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Academic identities and teaching wicked problems: how to ‘shoot a fog’ in a complex landscape

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ABSTRACT

Policy makers increasingly call on higher education to prepare learners for challenges such as global health emergencies or ecological crises. These can be understood as ‘wicked problems’, which are unbounded, complex and resist simplistic definition. Wicked problems involve stakeholders with incompatible value positions and attempted solutions can result in unforeseen outcomes. How academics stay committed to teaching about such challenging topics – despite the many difficulties of contemporary higher education – is an under-researched area. In this study, we interviewed academics who were deeply engaged with teaching about wicked problems. We drew on the concepts of landscapes of practice, boundary work and academic identities to make sense of the teachers’ persistence and practices in this space. We conclude with advice for policy makers on how to support academics in this work.

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Introduction

Policy makers increasingly call on higher education to prepare learners to address ‘wicked’ problems such as the climate and biodiversity crises, inequalities and conflict (Cantor et al., 2015; Cross & Congreve, 2021; Hanstedt, 2018). Wicked problems are unbounded, complex and resist simplistic definition. These problems involve stakeholders with incompatible value positions or perspectives. Attempts to solve wicked problems often require working across disciplines and across diverse communities. Initial solutions can result in unforeseen and sometimes problematic outcomes (Cantor et al., 2015; Rittel & Webber, 1973).

In the research interviews for the present paper, one of our participants described attempts to solve wicked problems as trying to ‘shoot a fog’, hence the paper title. Veltman et al. (2019) provide a useful three-part definition of wicked problems based

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on the work of Head (2008). In this model, wicked problems have three key defining characteristics:

- complexity and interdependencies;
- uncertainty in relation to risks and consequences;
- divergence in values and perspectives.

In such uncertain and rapidly evolving contexts, the importance of defining our academic selves comes to the fore in considering and articulating our ‘role, its domains and boundaries in relation to the others’ (Di Napoli & Barnett, 2008, p. 5). This is the process of creation and recreation of our academic identities. In this paper we define identities as evolving and significant stories that are told about an individual and that individuals tell about themselves. When we describe what we do and prioritise as academics, we are telling our identities.

Our stories are reshaped through cultural and social processes and are grounded in personal and broader histories (Sfard & Prusak, 2005). These narratives evolve in an interplay with individuals’ values and their identification with, and movement through, diverse communities (Di Napoli & Barnett, 2008; Sfard & Prusak, 2005; Taylor, 2008; Watson, 2006; Wenger-Trayner et al., 2014). Academic identities are key to making sense of who steps up to teach wicked problems in the challenging contexts of contemporary higher education.

Research into academic identities has expanded rapidly due to extensive changes taking place in the contexts of academic work that the pandemic has magnified. Social and political shifts, changing structures, and challenges in the funding of higher education all contribute to the churn (Barrow et al., 2022). More specifically, higher education internationally has seen shifts towards: managerialism; audit culture and neoliberal corporatism; reduced public funding; increased datafication and fast evolving use of digital technologies; and changing student demographics. These moves have substantially changed the nature of academic roles, contributing to new challenges for academics in making sense of their identities in relation to their work (Barrow et al., 2022; Brøgger, 2018; Fawns et al., 2021; Hodgson & Watts, 2021).

Academic identities are multifaceted and often at least partly in tension or even fragmented by the challenges of contemporary academic life (Kaasila et al., 2021; Yang et al., 2022). It is important for academics to be able to find some coherence in their identity narratives to underpin motivation and direction in their work (Archer, 2000; Taylor, 2008). Kaasila et al. (2021) offer case studies of how such coherence can emerge across the research-teaching nexus through guided reflexive practice. Where more coherence is achieved, academic roles can take less toll on emotional resilience (Yang et al., 2022).

The interdisciplinary nature of solutions to wicked problems (Cantor et al., 2015; Pharo et al., 2014) may provide additional challenges for academics working on these problems in forming coherent identities across disciplinary boundaries. Furthermore, solutions to wicked problems will generally require collaboration across a range of landscapes of practice beyond academia – such as NGOs or policy makers – adding further complexity to the process of developing coherent identities (Wenger-Trayner et al., 2014). The work to protect coherent academic identities can lead to boundary disputes (Barrow et al., 2022; Simula & Scott, 2021).

A ‘landscape of practice’ is the system of communities that a practitioner works across and the boundaries between them. The idea of landscapes of practice builds on Wenger’s earlier work on communities of practice (Wenger, 1998). Embracing the metaphor of landscapes of practice acknowledges that most people – perhaps particularly those working on wicked problems – move across diverse communities in more complex paths than those foregrounded by the communities of practice metaphor. Wenger-Trayner et al. (2014, p. 20) describe three modes of identification in landscapes of practice, which are relevant to understanding academic identities:

- Engagement: engaging in practice, doing things, reflecting together;
- Imagination: creating an image of the landscape to see oneself and explore new possibilities;
- Alignment: coordinating activities with others, following rules for shared practice.

Wenger-Trayner et al. (2014) note that ‘boundary encounters between different practices can be important opportunities for learning but also bring significant challenges’ (p. 5). As meaning is produced within each community of practice over time, lack of shared history and repertoires often contribute to misunderstandings at boundaries. These authors use the notion of ‘knowledgeability’ to talk about the capabilities practitioners develop to be able to work effectively across landscapes of practice. The ideas of movement, identification and boundary work across landscapes of practice are therefore particularly valuable to make sense of how the participants in this study construct their ways of working with wicked problems and their identities.

Given the complex and contested landscapes of practice across which our participants are working, and the urgency of many wicked problems, this paper addresses the following research questions:

- (1) To what extent and how do academics teaching about wicked problems construct coherent identity narratives while working across diverse landscapes of practice?
- (2) In what ways do these identity narratives differ from those of academics whose focus is on teaching specific bounded topics rather than wicked problems?

Methods

We recruited a purposive sample of 35 academics teaching on undergraduate and/or taught postgraduate courses across the humanities, social sciences, STEM and clinical subjects. Participants gave informed written consent to participation and we had approval from the ethics committee in the Moray House School of Education and Sport at The University of Edinburgh (Ref 1177). The sample was also purposive in the sense of seeking diverse roles and a wide range of teaching experience. We conducted the interviews in a research-intensive institution in Scotland.

For our recruitment, we defined wicked problems using the model developed by Veltman et al. (2019) described earlier. Twenty of our participants had teaching practices centred on wicked problems. Seven of this group were from STEM backgrounds, eight from the social sciences and humanities, and five from clinical teaching. We also recruited 15 teachers for our comparison group whose teaching focus was not about

wicked problems. Six came from clinical areas, five from STEM, and four from the social sciences and humanities.

The first author began the data analysis by repeatedly reading all of the transcripts from the participants teaching about wicked problems, in order to identify any talk relevant to academic identities. This involved coding any mention of: academic roles and their boundaries; discussion of priorities, values and significant decisions about their practice; narratives about how the participant came to be the kind of academic they felt they were; discussion of core perspectives and values they shared with fellow academics and of where they disagreed.

On this basis, the first author began to identify narratives that might represent important dimensions of academic identities for these participants. Next, the first author read all of the transcripts from the comparison group and engaged in a process of constant comparison within and between the two sets of data to explore whether there were narratives relating to academic identities that seemed distinctive to the wicked problems group.

Based on these initial analyses, we decided to focus this paper on a particular kind of coherence emerging in the majority of the wicked problems participants' identity narratives that seemed unusual in the context of the wider literature, and different from our comparison group. These participants' academic identities appeared to cohere around a particular wicked problem (or a cluster of related wicked problems) rather than focusing on a specific academic discipline or becoming pulled into tension by competing demands. We also explored these participants' accounts of identity work across boundaries.

To do this we took forward a rigorous narrative analysis (Riessman, 2008). We chose to adopt narrative analysis because our definition of academic identities is centred on the stories that academics tell about themselves and their roles. Narrative analysis is particularly well placed to draw out and contrast such stories. In doing so our work aligns, for example, with the practice of Fitzmaurice (2013) and Jones et al. (2022) in their research into academic identities.

By 'narratives' we mean 'stories of personal experience' (Watson, 2006, p. 511). The focus was the narratives that participants offered about who they were as teachers of wicked problems. The first author created an edited down version of each transcript to include all of the narratives running through the transcripts that were relevant to academic identities and wicked problems. The first author summarised the main characteristics of these narratives and author two worked with 12 of these summaries to check and refine the initial conclusions. We discussed these conclusions until we agreed on the account presented in the findings section.

Findings

In this section, we present three case studies that illustrate our findings on how 15 of our wicked problems participants seemed to find coherence in their academic identities through centring their research, teaching, professional practice, and often aspects of their wider lives, around a wicked problem. In this context, we noted this group of participants also tended to share a deep commitment to transformative teaching. Their commitment to education and action on wicked problems typically came through as a strongly held ethical value position with a pronounced emotional component.

This group were also notable for their openness to learning about teaching approaches and about wicked problems from students and/or non-academic groups, and seemed less protective of the traditional role of the academic as the sole expert or authority. These participants had realised that the ‘knowledgeability’ to be able to work effectively across landscapes of practice and their boundaries (Wenger-Trayner et al., 2014) had to be learned with and from others beyond academia. This led some of the participants to question aspects of academic convention, such as how they spoke about their responsibilities as communicators. Simply focusing on standard dissemination approaches was not enough for them to reach the audiences that mattered.

In the following case studies, we illustrate these participants’ academic identities as they moved across their landscapes of practice, and which we feel exemplify many of these aspect of identities cohering around wicked problems. However, no single case captures everything. We then present one contrasting case study from our comparison group to illustrate a participant with academic identities that were more focused on a single academic discipline. These non-wicked problems participants were more likely to emphasise tensions in their identities, such as between research and teaching. They tended not to emphasise engagement with communities outside their home discipline. While they described caring about teaching and students, they did not typically express the passion that our wicked problems participants described for transformative teaching.

Participant O

Participant O taught sustainability and climate change, based in a science setting. They were a very experienced academic with a long history in the institution. All of their teaching and research cohered around these wicked problems. They also seemed to be able to find positive experiences of movement across the different parts of their landscape of practice relating to teaching and research, which is often the rhetoric in universities but may be challenging to achieve in practice (Robertson, 2007; Van Lankveld et al., 2017).

[...] I think all my teaching’s about messy, real-world problems [...] we have lots of on-campus students from different degree programmes [...] also masters students who are studying online around the world [...] we look at wicked issues like food security, climate change, water security, population growth [...] And we look at it through them, really, in terms of all their different perspectives.

They talked about how their teaching encouraged them to work with others more widely across landscapes of practice than might otherwise have been the case. This was partly because their students inhabited different landscapes of practice to their own. While this presented challenges, participant O also felt this enriched their work. This mirrors ‘engagement’: one of the modes of identification explored by Wenger-Trayner et al. (2014, p. 20). It is also an example of the development of ‘knowledgeability’ described by these authors:

through discussion [with students] [other examples] will occur, and then that feeds back into my own research of going ... instead of just writing these simplistic kind of blinkered papers about, this is how we’ll just cut greenhouse gases, it makes it a harder job for me, but much more relevant, I think [...]

There is a sense throughout the interview that researching and teaching climate change was a true vocation for Participant O, and that they valued teaching very highly. This

meant that they could enact their values consistently across landscapes of practice, even if some of the underlying discourses and ways of working varied:

So I've never ever looked at my job description, so I just assume that that is kind of ... part of my role, as an educator, as a teacher and as a learner is to have that ... is to help each other develop those competencies [to prepare students for wicked problems]. For me there's a driving imperative, which is around climate change. The more people that understand it and kind of can develop solutions, the better we can address that [...] So, yeah, I don't really care if it's in my job description or not.

This does not imply a complete absence of tension, however, as values and priorities were not entirely coherent across their landscape of practice. The challenge here was not so much about balancing research and teaching as doing so within a landscape of practice that included audit-focused communities:

The main barrier, I think, in a job like ours is that you're not just about the education and teaching side, even if you want to be. You have to put out lots of high-impact papers, and have a large research group ... certainly if you want to make professor.

Participant O also noted how their landscapes of practice crossed disciplinary boundaries but that could be successful with colleagues that 'get it':

so we mix social science with physical science, and the role of that, focused on the environmental wicked challenges, I think that does resonate here. We work quite a lot with colleagues in Health as well, and they get it.

Despite the complexity of their landscape of practice, Participant O had become confident over time in their knowledgeability about teaching across this landscape and seemed very open to developing as a teacher. They were also willing to prioritise teaching within a research-intensive institution and to mentor others in relation to their teaching.

While Participant O clearly still identified as a natural scientist, their focus on wicked problems seemed dominant. This might help explain their openness to diverse perspectives and interdisciplinarity in addressing these problems:

So instead of saying, OK, climate change, let's look at that, by itself, and look at it from a physical science perspective, which is my background, we instead look at the topic from multiple perspectives [...]

Participant O shared aspects of their life history and role models that helped illuminate some of the origins of their practice and long commitment to work on wicked problems. This illustrated the 'imagination' aspect of identification described by Wenger-Trayner et al. (2014, p. 21):

Yeah, my hero is David Attenborough. So he's probably the reason I became a scientist, and his ability to communicate in such an impactful way to millions is incredible.

One of their role models in the university had a different – but partially overlapping – landscape of practice and learning across boundaries seemed to work well in this instance:

One of my heroes in the university, who works on sustainability, is XXXX [...] So she's in [another academic discipline] [...] So she's amazing, and she is someone who is just an amazing teacher.

Participant R

Participant R was relatively new to their academic role in the university but had extensive relevant career experience outside of higher education, including some teaching experience. So the boundaries of their landscape of practice had shifted significantly over time. Their work in the university focused on sustainability and climate change. Although participant R was based in a particular social science discipline in the university, they were clear this was not where they identified and that their true subject area was ‘sustainability’.

We discussed one of their undergraduate courses about climate change. When Participant R was talking about this course, it was clear that climate change was also a personal and research focus for them, so there was a strong sense of their identities cohering around this wicked problem:

And I chose this [topic] because I think that ... well, it's my personal interest, it's my research interest; my research is all about [...] climate change [...] so it was the thing that I felt most comfortable teaching, but I also do think it is in some ways the most pressing problem.

Participant R shared their reflexive awareness of their own strong feelings about climate change:

before I even ran the course, when I was designing it, I was very aware of my own emotions, which are emotions of fear, and sometimes guilt, sometimes distress, sometimes anger, and sometimes despair. [...] and sometimes the feedback from students [on previous courses] would be that it was too negative.

They explained how this personal experience and student feedback led them to think through their care for their students' wellbeing. They focused on helping students see possible solutions to climate change and supporting them to avoid becoming distressed and despairing. Participant R also talked about how they made space within their classes for students to express their feelings about climate change using structured and supportive classroom activities.

They also went beyond typical support for students in this university by organising additional activities outside the course to support students in making sense of their feelings about climate change. They talked about how the latter activity felt a little uncomfortable for them, as they had a sense it was outside the norms of the institution. They were crossing a boundary that was not often crossed by others in the academic part of their landscape of practice. They also speculated that once they had been in the institution for longer and felt more confident they might engage in further innovative teaching. So the knowledgeability to teach across these complex landscapes of practice was taking time to develop.

While Participant R was clearly concerned for their students' emotional wellbeing, they also felt strongly that it was part of their role to engage students emotionally with the climate emergency and to get them politically engaged. Throughout the interview there was a sense of their personal values and how this could carry them through the challenges presented by teaching a wicked problem in a complex landscape of practice. There was a clear sense of activism:

I find it disturbing if someone can study it for four years and go away and feel as if it doesn't actually impact them [...] the world is going to change in their lifetime, in my lifetime, and I feel like I haven't done my job properly if they haven't really got to grips with that [...] I guess I do want to encourage them to be willing to go against the flow of what is politically acceptable.

Participant R talked about feeling relatively confident as a teacher in relation to this topic. They were open to, and had actively engaged with, continuing professional development for teaching. This included having led some teaching development for others. They often learned from feedback from their students. Overall, there was a sense that this participant often went beyond what was expected of them as a teacher. They had also presented about their own teaching at conferences. So their landscape of practice included communities focused on the value of higher education teaching.

Participant R was interested in the interviewer's question about whether everything they were doing would be within their academic job description. They reflected on the parts that were closer and a less good fit with their job description and on how they would take some of these activities forward anyway, regardless of their official role. There was a sense of the identification by 'alignment' discussed by Wenger-Trayner et al. (2014, p. 21) but not full compliance.

Ooh, interesting. Some of them are obviously in my job description. [...] I mean, the kind of overt stuff that's in my job description is, you know, I'm going to teach; I'm going to give lectures, I'm going to give seminars [...] I think most people would accept that, yes, developing critical thinking in my students, developing the ability to work in teams [...] I don't think that would be controversial [...] Would they see some of the other things that I see as competencies? I wonder [...] I certainly think that encouraging students to have a more mindful attitude towards things is part of my job, but I'm not sure that everyone would agree. But it's also, it's very definitely personal. Even if it wasn't in my job description, I'd still do it.

Participant R also talked about feeling like a bit of an outsider sometimes with some of the academic peers in their landscape of practice, in terms of ethical choices that they might make and in terms of their ambitions for how their students would act in future:

I am quite open about the fact that what I am trying to do is send out [...] generation after generation ... of students who are going to make a difference in the world [...] I definitely do want them to take it very personally, and to make a difference [...] I think my other colleagues might feel it's much more about helping ... just the intellectual development.

One way they dealt with this was to bring in support from other landscapes of practice if a particular aspect of boundary crossing felt too problematic:

So we're going to have a workshop, and I'm not going to lead it [...] So what I've done instead is to get money to pay a facilitator [...] I felt that I couldn't do [some of this work] in the classroom, because it's a bit too weird, it's a bit too beyond what we're allowed to do in classrooms. [...]

Participant U

Participant U worked in conservation medicine with vets and noted that this was an inherently complex and interdisciplinary area. They described it as a 'crisis' discipline

where you are: ‘responding to complex problems in the absence of all the information’. For Participant U, their subject area identity was inherently interdisciplinary and focused on wicked problems. They described a rich awareness of the boundary crossing and knowledgeability required for successful professional work across their landscape of practice. In their teaching, this involved moving beyond more narrow veterinary foci to:

broaden [students’] understanding of the complexity of issues, from their quite narrow veterinary focus to understanding [...] the often conflicting needs and requirements of those different stakeholders and how you balance that [...] it’s not just about the species you’re trying to conserve. You’ve got to address the human angle, in terms of socio-political, geographic, health. There’s a huge human angle, there’s the animal, the sort of species angle, and then there’s the environmental angle.

Teaching students to understand the boundaries and related tensions in their future landscapes of practice and to develop knowledgeability was ‘the whole ethos of our course’:

[Students] often come into the course thinking, ‘I want to save the tiger.’ [...] They’ve never really thought about [...] all the things that you need to involve, in terms of politics, money, human needs, societal needs, growing population, agriculture.

Participant U explained that their research also focused strongly on these kinds of wicked problems:

Yes, it is, because my research is in conservation of species. [...] OK, we’re focusing on one species, but [...] the natural environment, physical environment and political/human environment that we have to do that in is incredibly complex.

Participant U talked about how they developed the knowledgeability to work well with wicked problems across landscapes of practice through ‘bitter experience’ and now felt confident in teaching others about how to do this. They emphasised their many years of experience in working with and teaching about these topics. Some of this confidence also drew on the ways in which the same wicked problems pervaded their wider landscape of practice involving being ‘on lots of committees, conservation bodies, charitable trusts’. They felt it was important to the validity of their teaching that they were still grappling with these wicked problems themselves and still learning from their mistakes. They were also engaged with professional development for learning and teaching in their local area and in the wider university and valued the learning experiences on offer despite their extensive experience. So they were able to include teaching-focused communities in their landscape of practice.

Participant 9

Participant 9 was a member of our comparison group. They were an experienced academic and taught experimental Physics. In their teaching, Participant 9 focused particularly on the skills and understanding needed for further research or study in their subject area:

So rather than kind of going, ‘Well, you’ve got the answer wrong,’ it’s kind of, ‘No, what’s the process here?’ Because it happens to me in the lab as well, right? I’ll do a new experiment and

I'll go, I'll kind of go, 'Hold on, this answer's way too big, what am I doing wrong?' So it's trying to teach them that process that you go through.

Participant 9 did briefly mention some other communities that were relevant to their own landscape of practice, or might be relevant for their students. Unlike our wicked problems participants, however, boundary work seemed much less central to their academic identities.

Well, you kind of try and teach in such a way that it doesn't matter whether they go into academia or not. So the core knowledge is mostly useful if you go into an academic research career or if you join a company that works in the soft matter arena [...] If you're not going into that, then that is less useful to you but the things that they do learn that is useful in other jobs are the problem solving, linking mathematical models to the real world.

Although Participant 9 was able to describe some connections between their research and their teaching, these elements of their academic identities seemed less richly integrated and more in tension than for our wicked problems participants.

Time, it's just time [that gets in the way of developing teaching]. You've got the running of the course itself, there's a lot of assessment to do and there's a lot of second marking to do and, you know, your research is still ongoing because you also have [research metrics] to consider.

Like our wicked problems cases, Participant 9 was interested in developing as a teacher and learned from experience, discussion, feedback, and formal continuing professional development for teaching. This seemed to come less from a passion for engaging students with a particular real world challenge and more because 'it's part of the job and that means you have some, some duty to'.

Participant 9 was also more troubled by some of the interdisciplinary boundary crossing involved in professional development for teaching than our wicked problems participants. They would rather this had been more closely tailored to their disciplinary home:

a lot of educational literature you read has not been done in the science arena [...] there were some papers where I went, 'I don't understand half of the words they're using.'

Discussion

Our findings suggest that it is possible for academics working on wicked problems to cohere their practices and identities around these problems in ways that can help to resolve the tensions and losses often inherent in contemporary academic identities (Barrow et al., 2022). Some of our participants seemed to have made considered decisions about creating this coherence in their values, roles and practices. For others, it may have come about more as an after effect of their passionate engagement with a particular wicked problem. This coherence can potentially help to reap the benefits we mentioned in our introduction, of greater coherence in academic identities supporting emotional resilience. For example, caring deeply about teaching can be in tension with other aspects of academic identities particularly in research-intensive contexts (Loads & Collins, 2016; Skelton, 2013). For many of our wicked problems group, however, being passionately engaged with teaching, and valuing it highly, seemed to sit well

with wider academic identities' focus on wicked problems. For some, this could resolve one source of emotional distress in academic work.

These participants also seemed particularly able to work across landscapes of practice in ways that recognised and valued the expertise of students and members of non-academic communities. As such, our wicked problems participants were sometimes able to question and challenge more traditional academic roles, such as sole expert or authority.

Boundary crossing is a key practice that characterises academic work in teaching about wicked problems. Rather than causing identity disputes in the blurriness of interdisciplinary work, for some of our participants, it seemed possible for their academic and wider identities to crystallise around a particular wicked problem – rather than an academic discipline – in ways that seemed to bring a sense of coherence.

We suggest that the notion of 'wicked problems' could productively be conceptualised as a 'boundary object' in teaching practice and introduced as such in academic development. Star and Griesemer (1989) introduced the idea of a 'boundary object' to explain how non-human actors can enable coordination of activities across different social worlds. Boundary objects can take a wide range of forms such as maps, contracts, machines or concepts, like wicked problems. How academics navigate their relationships with this boundary object can shape their identities and roles in ways that reduce tensions and enhances their passion for their work across landscapes of practice.

The shifting roles of these objects may help to create cooperative and harmonious landscapes of practice such that easier communication across boundaries becomes possible (Adams & Forin, 2014; Boujut & Blanco, 2003; Koskinen & Makinen, 2009). However, this is not always the case. Boundary objects can also contribute to the construction of communities where conflicting perspectives and power are present, and can obfuscate successful working as a group (Bechky, 2003). The comparison case, Participant 9, for example, showed how the language of education could act as a boundary object that held power for one discipline more than another, and created a barrier: 'there were some papers where I went, "I don't understand half of the words they're using"'.

We also contend that the terminology often used for talking about 'boundary crossing' such as 'bridging' and 'spanning' (e.g., Adams & Forin, 2014; Johri, 2008) is too neat, and represents disciplines in separation from one another. Rather, we may want to think of students and teachers spending time together in the liminal ground between landscapes of practice. Richardson (2019) suggests the metaphor of a beach between land and ocean where students or teachers might know the ocean (home discipline) more by seeing it in contrast with the land (new discipline). To know the ocean (home discipline) learners might need to move between looking at it from the beach, to sailing in a boat, to swimming in it multiple times. Teachers and students might need to sit with and accept the uncertainty of not knowing where they will voyage next or what they will find.

We find the metaphor of 'patching' valuable, where partial, over-lapping and often contested knowledge practices are brought together to enact an interdisciplinary arena. It can become part of the academics' identity to act as 'patchers', where they cultivate the patching together of different knowledge practices to create interdisciplinary dwelling places in their landscapes. In this patching, the messy, often implicit and taken-for-granted practices that academics must do in order to work across landscapes of practice in teaching wicked problems are better represented as relational connections. As Latour

(2010b, p. 81) argues, science, technique, law, and religion do not exist as independent domains, but are instead enacted as types of relations, i.e., a connection is made legally, scientifically, religiously, artistically, politically or technically.

It is thus important that academics in these contexts develop the knowledgeability to work successfully to navigate the liminal places in landscapes of practice and to patch together new dwelling places. Professionalism and status are sometimes called into question at boundaries and therefore it is important that policy makers support those working across complex landscapes of practice. This should be considered in relation to workload models, precarious contracts, recognition and reward. Giving permission and space to challenge traditional academic roles is an important contribution that policymakers could offer, particularly for less experience academics and those in hybrid roles, who may feel more vulnerable. Future research could usefully explore how and why some academics enter or choose these more complex roles and situations and why other academics do not.

The reflexive practices described by Kaasila et al. (2021) – where academics were drawn into consideration of their identities through pedagogical training – provide one example of the forms of academic development that might be valuable here. Discussions of role models – who were important for some of our participants' identities – could contribute to this work. Explicit consideration of the emotions and values triggered by working in complex contexts with potentially conflicting priorities would also be useful.

While the impact of boundary crossing research may be easier to demonstrate in the short term, we should not underestimate the longer-term impact of involving and enabling students to work in these ways. This will involve supporting teachers and students to see students and other stakeholders as experts, having knowledgeability about aspects of wicked problems that may exceed that of the teacher. We are concerned that, for some time now, the trend has been to minimise student learning time and staff teaching time on courses, and to use relatively easily managed time-efficient forms of assessment, all of which mitigate against engaging students meaningfully in learning through (not just about) wicked problems (Payne, 2014; Shahjahan, 2018).

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