Correspondence

Revive PhD training with philosophical inquiry

You have highlighted how PhD training assessment has stagnated, despite evolving educational methodologies (see *Nature* **613**, 414 (2023) and *Nature* **627**, 244; 2024). In particular, you note the mismatch between the current PhD journey and the multifaceted demands of modern research and societal challenges.

The current practice of prioritizing candidates whose skills align directly with supervisors' immediate research objectives means that the doctoral journey has become simply a utilitarian quest for results. One profitable reform would be to challenge the focus on narrow skill sets by providing all PhD students with a systematic grounding in philosophical knowledge relevant to their fields.

That should include instruction in approaches such as iterative design and systems thinking, which are essential for understanding complex systems. This could foster a more exploratory, innovative, critical and ethically minded academic culture that takes into account wider and longer-term consequences of scientific innovation.

By reforming doctoral education to prioritize such broad intellectual foundations, we can cultivate better-rounded thinkers and align doctoral training more closely both with the innovative spirit of technology companies and with the broader quest for discovery beyond the confines of pre-existing hypotheses.

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Adopt standards for better social-science study comparisons

Research in health, education and social sciences cannot rely on the same measurement precision as that in the natural sciences, because it is based on reports and recordings of what people think, say or do. This generates issues of comparability and validity that are exacerbated by the need to adapt studies to different contexts and target populations.

The Test Adaptation Reporting Standards were developed by a multinational working party under the auspices of the International Test Commission to support greater accuracy, transparency and usefulness of study documentation, specifically in psychology. The standards, published in January (D. Iliescu *et al. Int. J. Testing* **24**, 80–102; 2024), represent a holistic set of reporting requirements for test adaptations. This encompasses details of translation processes, any other changes made to the test and its content, and samples and statistical tests used to confirm the equivalence and validity of the adapted test.

We hope that these standards close a long-standing gap in how tests across health, education and social sciences are developed, used and reported, and can help to advance knowledge in fields that rely on comparably weak methods of measurement. We urge journal editors, reviewers and authors to implement and endorse the guidelines so that they can have a sustained impact.

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Create 'promotion pauses' for more equitable research

I appreciate the urgent appeal by Christina Mangurian and Claire Brindis to hasten the achievement of gender parity and enhance diversity in science (see *Nature* **627**, S21; 2024).

They outline very specific steps for cultivating a truly inclusive workforce. Another issue to consider is the pressure that many academics feel to be constantly productive to achieve a promotion. A possible solution would be the implementation of 'promotion pauses' — defined periods of reduced work effort that do not penalize academic progression, and that represent efficient and equitable off- and on-ramps in the promotion system. Such a measure would enable a healthier balance between family responsibilities and professional duties, and would benefit all faculty members.

Such a concept is not yet widely embraced in academia or society, but a comprehensive reassessment of the work culture in science and health professions is imperative. The COVID-19 pandemic prompted many academic institutions to revise promotion policies, mitigating the impact of what was, in many fields, essentially a slowdown in research.

Despite the challenges, addressing this issue more permanently is crucial. The need for constant productivity is a persistent barrier that disproportionately affects women and limits professional opportunities, such as access to research grants and higher-level leadership opportunities, for all with family or other caring responsibilities.

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Don't just focus on emissions removal

Boyd *et al.* argue that carbon offsets for hard-to-abate emissions should prioritize removing greenhouse gases, such as carbon dioxide, from the atmosphere over avoiding emissions. The authors suggest that avoided emissions "do little to lower CO_2 levels in the air" (P. W. Boyd *et al. Nature* **620**, 947–949; 2023). We disagree.

Compared with 'business as usual', preventing emissions that would have occurred reduces atmospheric CO_2 as much as growing new trees or technological capture. If the atmosphere is a rapidly filling bathtub, reducing the tap's flow and pulling the plug out both stop it overflowing.

All types of carbon credit have potential integrity concerns. Issues with some avoided-deforestation credits have been much publicized (T. A. P. West *et al. Science* **381**, 873–877; 2023). But technological removal uses huge amounts of energy, and risks extending fossil-fuel use as we ramp up renewables capacity.

Right now, credits for avoided emissions are cost-effective and plentiful because deforestation releases 1–2 gigatonnes of carbon into the atmosphere each year. We can stop these emissions, but lack the funds. When we near net-zero emissions, avoided-emissions credits will be rare and we will be in the 'era of removals'. We're not there yet.

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