis. Meanwhile, amid this heterogeneity, policymakers have tended to reach toward greater standardization, coordination, and integration in attempts to align implementation more closely with intention. These presume a wish for order and coherence, and a press for similarity to overcome difference (2011: 79).

The complexity and multiplicity associated with institutional agendas presents a challenge for research and analysis of teaching and learning change. One response is to frame studies around the 'wish for order and coherence' at the expense of investigations of the diverse interactions of practiced realities. Adopting an integrated model of the organisation invites a reified and uncritical notion of 'change' that engenders separations of scale: for example, focusing on the macro-level of the university through evaluation of strategic outcomes tends to bracket out both local practices and the meso-level of institutional systems, with the consequence that the adaptions and negotiations that occur with existing arrangements and practices become barely visible.

Researching change through networks of professional development

A research approach that moves away from unified and causally linear notions of change based is exemplified in the sociomaterial perspective (Fenwick, 2010), specifically actor-network theory (ANT), which can study the material arrangements through which activity and change are enacted or put into practice (Latour, 2005). I will draw on two key ideas drawn from these approaches to frame the analysis of this study of teaching practices. The first is the focus on the materials that are embedded in everyday activities, where materials encompass people (bodies), technologies, policies, physical spaces, objects, and institutions. Thus 'things' are not subsumed in social concerns in an ANT analysis, rather, together with material elements they co-constitute and enact the phenomena and objects of everyday activities and practices (Orlikowski, 2010). Practices are not assumed to be homogeneous nor intentionally determined; rather they are gatherings of heterogeneous elements, and indeed, intentions, strategies and change do not precede the phenomena under study, but are themselves effects of interactions. Professional development, then, is a heterogeneous nexus for teaching and learning knowledge and practice that is materialised across the university, combining curriculum objects, policy documents, teaching spaces, institutional procedures and digital technologies to assemble and re-assemble as change and new practices occur.

The second idea, obduracy, invites analysis of the organisational arrangements that stabilise and hold some practices in place but enable others to change. This idea draws on the

less human-centred understanding of organisations offered by John Law (2003), in which organisations do not function as a singular reality, through fixed structures, but through *organising*, or contingent arrangements that need continual attention, resources and effort. Law asked 'how does an organisation hold itself together?' (2009: 149), and argued that particular networks became durable, or obdurate, through social arrangements which were delegated to material or strategic forms. In achieving this durability, particular discourses or 'logics' (Mol, 2010: 260) were at work, through 'modes of ordering that extended through people to include technologies and organizational arrangements' (Law, 2009: 149).

To consider professional development as a gathering of activities in the development of teaching practice in the university draws attention to the material configurations at the institutional meso-level. Professional development is enacted through the interaction of separate components of the university, each has its own network of relations, structures, legacies, procedures, and goals. These disparate networks are exemplified in library systems, student information and learning technology systems, as well as networks around policy and governance, and teaching and curriculum arrangements. Sociomateriality, therefore, invites a shift from traditional approaches to change, and different questions about university teaching practices: what kinds of networks are visibly at work in professional development? How are conflicting modes of ordering resolved, and what makes some practices obdurate and others mutable? The following sections set out a study of the networking practices of professional development in a period of intensive university-wide curriculum change.

Setting and Method

One of the important forms in which scholarly knowledge and teaching practices are supported and recognised in professional development is through formal programs for university teaching, in this case, the Graduate Certificate in Higher Education (GCert). While programs of this type are widespread, their efficacy has been questioned (Bamber, 2009; Boud and Brew, 2012), with calls for a shift from a focus on institutional ends, for example, through measures of completion rates, to a focus on academic work and situated practices. Peseta, et al. (2016) took up the issue of the paucity of research into how collective teaching and learning expertise is shared and mobilised, and explored how 'new knowledge and know-how' circulated through academic workgroups. This study follows a similar practice orientation applied to workgroup settings. The focus for interviews was on enactments of professional development among the workgroups following completion of the GCert, where professional development is scoped to encompass both formal and informal activities.

The setting for the study was an Australian university undergoing institutional curriculum change. Data for this study consisted of transcripts of interview and focus groups from two workgroups from two Schools. Workgroups self-identified as Biosciences and Health Sciences, with each workgroup focussed on a particular configuration of change in curriculum re-development and teaching practices. All participants who were interviewed for the study had completed the GCert, as summarised in Figure 1:

Figure 1: Disciplinary workgroups and interview participants

Departmental teaching academics	Size	Setting	Workgroup participants	Gender/early-mid-late career
Health Sciences	11	Common core first year health unit. N=1700	7	1 late career 1 mid career 5 early career
Biosciences	14	Multicampus B.Sc re- design	6	1 mid career 5 early career

In this study, the method of sociomaterial tracing was applied to discern the 'things that matter' (Fenwick, 2015) to the workgroup, that is, to first identify the actors in teaching and learning change – social (discursive, institutional, pedagogical), and material (artefacts, technologies, spatial arrangements), and then trace their associations, interactions, and effects. The strategy for analysis of interview transcripts was chosen to avoid seeking underlying themes or shared conceptions, for to do so would risk limiting professional development within a framing of human intentions and local settings. The sociomaterial approach adopted in this study did not analytically bracket accounts of practice from their connections to the institutional, technological or pedagogical agendas beyond the workgroups, but sought to trace the material and social relations of practice from the workgroups that contributed to obdurate arrangements.

Tracing commenced by selecting the GCert as a 'salient' object, (Read and Swarts, 2015: 24), where 'salient' marks an object that has meaning and importance to stakeholders, in this case, of professional development of university teaching. The practices gathered around the GCert were traced to those issues of concern that were most visible or prominent in the workgroups. These issues were expressed as instances of what could be termed fixities, sticking points, or *things* that were obdurate rather than subject to change. Analysis was then conducted by coding these instances, where materials – curriculum, technologies, policy texts and institutional procedures – were bound up in practices in the workgroups. These coded instances were analysed for their recurrence and intensity, so that gatherings or nexuses of practice were identified as the focus of effort and labour for the workgroup.

In the following sections, I describe first gatherings of practice around the GCert in which professional development activities circulate. Then I identified three obdurate networks of practice that surfaced in the workgroups with the greatest intensity, These were: networks of policy implementation, of the digitisation of knowledge via e-textbooks, and of the 'culture' of university teaching.

Gatherings: Tracing curriculum change through spaces and materials

The starting point in this study was to inquire into the extent to which knowledge from a 'formal' professional development program, in this case the GCert, was shared and put into practice in the workgroup, or whether such knowledge remained restricted to the individual participant. The workgroup identified a set of key concepts from the GCert that they found relevant to their academic work, including 'constructive alignment', 'blended learning', 'flipped' lectures, 'modes of teaching' such as inquiry based learning, and 'active learning'. How these concepts from the GCert were translated into activities and circulated in practices was an issue raised in the Health workgroup:

> … [T]he one thing that is formal is like I said, doing the Graduate Certificate and … then how far you go and what you choose to do with that once you finish is really your prerogative. You can leave it and say there's my certificate up on the wall, and I'm just going to do what I do, and or like I said I've found a lot more about what we do and why we do it and how we do it is those conversations with people. (Health WG-FG)

Professional development, then, was enacted around shared activities, or 'what we do', in informal settings where 'those conversations' with colleagues occurred. For the Health focus group, sharing knowledge related to the GCert pivots on these encounters: 'that's where it comes from, it's really hallway conversations.' The speaker further reflected on this tenuous 'community':

> … [T]hat's where it is at the moment, it's your own reading and your own delving into the research and then it's those discussion with colleagues. 'Well, I'm doing this in my subject, what are you doing in yours?' And that's the community that we have at the moment, there's very little that's formalised there is no formalised documents that ever comes of that. (Health WG-FG)

and:

> We don't sit down and have a big group department wide discussion about teaching and learning it tends to happen more in the scenario of teaching team, teams. (Health WG-P1)

Teaching and learning knowledge was mobilised through informal and opportune gatherings rather than formal settings and agendas. These gatherings highlight the materiality of professional development: first in in physical spaces with proximity to colleagues, and second, by translating curriculum change agendas into specific and concrete projects, in this instance, preparing and producing online content:

> P: This year, for semester one, for the first year subject, helping to get some cardiovascular content up in an online form, rather than deliver as a lecture. So that was the big shift that's happened, for a first year subjects, physiology and anatomy …
>
> J: What form were the online lectures in?
>
> P: So it was literally all the content we had, so as staff we have various expertise so mine is cardiovascular, someone like [WG-P6] would be muscle, so basically in

> Physiology we cover all the body systems, respiratory, cardiac, gastro-intestinal, etc … and basically deliver a foundational knowledge in all the body systems. (Health WG-P1)

This and other descriptions of curriculum change indicated the considerable efforts undertaken to reconfigure the arrangements for teaching and learning. In the Health workgroup, the 'big shift' in the common first year curriculum was accounted for as a material re-working: in particular translating the traditional lecture form to short, 8-10 minute videos and rich images of physiology content. The workgroup undertook a regime of development of digital artefacts based on their specialist expertise, drawing on their shared disciplinary and scholarly knowledge from the GCert to assemble a material network: using digital technologies for video recording, sharing the curation of specialist content, and configuring the LMS (learning management system) for a multicamppus cohort of 1700 students.

The intensity of the shared effort of curriculum work in the health workgroup reflected a narrative of de-centring: of teaching practices and of their agency. Teaching and learning in the common core unit shifted from local settings to a gathering of distributed entities across and beyond the university: to information technology systems, proprietorial systems such as e-portfolios and e-publishers, digital production studios, student learning support, and customised library resources. These institutional entities reflected multiple, heterogeneous interests that were combined and ordered through the new curriculum, generating new configurations of teaching practice. Questions about professional development, in this case how scholarly knowledge was enacted in the workgroups, become a matter of how these heterogeneities were aligned and coordinated, how these gatherings enabled new practices, and what made them persist?

Encountering obduracies: networks that persist

The following three sociomaterial networks of practice emerged as foregrounded presences in the workgroup accounts of how the Gcert was put to use.

Policy networks: In a sociomaterial tracing, policy becomes a reality as it takes effect through its instantiations in an array or network of interests, forms, materials and locations. Both the Health and Biosciences workgroups cited the new teaching and learning policy agenda in different articulations. The new curriculum took effect in specific reconfigurations, for example, in teaching over multiple campuses:

> S: It was now taking what we had as two subjects and four other campuses and combining it all into one, with a lot more students also doing it than we had in those original subjects.
>
> J: So large is 800
>
> S: Large at that stage was about 800 yeah. And we doubled it (laughs) with the five campuses as well. (Health WG-Head)

The phrase 'now taking what we had as two subjects' marks the magnitude of a change from traditional, campus-based lectures, labs and workshops, to a new set of practices using video

and rich image content, involving significant re-working, undoing and redoing of teaching and learning arrangements:

> This year because we had the directive to - we got to switch to blended, basically we dropped totally a lecture schedule, everything was moved online, and they only had the two hour workshop. So that was a total shift. (Health WG-P1)

This 'total shift' was specified through a 'directive' from Schools. This was further specified as a blended learning 'target' (identified in terms of student workload in the online learning environment by the university's teaching and learning strategy). Yet this did not translate clearly into pedagogical practices:

> …there's so much *happening* on LMS, for example, a lot of learning activities, a lot of additional resources, a lot of discussion happens on LMS if you encourage it, and I think that's all part of the *blending*, you know, it doesn't have to be: '25% has to be online assessment so it's *blended*'. That is very weird, you know for me it feels very artificial. (Biosc WG- FocusG)

and

> It's a moving feast everyone's trying to find a way of getting around the directives that are coming from above plus, still trying to get the content delivered effectively. (Health WG-P1)

There is a tension in these descriptions that points to an intersection between emerging teaching practices and policy enactments. The speakers above articulated the crossover between two distinct networks, each with its own discourses, procedures and logics: teaching practices are organised around a network of key scholarly concepts and theories that were gathered by the GCert, whereas the university's strategy was embedded in a network of institutional policies and implementations, in this instance, in 'directives' to Schools. Yet the directives were encountered as an obduracy that the workgroup, in configuring new scholarly practices, needed to negotiate and contest, or 'find a way of getting around'.

How, then, does policy take effect when competing networks interact? Rational models for organisational change that are frequently implicit in universities invoke an organisation that is a coherent entity, with change that is diffused through a strategy document, implemented, and then adopted or resisted by staff in varying degrees (Rogers 2003). From a sociomaterial perspective, for policy to take effect requires not only resources and effort, it also requires coordination and mobilisation, as described by Mulcahy:

> Policy is always in the making and in order for it to be transported from one point to another, it must be materialised in discourses such as twenty-first century learning, or objects such as physical facilities, or practices such as team teaching and inquiry learning. In other words, it must be performed and importantly, performed time and again, in order to 'stick' as an assemblage (2014: 5).

In this study, policy was mobilised through the circulation of specific policy directives on blended learning that ensured extensive reach throughout the university, and became a

powerful nonhuman actor for the workgroup. The workgroups' efforts to work with and negotiate the strategic directives was reflected in recurring expressions of a 'disconnect':

> I think there is a bit of disconnect coming from higher up to say this is the way we're heading. We've obviously been told this is going to be enacted, start finding ways to do it. And let's get some preliminary data on how the students are coping… I was quite shocked at the low number of hits so-called on different activities. (Health WG-P1)

> Given changes to workload, increased pressure, less staff, systems that aren't particularly working well, I think that that's going to be a real barrier … at the moment there's a lot of disconnect between what you can do and where you can find the answers to that. But that's the nature of the beast I guess, because if you haven't gone blended and you haven't used the systems you don't know where those pitfalls are. (Health WG-FocusG)

While the reported 'disconnect coming from higher up' may be seen as reflecting a managerial-practitioner divide, it can perhaps more usefully be seen as an effect of competing network logics, one expressed in strategic imperatives and the other in scholarly teaching practices. For workgroup academics immersed in assembling a set of practices around the new curriculum, policy demanded a different language and set of tasks – of meeting targets and compliances. These directives acted less to lead and guide their efforts than to disconnect from pedagogical practice:

> …so basically be given that advice and trying to accommodate the blended because we've had to cut on face to face time, that's the model we've come up with to try and deliver this year. (Health WG-P1)

The 'model' of blended learning that required reduced face to face time was an effect of the policy network, despite the policy not requiring this outcome specifically. In the absence of a gathering or network of scholarly practice, this 'advice' was less likely to be contested and reinterpreted.

How did the workgroups respond to the blended learning directives? Their endeavour to 'start finding ways to do it' and to find out 'those pitfalls', reflected a workaround or bricolage approach to practice (Johri, 2011), in which professional development became learning by doing, a 'making do' with what is at hand. It also meant articulating and configuring new agencies that enacted scholarly knowledge rather then delivery models. Such a bricolage approaches to curriculum change may be missed in a narrative of change by diffusion, with a resulting formal professional development program for updating skills. The top-down focus of such human-centred narratives neglects the effects of heterogeneity – the interplay of multiple interests – on curriculum and teaching practices.

Knowledge networks - the e-textbook*:* A key resource in the common first year unit, an e-textbook, enacted a particular technological mode of ordering. In a followup interview, members of the Health Sciences workgroup recounted the first iteration of the core first year unit: feedback data identified a problem with the way students engaged with the anatomy resources that were embedded into the LMS: on accessing the rich digital images from the

unit's e-textbook, students were relocated to an external, publisher-owned online space, resulting in a perplexing experience:

> We got a direct integration with Moodle, the problem is that you can't actually directly go into their resources, so you've got to send them to a whole big study area and expect a first year to find it. I can't even navigate the system – I can, but it's a nightmare. (Health WG-FocusG)

The 'integration' of the e-textbook into the curriculum was a link from the LMS to a separate location, the online publisher's 'big study area', such that students 'can't actually directly go into their resources'. The e-textbook directed students first to a digital gateway, then to a bounded space containing a large repository of text and image resources. The e-textbook integration led students away from the LMS to a different system that was aligned to the publisher's goals of capturing the user within the e-textbook domain, and thus competed with the pedagogical design of the core first year unit. Thus efforts by the workgroup to improve curriculum design of the core unit met a systemic obduracy. The e-textbook system brought a conflicting networks into play with unintended outcomes for student engagement.

As in the previous example, professional development that was framed as technological skills training would not address the problem of student engagement arising from the e-textbook configuration. This instance invites a radically different type of professional development that can respond to obduracies arising from technological arrangements in which proprietorial actors configure curriculum design, and negotiate the politics of knowledge resources in which private, for profit, digital systems compete with those of the university library.

***Networks of university teaching**:* Obduracy was visible in another way, through the persistent legacies of university teaching. In the Biosciences workgroup, the head of department identified obstacles in her efforts in leading change:

> At the start we were, you know, the hurdles were up at, you know, ten metres high, but by the end people had kind of come round to a curriculum design that would work for them but also meets the criteria of blended designs. So it was a really gradual drip feeding, very careful planning of meetings and … highlighting the things we could change. (Biosc WG-Head)

Here, the metaphor of hurdles 'ten metres high' points to a tradition of teaching in the science programs in the Faculty. In attempting to lead a change agenda, the Head was confronted with the task of persuading her staff to shift to new, uncertain curriculum designs and away from the existing practices organised around physical spaces and schedules, embodied in lecture theatres, laboratories, end of semester exams and systems to allocate and sort students into workshop and tutorial rooms. This tradition was summarised in descriptions of 'culture':

> The culture, the culture is a bigger thing, isn't it? OK, so I would describe the culture as very mixed, there's probably about eighty percent very traditional thinking, um, academics that wouldn't call themselves teachers, so still stuck in the groove of, 'ah, I

> give lectures, the students should come to the lectures, that's where they're going to learn'. (Biosc WG-Head)

The culture embodied in 'traditional thinking' that the Head found hard to shift was a culture that pervaded her department ('about eighty percent'). Yet, while the Head identified this culture with individual academics who were 'stuck in the groove' of lecture-centred teaching, it also resided in physical teaching spaces, buildings and their deployment as resources for the university. Further, this tradition extended to the historical spatial and temporal networks of the university itself, and indeed reaches back centuries to the mediaeval tradition of the 'hermeneutic lecture' (Kittler, 2004). Despite the presence of new architectural learning spaces on campus, the low level of engagement in professional development in the department through the GCert limited the capacity of the Head to challenge this traditional teaching culture and make the new connections and materialities for teaching and articulating a digital curriculum.

Negotating agency and change in teaching and learning: re-assembling professional development

Making sense of teaching and learning change means identifying and disentangling the multiplicity of interests that shape the practices of university teaching and curriculum. Professional development is one domain in which these multiplicities are gathered and where agency of change is distributed among social and material entities, in particular through the tension between institutional and practice views of teaching and learning change and effectiveness (Boud & Brew, 2013). Informed by this tension, this study adds to Peseta et al's (2016) inquiry into how scholarly knowledge and know-how from formal professional development is put to use in academic workgroups and collectives – it also extends the focus of academic collectives to the spatial and material arrangements that contribute to change and stability in teaching practices.

The three instances presented above highlight nexuses of teaching practices that became stuck in efforts to shift to new curriculum approaches, and the material arrangements of practice that are foregrounded as they become obdurate. They also point to the way in which agency is tethered to and bound up in materials: in policy documents and blended learning targets, in the interplay of competing digital systems during the integration of an e-textbook, and in teaching practices that were embedded in the university's architecture and centuries of tradition. In tracing the professional development work of assembling new teaching practices in these instances, this study offered a description of the obduracies that were encountered by workgroup participants, through the disparate agendas, networks or logics that were embodied in particular material arrangements. Thus the university, in effect, did *not* act as a coordinated and unified organisation during the curriculum change process, and the agency for professional development was entangled in competing network practices.

The analytic of sociomaterial tracing was used as a method for making visible the effects of social and material relations in teaching practices: materials including curriculum, technologies, policy documents teaching rooms; and 'social' forms that are expressed in these relations, including scholarly knowledge, pedagogies, blended learning, and teaching

identities. This study scoped practice beyond the local setting to the networks that interact, adapt and sustain them, it sought to open up and discern the competing logics at work in teaching practices and professional development, and highlight the critical role of materials in the mobilisation and stabilisation of practices.

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