

Chapter 7

A Public and Persuasive PhD: Reforming Doctoral Education in the Outreach-Focused University



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Abstract This chapter, written in the confluence of two global crises, that of the environment and the COVID-19 pandemic, considers how doctoral education should respond. Taking Latour’s idea of the reformulation of the mission of university around outreach as the key organising principle, we argue for reform of doctoral education to produce graduates who are proponents of public and persuasive science. Our model for public science is drawn from that of public health, that aggregation of specialisations which is able to propel public policy, as evinced in the management of the pandemic, by bridging the gap between science and policy. We respond to Latour’s provocations for the re-orientation of the university with some specific considerations pertaining to doctoral education and curricula; and the relationship between STEM-M and HASS fields and capabilities in the outreach focused university. Our proposals include the need to shift from involuted models of doctoral education as preparing ‘stewards of the discipline’ to an idea of doctoral education as a different kind of worldly stewardship and a challenge to positivity and a plea for normativity. We call for a public and persuasive PhD: programs which produce graduates who have advanced capacities in communication, in reason-based argument, in persuasion, and who can deal adeptly with the demands of academic debate and the rigours of public discourse.

Introduction

In planning this chapter, we intended to make our starting point Bruno Latour’s neo-Humboldtian vision of the university and the re-ordering of university priorities recommended by him for survival in the ‘world in ruins’ (Chap. 2, this volume).

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We were keen to explore how the doctorate might be re-shaped and re-oriented to address the compounding challenges of the climate emergency and the crisis in public confidence in the authority of evidence-based science as a basis for political, social and personal action. As we worked on our arguments, we were interrupted by COVID-19 and its fallout—as were many of the contributors to this volume. In fact, the volume conceptualised in the throes of one global emergency was brought to completion in the midst of another. The nexus between science, governance, social and personal action in the political management of the pandemic in Australia provided us with new insights into Latour’s ideas and challenged some of our own thinking. This chapter, written in the confluence of these two global crises, considers how doctoral education ‘at the end of the world’ should respond.

Setting the Scene

In January 2020, as bushfires consumed 100,000 km², or 24.7 million acres, of the country across Australia, following hard on catastrophic wildfires in the Americas and other extreme weather events in 2019, a UK-based climate scientist confronted Australian parliamentarian and serial climate-change denier Craig Kelly over his ‘blatant misrepresentation’ of her bushfire research. Professor Sandy Harrison explained: ‘I am a working scientist and I do not routinely engage in arguments on social media, but I do not think the misuse of scientific analyses should be allowed to go unchallenged’ (Redfearn 2020.). As Harrison put it to Kelly, the respective roles and responsibilities of scientist and politician are clear: ‘As a scientist, my job is to tell you the facts. Your job is to act on them’.

This deceptively simple statement neatly captures numerous complex issues around which this chapter pivots, the fulcrum being the challenge of communication. Why don’t governments act on what scientists are telling them? More specifically, why aren’t ‘the facts’ persuasive enough to galvanise action? Of course, part of the explanation is that neither ‘the facts’, nor what action should spring from them, are straightforward or self-evident. Facts don’t speak for themselves; they need to be interpreted and communicated. The contestation of facts, concepts and theories largely occurs within the academic disciplines in which they are generated, as is appropriate. The issue that Harrison’s statement raises regarding the respective roles of scientist and politician is what happens as facts, or, more specifically, consensus positions regarding the interpretation of these facts (Cook and Jacobs 2014) are released into the public domain. Putting aside the numerous issues raised for public policy, governance, democratic institutions and functions, here our considerations focus on the issue of the role of PhD in the communication of science or knowledge. What can be learnt from the current and prolonged stand-off between politics and science on the climate for research education and the communication of science and knowledge?

The paragraph above was drafted in early 2020 when the escalating emergency of global climate politics and the gulf between scientific consensus on the climate emergency, the urgent need for action to address this and the political will to do so, appeared unbridgeable. In Australia, whose cities were choking with smoke and where vast

regions were enduring apocalyptic fire and destruction, the disjuncture between the very palpable sense of the end of the world and the persistence of climate change denialism in public discourse became intolerable. There seemed no way to bridge the gulf between science and politics on climate issues; no way to ensure evidence-based research might meaningfully inform public policy. No way for us to avert the disaster that scientific experts proclaimed as imminent. Then came COVID-19.

As some fires still burned, the Australian public witnessed a *volte-face* in the government's relationship with scientific expertise in the handling of COVID-19, after a faltering initial response. Far from ignoring or trading blows with scientific experts as they had done in the lead up to the outbreak of the first fires in late 2019, which were themselves a consequence of the lack of scientifically informed action on climate over decades, the Prime Minister and senior cabinet readily, although not immediately, fell into lockstep with the Chief Medical Officer and public health experts. In the management of the pandemic, politics in Australia did what had previously seemed impossible and deferred to expert advice. Evidence-based science informed the public policy response to COVID-19 in a way that it had failed to do on environmental issues—notwithstanding decades of scientific consensus on the scale of the problem, its causes and its remedies (IPCC n.d.).

This *volte-face* occasioned comment in the media and from public intellectuals (Evanson 2020; Galbraith and Otto 2020; Goldie et al. 2020; Rouhad 2020). If the Australian government was persuaded to listen to experts on public health, why not on the climate? This question has been repeated in Australia by commentators in the first six months of 2020 (Currell et al. 2020). Further, witnessing the ways in which Australians and others around the world changed behaviour, ways of living and working, almost overnight in response to directives informed by science provided one answer to a question hovering over all climate change remediation discussions. That is, could and would people change the way they lived in order to avert disaster? What occurred in Australia (and in many other parts of the world) in 2020—with the overnight transformation of life and work as people locked down to stem the spread of the virus—answered this question. It is possible to change behaviour; it is possible to live differently and deliberately in response to an emergency. Within weeks, lifestyle changes previously toyed with or considered unimaginable were realised, such as remote working, online education at scale, and fully subsidised childcare. With some notable exceptions where national leadership ignored or slighted expert advice, including most shockingly both the USA and UK, the multi-layered, cross-jurisdictional mobilisation in response to COVID-19 provided a partial correction to views expounding the impossibility of concerted action on climate. For example, bleak futurist Roy Scranton concludes that there exists 'no mechanism for uniting the entire human species to move together in one direction' (Scranton 2016). At the same time, we continue to witness in horrific detail—including unthinkable images of mass graves in advanced economies such as the USA—the perils of ignoring expert advice.

The measures taken to stem the pandemic had other surprising effects. In a paradoxical phenomenon experienced globally, COVID-19 restrictions led to massive reductions in carbon emissions. While no-doubt temporary, this is surely one of the most perverse and paradoxical outcomes for those campaigning for decades for real action to curb emissions. While there is much to be learned about the imbricated

relationship between the rise of global pandemics of zoonotic origins and the environmental damage of carbonisation (Arora and Mishra 2020; Pimental et al. 2007), we now see how the cessation of normalised, carbonised activities leads to an immediate reduction in carbon and other toxic emissions. Skies over many Chinese cities, and mega-cities such as Los Angeles, Tokyo, and London were clear and blue. Wildlife returned to cities whose empty streets saw deer, boar, mountain lions, foxes, kangaroos and other creatures venture into the newly vacated spaces. Imagery poignantly refused pathetic fallacy: bright blue skies in China, Italy and Spain and, more recently, Florida and other USA cities, were the backdrop to mass death, challenging the perverse norm of skies choked with particulates signalling booming economies.

Fear of the pandemic, and the need to contain its spread, has caused governments and communities worldwide to stop the very activities previously considered unstoppable. Action taken to limit the ravages of COVID-19 has provided a glimpse, therefore, into a de-carbonised world and life lived differently. Leaving to the side the disastrous individual, social and economic impact of this shutdown, it has provided significant pause for thought about different ways of living and the potential to pursue different economic models as economic activity resumes (e.g. the World Economic Forum's report, *The Future of Nature and Business*, 2020). For us, these questions and the relationships between science and government in the management of COVID-19 and the climate emergency resonate in rich and surprising ways. What insights can be gleaned from these perverse events for doctoral education and how could these be brought to bear on our original interest in the outreach-focused university, as theorised by Latour?

What follows is a series of ruminations arising from the jostling together of the two, and not un-related, end-time crises of COVID-19 and the climate emergency. Our proposals for changing the way in which we might educate doctoral candidates draws on Latour's 'hints' at a radical re-orienting of universities (Chap. 2, this volume) and our own observations and reflections. We've framed this loosely in what follows according to three themes: the re-prioritisation of outreach in universities; the need for new communication literacies, and; the new disciplinary formations required to pivot the university earthward. We acknowledge that the following discussion raises as many questions as it seeks to answer. We acknowledge, also, that what we propose will not be easily achieved but it seems to us that we now stand on the brink of anything being possible. Or nothing at all.

The Power of Public Science and the Need for Outreach Universities

Latour's first proposal for the radical re-orientation of the university to address the climate emergency is to prioritise outreach. This resonates strongly with our observations of the management of COVID-19. For Latour, a salient failure of the modern university—particularly as exemplified by the American research university—is the promotion of research and education at the expense of outreach. This has led, among other things, to the dangerous co-incidence in the USA, in

particular, of a world-class university system, alarmingly high levels of ignorance and misinformation in the general population, and concerted attacks on the value of science by many in the political classes. Elsewhere we have written on the crisis in expertise and the risks that it poses to higher education and doctoral education (Barnacle et al. 2018). The power of Latour's explanatory model is that it reveals the connection between failures in higher education delivering on its promise as a public good and the destructive politics of climate change. Latour sees the abandoning of outreach and public pedagogy in favour of the narrow conception of research that is competitively enacted in our universities as a potent analogy to the failure of trickle-down economics in assuring the just distribution of wealth. World-class university systems do not assure wide-spread educational benefits for the communities in which they are located. Nor do they equip these communities with the critical literacies required to discern between scientific evidence and politically motivated arguments countering science, and which may masquerade as science. This results in the highly politicised controversies on climate and other scientific issues, such as vaccination, which we note has also flared up during COVID-19, including the emergence of new and repurposed conspiracy theories intended to debunk COVID-19 as a hoax. Take, for example, the assertion of the rights of the sovereign self over and above public health imperatives on such issues as the wearing of face masks (Manavis 2020; McGowan 2020).

To counter this gulf between the university and the communities it is supposed to serve, Latour advocates numerous reforms. Notably, a neo-Humboldtian university would prioritise outreach as its paramount mission and organising principle. The work of universities—especially the findings of science (broadly framed to include the humanities, arts and social sciences or HASS and science, technology, engineering, mathematics and medicine or STEM-M) on issues of public importance—stands to be better supported and better received by a literate and educated population. Herein are imperatives for both enhanced outreach and wider access to higher education. A university sector which commits itself to outreach—a commitment to the public good—is more likely to enhance the potential for the knowledge it produces to be translated into effective political action and policy responses to pressing global problems. A commitment to outreach would also prioritise equitable access, community engagement, and career paths for academics which reward public engagement as well as scholarly attainment.

Multi-disciplinary Aggregations

What would a reformed, outreach-oriented university look like? In other words, what would a truly *public* science look like, again, with science broadly conceived to include STEM-M and HASS? Thinking along these lines requires reframing the largely and persistently discipline-based education and research activity in universities into outreach-oriented endeavours. For the explanatory and analytical tools provided by disciplinary knowledge to be brought to bear on significant global problems, expertise would be drawn from the disciplines *but not bound by them*.

Such problems include the reactivation of world economies without acceleration of carbonisation, and sustainable ways of living with a view to both the health of the climate and our capacity to withstand new and virulent disease. This latter necessarily entails a social justice dimension, a focus on equity and combatting disadvantage, as the health of society and the economies which support it are necessarily undermined by inequity. Both climate change and the pandemic have cruelly exposed gross inequity at a global and local level. These include, for example, the threats to the livelihoods and survival of those who live in marginal lands subject to rising sea levels and the threats exposed by precarious workers, those who need to work, even when ill, due to the lack of paid sick leave or the absence of other social security protections. With reference to one curiously persistent characterisation of doctoral education as the production of ‘stewards of the disciplines’ (Golde and Walker 2006), this orientation in doctoral education would fashion ‘stewards of the earth’ or perhaps ‘stewards of life on earth’ with a significant shift in emphasis. In other words, advancing disciplinary knowledge would not be the aim of research and education, but a by-product of the outreach mission.

The multidisciplinary aggregation of public health provides an interesting exemplar of the kind of disciplinary aggregations we are thinking of. Combining medical research, public policy, public outreach and education capabilities, such aggregations are proving effective, notable exceptions aside, in guiding both government policy decisions and public behaviour in the response to and management of COVID-19. The support of public science by advanced capabilities in communications, including compelling data visualisation, also provide insight into the skills, capabilities and literacies with which doctoral graduates might be provided in a reshaped and reoriented PhD. A public health modelled PhD would routinely pursue trajectories which enable diagnosis, investigation, description, analysis, discovery, theorisation *and*—with the requisite attention to the additional skills and capabilities required for this—action, remediation, solutions and redress.

Of course, there are myriad examples of this work being done or attempted—often by exception, extension or in specialist programs—in formations such as problem-based learning in undergraduate programs, and interdisciplinary programs at undergraduate and graduate levels including, notably, in the field of environmental science. In this volume, Susan Porter provides an example of a purposeful attempt to do this at a doctoral level in the Public Scholars Initiative at the University of British Columbia (see University of British Columbia, [n.d.](#)). A further example is Lund University’s PhD program, Agenda 2030, designed around the Sustainability Development Goals (Myklebust 2020).

While these are promising developments, to grow this sort of endeavour at scale and beyond specialist or niche programs will require significant re-orientation in the conceptualisation and modalities of academic work. All of us working in higher education recognise the extrinsic and intrinsic challenges entailed in growing this sort of work at scale and making it, as per Latour’s formulation, the organising principle of universities. A significant challenge to be overcome in such reform is that academic disciplines persist in exerting restraints on this sort of development. To mention a few of these, constraints are expressed through the structural determinism of disciplines on the organisation and funding flows of universities; as

well as their continued influence over the organisation of research journals and publishing, professional and scholarly societies, academic recruitment and career progression, and global rankings. Notably, the inclusion of impact and sustainability measures in some global ranking schemes will assist in driving engagement and outreach—as for example, the Leiden ranking produced by the Centre for Science and Technology Studies at this university (see CWTS Leiden Ranking 2020).

There is a further deep inhibition to the sort of outreach-focused university advocated by Latour and the trajectory from *research to action* which we propose. That is the deep academic bias towards positivity and the disciplined resistance, in many cases, to normativity. The need to shift from a positivist paradigm in reforming higher education and the ‘massive effort’ required to do so are also commented on by Deane Neubauer and Susan Porter (Chaps. 5 and 8, this volume). The trajectory of academic endeavour we propose, which commences in the positivist domain (diagnosis, investigation, description, discovery, and theorisation) would need to transition—based on evidence—to the normative domain (action, remediation, solutions and redress). This would entail a significant shift from a commitment to understanding the world as *it is* to a commitment to making the world *as it could be*. A commitment to research in this paradigm will likely see a repositioning of action research models from the periphery to a more central position, as Ramirez et al. explore (Chap. 4, this volume). Thus, the *outreach* of the outreach university would need to be expressed not only structurally (in the organisation and collocation of disciplines, the orientation of programs of study, and the career paths of academics) but also epistemologically and philosophically, or in terms of how these new, restructured or aggregated disciplines view their core business and its relationships, not primarily with the discipline, but the world.

Pathways to Impactful PhDs

Doctoral education is a prime candidate for such reform. On the most recent available data, the aggregated global research capacity encompassed in doctoral programs amounts to a staggering 400,000 graduates annually (Barnacle et al. 2019a, b; Gu et al. 2017; OECD. Stat 2019). If the principles of outreach, understood as a commitment to public pedagogy or public science, were routinely included in doctoral curricula, the potential to develop public science and to launch substantive outreach activities can be readily seen. As indicated, this would necessitate the development of new and different skills. This does not represent a departure from, but instead a return to, capabilities originally envisaged in the degree which, as Ross Gibson (Chap. 12, this volume) reminds us, derives its title from the Latin *docere*: to teach, to instruct. We also see the notions of public outreach and persuasion in the concept ‘candidate’. From the Latin *candidatus*, meaning ‘white-robed’, candidate refers to the eye-catching togas worn by those vying for the votes of Roman citizens, and we still use it today to refer to politicians running for office. Being able to influence, to persuade and teach, therefore, are at the heart of the concept of a doctorate and what it means to be a doctoral candidate.

While there is a range of capabilities which would need to be formally developed through PhD curricula to enable this, particularly those centred on communication and data literacy, there is also the need to educate doctoral candidates in the concepts of impact and pathways to impact in the conceptualisation and design of research. That is, questions of how the proposed research might be applied or translated should assume as central a position in our evaluations of the potential value of the research as questions about its potential to contribute to knowledge. Pedagogically, this could be enabled through the prominent positioning of education on pathways to impact (of which there are several available models see e.g. CSIRO n.d.) for all doctoral candidates. This would involve doctoral curricula to orient candidates—from the outset of their research—into thinking concretely about issues such as: the ways in which their research might be designed with and communicated to audiences beyond the academy; how to articulate potential applications of their work, thus enabling the knowledge and other outcomes to be translated into changes in policy and practice, and; a range of other impact pathways, beyond the narrowly conceived research commercialisation pathway.

As with Lynn McAlpine's thought experiments for reformed doctoral curricula (Chap. 6, this volume), which challenge us to posit an applied dimension to doctoral work (we would insist at the outset and not as an afterthought), we consider it both timely and necessary for doctoral educators and examiners to give serious consideration to expectations that work at a doctoral level will not only display robust research methods (to assure positivist requirements) but also articulate pathways to impact, translation or outreach, whether to be pursued by the researcher in further work, or others.

Enhancing Outreach Capability: The Key Role of Communication Literacies

To leverage the capabilities of doctoral research to address the climate emergency and the array of social, political and economic as well as scientific and technical challenges it presents, the topics selected for study by doctoral candidates would need to be informed by these worldly—as distinct from purely academic—concerns from the outset: '[Outreach] is no longer an afterthought, added once basic research has been completed; it is that toward which basic research is directed' (Latour, Chap. 2, this volume). To support outreach, Latour proposes a second radical orientation for universities towards a cluster of specific capabilities. This will require the considered addition of capabilities to the doctoral repertoire. For instance, advanced students, such as those undertaking the PhD, could be better served by a grounding in the political economy of knowledge and science and in a range of communication skills and strategies. Addressing survival in the Anthropocene, which by necessity entails surviving and countering the politics of the Anthropocene to assure a pathway for sound policy and government, advanced communication literacies will be required. Latour also highlights design,

performance and other political arts, and digital literacy, including advanced capabilities to work with and communicate, including visualising, big data.

For us, especially considering what we have observed during the COVID-19 emergency, the case for a re-orientation is compelling. The prolonged standoff between science and politics in the hyper-politicised climate debate should provoke a rethink in all of us engaged in research and research education about data and communication. When data upon data are stacked towards a resounding consensus, the stalemate in which we are stuck is not necessarily going to be broken by more or better science. This is not to say that more science is not needed, but it is not needed for evidential purposes. The reliance on rigorous research, evidence-based and reasoned argument alone—the very disciplines and techniques in which we train our PhD candidates—are effective in producing researchers who can contribute to knowledge and diagnose problems. They have proved less effective, however, in producing researchers who can shape public opinion and public policy. Recalling the derivation of the doctor in *docere* (to teach), our current mode of doctoral education has not proved as efficacious as it needs to be in producing individuals who can engage with the wider public. A better educated public might be more inclined to demand sound public policy and have the skills necessary to exercise critical judgements to discern hoax or pseudoscience from the real thing.

This is neither a retreat from facts nor an argument for their absorption into opinions. On the contrary, it's incumbent on well-trained researchers to understand precisely this distinction: where facts end, and interpretation begins; and where scientific evidence requires a dedicated communication science to assure its translation into effective policy. To return to an earlier line of thought, we might also add: where positivist inquiry and argument ends, and where it provides grounds for normative proposals and actions. We agree with Latour that the education of scientists has not served them well in being '...able to sustain the violent controversies that their science will necessary trigger' (Chap. 2, this volume). Nor does it help them to understand the complex politics which drive these controversies. Scientists, publishing in peer-reviewed and difficult to access scientific journals, are not necessarily or assuredly equipped through their education to deal with the lies and misinformation spun by highly effective communicators and promulgated on an industrial scale by bots and through various digital platforms which either misrepresent their work or produce pseudoscience refutations.

There is a need for high-level training in communication for all researchers to accompany their domain expertise. There is also a further need for the development of new, hybrid fields of expertise in effective scientific and political communication on questions of science and public policy, and possibly also social psychology and sociology. As argued compellingly by Pidgeon and Fischhoff (2011, p.38) '...public understanding of climate science deserves the strongest possible communications science to convey the practical implications of large, complex, uncertain physical, biological and social processes'. Communication, as a field in its own right, and as a core component of all doctoral programs, is crucial to the outreach mission and connects with it in several ways. As argued by Wynne (2006, 2007) and Gauchat et al. (2017), effective science communication is legitimate outreach and offers the

potential for scientists to rebuild public credibility in those communities which are critical or sceptical of science on issues such as the climate. Effective communication has the potential to depolarise opinion. For Wynne, the public needs to hear from scientists who can communicate effectively, and not only science communicators or other surrogates.

Rethinking Disciplinary Arrangements Towards an ‘Earthy’ University

So far, we have outlined some considerations in response to the call for the principle of outreach as that which organises all activities within the university. Our conceptualisation of public science—and the public and persuasive PhD—calls for fundamental shifts in academic practice. This includes the shift from positivity to the initiation of pathways from positivity to normativity, and the repositioning of the primacy of disciplines to the primacy of problems to which disciplinary expertise is brought. We also argue for high-level training in communication for all researchers to accompany their domain expertise to enable community engagement and inform appropriate policy actions. Next, we address what this means for the way in which disciplinary knowledge is organised towards serving the earth and its preservation.

At the time of writing, the Australian Government has proposed university funding measures aimed at suppressing demand for HASS courses and increasing demand for STEM-M, claiming the latter’s employability and economic advantages (see Australian Government 2020). While the intention of such a measure has nothing to do with attempting to ameliorate the climate crisis, STEM-M fields have an obvious role to play in climate research by understanding the impacts of fossil fuel-based economies on our planet and the means of its remediation. What role, however, HASS?

The problem here is reminiscent of that raised by Heidegger (1971) in his essay ‘Building, Dwelling, Thinking’. Writing at the time of the massive re-building task in Germany following the second world war, surely an apt precedent for learning how to live in the world in ruins, he reflects on the folly of a preoccupation with housing without a deeper examination of what it means to dwell. The perennial question of how we should live is perhaps more vexed now than ever. How should societies and economies re-organise to address the climate crisis? These questions are not those the natural or physical sciences alone can answer. Collectively, however, universities can produce the cross-disciplinary conditions in which these questions can be answered, particularly by actively facilitating places where multiple disciplines create knowledge and jostle and interact with other sectors and the community. Interdisciplinarity and non-university engagement is, of course, a recognisable element of widely established Mode 2 models of knowledge production intended to dismantle silos and orient researchers towards public engagement (Gibbons et al. 1994). Latour, however, takes this thinking one step further.

In Latour's third proposal for the radical re-orientation of the university, he questions current disciplinary arrangements and pivots the entire enterprise towards the earth and the task of 'becoming earthly'. In this model, the focus of the natural sciences, on natural processes and systems, is complemented by a reconceptualised model of the non-natural sciences, or HASS, as 'earthly sciences'. HASS as an earthly science is concerned with the world we inhabit: *phusis* or Gaia, what Latour calls the 'critical zone'. Whereas natural processes and systems are the proper focus of the natural sciences, the non-natural sciences are concerned with 'gaia-ology': the contested sphere in which the study of the earth we inhabit, the lived-world, takes centre stage.

In this model, HASS and STEM-M are complementary but the earthly re-orientation of the former is more transformative than the latter. For Latour, in becoming earthly, the former is mobilised towards the interpretation and translation of the data, or facts, which is the preoccupation of the latter. Echoing the earlier discussion about facts and their interpretation, the critical zone occupied by HASS in Latour's model is the contested sphere dominated by public policy and other debates concerning how facts should be interpreted and acted on, if at all. It is not that Latour is suggesting the natural sciences are without debate, rather, that the focus of their debates is in the establishment of facts. The critical zone, inhabited by HASS, is far more slippery. In Latour's words: '...contrary to the natural sciences, the earthly sciences cannot ignore that they are engaged in controversies for the production, interpretation, and application of data'. To put this in the context of Harrison's comment, above, about the respective roles and responsibilities of scientist and politician, if it is the role of STEM-M to uncover the facts, and politicians are to act on the facts, then it is the role of HASS to translate between the two.

Doctoral Curriculum in the Earthly University

Latour's earthly re-orientation of the university foregrounds public engagement; design, performance and data visualisation, and; the mobilisation of the earthly sciences (non-natural sciences) to 'gaia-ology'. How might this earthly orientation inform doctoral education? We have already touched on some of the numerous ways universities might re-orient to address public extension/outreach to address the survival and flourishing of life on earth. Adoption of these measures are likely to influence the research topics that are promoted and adopted by PhD candidates. For example, obvious measures in PhD programs include strategic allocation of scholarships and alignment of institutional research objectives/funding mechanisms with the United Nations' Sustainable Development Goals. External incentives are already in place for the latter in the form of the impact ranking systems, such as the Times Higher Education impact rankings (THE [n.d.](#)), and we are already seeing many universities world-wide adopting at least in-principle support for the SDGs—including our own.

Drilling down into opportunities in the co-curriculum, how might the new forms of collectivity that Latour's framework encourages mobilise the complementary disciplinary expertise of HASS and STEM-M? A feature of Latour's model is that both HASS and STEM-M have key, substantive roles. HASS, for example, is not simply there to provide the so called 'soft' generic and transferable skills, such as critical and creative thinking, to which it is as all too often reduced (Søaalen et al. 2020). Interdisciplinarity, to borrow from science and technology scholar Radin (2019) recognises, '...the complex forms of collectivity and politics that go into making reliable knowledge'. A model of the university that foregrounds interdisciplinarity, therefore, recognises the collective role of a range of disciplines in the production and communication of reliable knowledge and translating between science and social action.

Large scale, successful precedents for cross-disciplinary and cross-institutional innovations in the PhD co-curriculum are already available. The worldwide, Three Minute Thesis competition is one such example, in which PhD candidates are challenged to describe the significance of their research in three minutes (University of Queensland n.d.). A limitation of this model, however, is that the largely expository presentations do not allow for interrogation and discussion. Nor does it provide an opportunity for interdisciplinary or inter-sector interrogation, explication or dialogue. Building on this precedent, however, a dialogic, debate-oriented model is imaginable. For example, PhD candidates could collaborate in interdisciplinary teams, critically interrogating and communicating data sets with community stakeholders. Interdisciplinary dialogue of this sort would support, in Latour's words '...people in entirely different disciplines being pushed to compare their data sets no matter where they come from'. This would create interdisciplinary opportunities to share, discuss, interpret and visualise data with the aim of building data interrogation and communication skills and non-university engagement.

As discussed earlier, additional changes would be required to PhD programs—either to the core or to the co-curriculum—to support these activities and address key capabilities, such as critical communication, design, data analysis and visualisation. Essential to advanced communication, for example, is the need critically to understand and appropriately adopt techniques of persuasion. This has a theoretical element, based-on epistemology and the philosophy of science, in addition to an applied element drawing on models of debate and rhetoric. Ancient precepts regarding the arts of rhetoric and persuasion have long been considered the foundations of higher learning and are equally relevant now. For example, Aristotle's three proofs: ethos, the trustworthiness or credibility of the speaker and claim; pathos, the ability to draw-in the intended audience through identification and experience, and; logos, or argumentation and the effectiveness of supporting evidence. Whilst communication skills have long been recognised as essential components of PhD training, Latour's framework also highlights the need for design, data analysis and visualisation capabilities. Unlike Aristotle's time, techniques of persuasion are now heavily reliant on visual media and the ability to communicate data graphically. While recognising that some, particularly HASS, disciplines may specialise in this area, the development of appropriate co-curricular learning resources will be necessary across the disciplines, including opportunities for cross-disciplinary discussion.

As science communicator Nick Pyenson (2020) states, ‘it’s clear that facts aren’t always enough to capture interest or sway public opinion. Something more is needed. In our view, this something more can be encapsulated in the concept of persuasion; hence our characterisation of the PhD needed for our future as one that is publicly oriented and persuasive.

Conclusion

The need for a different kind of research which demands a different kind of research training feels very pressing—especially given the opening provided by COVID-19 for active consideration of the so called ‘new normal’ and the steps needed for humans to learn how to live—and dwell, as in Heidegger’s formulation—in a world made more perilous through deteriorating climatic conditions and mass pandemic. This task appears to us very urgent and it is salutary to consider how much brainpower could be harnessed towards solving some of these critical problems. For example, if universities worldwide directed a small proportion of all doctoral research—say 10% on current numbers as cited above—this would yield around 40,000 research projects directed to how we might live in the world, especially if these researchers conceived of their mission as the stewardship of life (in all its dimensions, including the social, political and economic) on earth and its sustainability.

In this chapter, we argue for a reformulation of doctoral education in the context of the re-organisation of universities around outreach and engagements as core principles. We identify the need for some inclusions in doctoral curricula to enable this—guidance in the concept of pathways to impact, more concerted focus on communication both within doctoral programs in all fields and as a field in its own right, an expanded range of literacies including data literacy and literacy in policy and political processes, and an ethos directed to the stewardship of life on earth in the place of the narrower, involuted stewardship of the disciplines. We draw on the model of public health to advance the idea of public science of which doctoral graduates would be highly skilled proponents.

We recall that the conferring of the doctoral degree is the conferral of authority to teach, to instruct and persuade, and envisage graduates capable of this important function both within the university and beyond. We are not oblivious to the challenges entailed in this re-orientation—the persistence of the disciplines in the structure of institutions and the career paths of academics remains an inhibition to change, as does the bias against normativity in many disciplines and the marginalisation of action-research models. Closely tied to our vision for a public PhD is our vision for a persuasive PhD: programs which produce graduates who have advanced capacities in communication, in reason-based argument, in persuasion, who can deal adeptly with the demands of academic debate and the rigours of public discourse. As indicated earlier in this chapter, we feel that the need for change is pressing. If not now, when?

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