Interdisciplinary learning and teaching manifesto

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Writing this manifesto is a complex and messy process in and of itself, and we do not aspire for it to be neat and harmonious. Therefore, we are aware that there may be contradictions and overlaps within and between these 11 principles. The language is purposefully provocative and forceful to spark discussion and debate by the readers. Furthermore, our intention is not to undermine disciplinarity, and, in fact, the application of all these principles to *disciplinary* thinking will also lead to richer and deeper learning in those spaces. A peer-reviewed paper that expands on each of these principles with evidence-based citations is forthcoming.

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While interdisciplinarity cannot be singularly defined, general agreement can be achieved on its basic tenets

There are many different understandings and definitions of what 'interdisciplinarity' is and how it is enacted. However, we believe that some consensus can be found among academics, practitioners, and students. For instance, we can likely agree that interdisciplinary teaching includes the gathering of multiple perspectives; working within and through complexity; a direct engagement with real world issues; and the need for shared reference points and understanding as a basis for action. We argue that the process of interrogating differing conceptualisations of interdisciplinarity is valuable for understanding how others view and practise interdisciplinarity. Doing so discourages interdisciplinarity from being reduced to a single definition and becoming too prescriptive.

The world's inherent complexity ought to be honoured in learning environments

We believe that learners and educators should bravely embrace complexity. Modern education can sometimes oversimplify, tending towards concrete answers and reductionist methods. As students are channeled towards disciplinary specialism, their learning can become limited to component parts and therefore separated from wider systems. Trying to conceal our world's inherent messiness with neat research methods, comfortable learning tasks and soothing conclusions only does a disservice to us all. Whilst keeping things simple and trying to reduce a problem to its essential questions might be a useful starting point, it is important to show how the application of simple methodological approaches to problems can fail to account for the world's inherent complexity. Thus, we need a pioneering spirit to develop new, or different, research methods that can engage and contend with the messy liveliness of the world.

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Power structures should be dismantled

Education and learning exist within a nested series of power structures that extend beyond the student-teacher relationship. For example, systems such as colonialism, capitalism, globalism, environmental destruction, and anthropocentricism determine the distribution of power within the classroom. We believe that interdisciplinary teaching and learning better equips people to challenge these power structures *and* that the challenging of power structures enriches interdisciplinary teaching and learning. Thus, interdisciplinary educators and students must not only reveal and dismantle oppressive power structures within their wider communities, but also co-create truly inclusive, hopeful and equitable futures.

Participatory practice is vital for interdisciplinary learning

Participatory practice is about *how* we teach and learn. It involves learning through doing, together, so will often draw on models of experiential learning. Furthermore, participatory practice is more than inclusion and exclusion; it is being aware of who has the power to invite others into existing teaching and learning spaces. We argue that simply putting students from different disciplinary backgrounds into groups will not achieve interdisciplinarity. Interdisciplinary teaching and learning demand practices that nurture genuine participation and learning. Existing spaces and relationships, with their entrenched power dynamics, may no longer be fit for purpose. It is our responsibility as educators to co-create and sustain new shared spaces and cultures to promote accessibility and a sense of community.

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Existing academic institutional structures inhibit interdisciplinary teaching

Explicit and implicit structures in traditional academic institutions can impede the successful implementation and delivery of interdisciplinary teaching. These structures range from the physical (for instance, campus and classroom design and syllabi) and the temporal (like the organisation of timetables and term schedules), to the perceptual (such as the perceived ownership and authority over different territories of knowledge, disciplines and expertise) and social (relationships with colleagues, external partners and students). We argue for considerable structural rearrangement, which can start at the course and programme design level. For example, a traditional linear syllabus focused on singular, modular design, can predetermine what learning matters, when and how. This can communicate a boundedness to students' learning. Contrastingly, a focus on programme level-planning allows for spiralled learning, where students revisit topics and key concepts repeatedly throughout the curriculum, in increasing depth and complexity. This not only illuminates, but also values, the interconnectedness of all learning.

The notion of expertise should be interrogated

Historically, teachers alone have been considered the 'experts' in the classroom, precluding students' knowing – and experience - from being equally valued. However, if we understand that knowledge arises through co-creative and interactive processes between more than one individual, then we start to interrogate traditional conceptualisations of 'expertise'. Understanding that a learner's lived experience extends beyond their identity as a student allows for the whole self to be valued. When we actively invite students to bring their whole self – emotions, body, spirit as much as mind – into the learning experience, we can start to expand the notion of expertise to permit democratic conversation, exchange and co-creation. This necessitates that we all, irrespective of our experience, approach learning with humility and an open mind. Such a reconfiguration places educators not just as 'teachers' but also mentors, learners, facilitators, troublers, and co-conspirators.

Relational, affective and embodied pedagogy in the interdisciplinary classroom is an ethical imperative

Research indicates that thinking and learning happen beyond the brain - "just use your head" is an unhelpful and misguided trope. Learning also happens through our brain's relationship with the rest of our body, and our body's relationship with the environment and with other people (relational). In addition, our emotions (affective) and the way we use our bodies (embodied) also play a huge part in what and how we learn. If we recognise that learning is not simply a cognitive endeavour, we can invite students to engage with their emotions, bodies and relations with others in the learning environment. If students and educators are not used to being invited to be physical or emotional in the learning environment, they can feel exposed and vulnerable. But we argue that interdisciplinary learning, which often touches on ethical issues such as climate change, requires educators to create trust so that emotions, relationships and lived experiences are valued for the richness they bring to learning.

Students' lived experiences and awareness of one's own worldview can be more important than their disciplinary background

Schools and departments instruct students to practise modes of learning that often devalue or exclude their lived experiences and worldviews. We believe that there are infinite types of knowledge and ways of knowing that transcend traditional, Western conceptualisations of how knowledge is valued. These conceptualisations are often organised by disciplinary boundaries.

We argue that students' identities in interdisciplinary learning and teaching

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should not necessarily be tethered to their discipline – indeed, can a secondary-school graduate entering university even be considered disciplined? We believe students should be encouraged to share their subjective observations, life stories and impressions freely, while developing self-awareness concerning how their perspectives were/are shaped, and what that then means for their practice going forward. Therefore, we argue that educators need to move beyond just asking students joining an interdisciplinary course or programme, "What discipline do/did you study?", and question "How do you view, and come to know, the world?" High quality interdisciplinary learning and teaching will require new ways of thinking and may well reshape these worldviews; not all worldviews will survive good interdisciplinary learning and teaching unchanged.

Be wary of 'anything goes' relativism

While championing lived experience is a fundamental approach to an interdisciplinary curriculum, we also argue that any important interdisciplinary endeavour must employ the discerning use of evidence and data to underpin learning and teaching; its absence would be ethically harmful. As such, expansive learning and teaching practices are not equivalent to 'anything goes.' We believe that teaching critical thinking skills and academic rigour is vital; students should be encouraged to research the provenance and purpose of knowledge and evidence sources to better determine their values and limitations, and to distinguish between logically coherent and factually sound beliefs and those grounded in falsehoods. Diverse perspectives ought not be silenced, nor should they be immune to informed debate, interrogation, or dismantling. Mis/disinformation poses real threats, and the denial of climate change or poverty is ethically dangerous. Students and educators must work together to create learning environments where freedom of speech is respected and the capacity to engage in debate is actively nurtured. This should be done without compromising others' dignity and humanity.

Teaching should make space for clumsy and messy exploration

Students should not be expected to generate comprehensive solutions to the global/societal problems they seek to tackle. Rather than seeking a single, elegant solution to a proposed problem, interdisciplinary teaching should embrace the clumsy, exploratory process that unfolds along the way. We argue that this requires teaching spaces for experimentation, tinkering, self-directed learning and learning from failure. This means our assessments must be able to honour and reward processes and creative failure, as much as the product. As educators, we must support moments of synergy as well as productive tension and disagreement. We should all be encouraged to question, question, and question some more; the goal is to pave the way for lifelong curiosity, fostering a love of learning and the courage to 'fail' that extend beyond formal education.

Learning will be, at times, uncomfortable and necessarily slow

Interdisciplinarity can challenge the norms of traditional education. Thus, for many educators and students in interdisciplinary spaces, resisting the *status quo* necessitates working with different educational expectations, approaches and objectives. This can make students feel uncomfortable with, and even unsure of, interdisciplinary teaching methods. It may take time for students to appreciate the benefits of this way of learning. This process will not be easy or linear; it will be uncomfortable and necessarily slow. As educators, we can and should be able to resist institutional pressures for expedience and question our habitual reliance on familiar models, syllabi and assessment methods. By consciously slowing down and experimenting with new ways of organising, educators afford students the time needed to adapt to this way learning. In creating a safe space in which to take intellectual risks, educators can support students to sit with and navigate their way through any discomfort.

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