A Manifesto for Plant Science Education

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Abstract

Societal Impact Statement

Plants provide oxygen, food, shelter, medicines, and environmental services, without which human society could not exist. Tackling pressing and global challenges requires well-trained plant scientists and plant-aware individuals. This manifesto provides a practical evidence-based vision to strengthen plant science education, focussed on five strategic priorities. It is relevant to all stakeholders within plant science and beyond: from frontline educators to institutional leaders; from commercial or charitable professionals to entrepreneurs and donors; from individual community members to their legislative representatives. Strengthening plant science education demands concrete actions from all stakeholders, ultimately to the benefit of us all.

Summary

Plant science education needs urgent attention. Skilled plant scientists are needed to address major environmental and societal challenges, and global communities require plant-aware professionals to drive impactful policy, research and environmental stewardship. This manifesto was collaboratively generated by a community of educators who gathered to reflect on the state of plant science education. The forward-facing document provides a clear strategy for plant science education, complementing existing research strategies. Five themes were identified as essential for meeting the evolving needs of plant science, educators and learners: (i) plants must be at the centre of an education that addresses global challenges and societal values; (ii) plant science education must prepare students for their futures using bold and effective pedagogies (iii) equity, diversity and inclusion must be robustly embedded in educational practices; (iv) local and strategic partnerships (with industry and beyond) are required to strengthen academic education; and (v) plant science educators need resources and opportunities to develop and connect. The manifesto is intended as a framework for change. Educators, funders, publishers, industry representatives, policymakers, and all other members of our communities, must commit to sustained investment in plant science education. By proactively and collectively embracing the

recommendations provided, the sector has an opportunity to cultivate a new generation equipped with the knowledge, skills, and passion to unlock the full potential of photosynthetic organisms.

Keywords

Education, Plant Science, Plants, Plant awareness, Societal Challenges, Sustainability, Diversity and inclusion, Outreach.

Introduction

Plant science has never been more urgent or critical for addressing profound environmental and societal challenges facing our planet. Climate change, biodiversity loss, and food (in)security can only be tackled with plant science playing a central role. In 2021 a *UK Plant Science Research Strategy* was published after extensive consultation within the sector (Langdale, 2021). Education featured as a core underlying factor for the success of the plan. Failure to recruit and train plant scientists, or to instil interest and understanding for plant science in our societies, would prevent the ambitious goals from coming to fruition. However, the strategy did not articulate how this could be achieved in practice, leaving plant science without a clear educational vision to complement the research strategy.

We, a community of passionate plant science educators from more than 10 countries and 30 institutions, came together at Lancaster University (UK) in January 2025, to reflect on the current status of plant science education. Our meeting explored strengths, weaknesses, threats and opportunities of plant science education from primary school through to postgraduate research (Supplementary Figure 1). From these collaborative discussions we identified a need for a clear forward-facing vision that enables plant science educators to meet the challenges and opportunities we face.

This manifesto is the result of our collective discussions and contributions. We identified five key themes that demand attention to meet both the evolving needs of plant science and the aspirations of those who teach and learn about plants (Figure 1). We use the terms "Plant Science" and “Plant Science Education” throughout this document in their broadest senses. Plant science is intended to encompass not only traditional botany and plant biology but also the study of other photosynthetic organisms. It should also capture crucial interdisciplinary approaches. The acronym plant science education is similarly not constrained to formal educational settings, extending to outreach and other community engagements. Our discussions were framed by the need to educate plant science literate individuals to go into a diverse range of careers (e.g. policy, communications, legislation, public engagement) as well as ensuring a robust pipeline of plant science researchers for academia and industry. We acknowledge that our perceptions and experiences are largely UK-centric, but we hope that many recommendations can be suitably translated to other educational systems.

Our manifesto is explicitly future-focused. We present this document with the goal of providing a framework for change, to elevate the profile of plant science education and to cultivate a new generation of scientists equipped to tackle the challenges of the 21st century (and beyond). We hope that this document will bolster arguments in support of funding, resources and career development.

1. Plants must be at the centre of an education that addresses societal challenges

Plants have shaped our planet and civilisations, yet they are routinely overlooked in school, college, and university curricula. This oversight may be partly rooted in Western philosophies, such as Aristotle's hierarchical view of living things, placing plants at the bottom (Marder, 2011). Limited plant awareness (relative to that for other organisms) is well-recognised among students (Wandersee & Schussler, 2001; Parsley, 2020; Pany *et al.*, 2024). Individuals may clump diverse species together in an unassuming green background, often functional to other organisms (Jose *et al.*, 2019; Sanders *et al.*, 2025). This, in turn, may lead people to overlook the key importance of plants; to ignore their unique features; and to erroneously conclude that they are unworthy of appreciation (McDonough MacKenzie *et al.*, 2019; Stagg&Dillon, 2022).

To build a robust pipeline of plant scientists and professionals, we must therefore confidently position plants in the foreground of science and education. While our direct audience understands this, many colleagues, organisations, and stakeholders do not. Therefore, we provide key context to justify the importance of plant science education, which can be widely shared.

People have long and complex relationships with both plants and nature more broadly. The advent of agriculture, for example, laid the foundation for the division of labour and for modern societies (Weisdorf, 2005; Gowdy&Krall, 2014). Ethnobiology is the study of dynamic relationships among peoples, biota, and environments. The dismissal of plant life is not universal; Eastern, pagan, and Indigenous thought often regard plants more highly, even as 'kin' (Hall, 2013). In all cultures, plants feature in language (Fitri&Rini, 2022) , art (Gibson, 2018) and literature (Guanio-Uluru, 2021), to name just a few spheres of influence. They also hold a symbolic role in celebrations and rituals across most cultures (Kandeler&Ullrich, 2009). Preserving traditional plant knowledge, eroded due to urbanisation, will be crucial for our collective cultural heritage (Turner *et al*., 2022). Engaging with natural environments can also reduce stress and improve mental health (Bratman *et al*., 2019). More people are also opting to follow a plant-based diet, which has been associated with reduced risks of chronic diseases and with lower environmental footprints (Viroli *et al.*, 2023).

As we look to the future, plant science research is vital for addressing global challenges, including the UN's Sustainable Development Goals (Amprazis&Papadopoulou, 2020). Plants are crucial for food security, sustainability (Jez *et al.*, 2016), mitigating climate change (Espeland&Kettenring, 2018), and providing ecosystem services like desertification prevention (Maestre *et al.*, 2012), phytoremediation (Yan *et al.*, 2020), and supporting sustainable cities (Manning, 2008). Plant biodiversity is key for many of these applications, highlighting the need for conservation efforts (Nic Lughadha *et al.*, 2020).

Plants also have immense human health and economic value. Crop-based agriculture contributes significantly to economies (e.g., £12 billion in the UK) (DEFRA, 2024), as does environmental horticulture (£28 billion in the UK) (OHRG, 2021). The World Bank estimates 50 million people rely on forestry, with timber demand expected to quadruple by 2050 (World Bank Group, 2016). Plants are also indispensable sources of medicinal compounds (Chaachouay&Zidane, 2024), and malnutrition remains a major underlying cause of childhood deaths globally (FAO *et al.*, 2025).

However, formal curricula often overlook this complex relationship. Plant biology is frequently reduced to basic dissections and photosynthetic biochemistry. To engage policymakers, funders, and society, we need a more holistic plant science education that connects plants to personal values and societal issues. For example, curricula could emphasize useful plants (Pany *et al.*, 2019) and the tangible links between plants and human health.

Specific actions that plant science educators can take to integrate societal challenges and wider relevance:

- Include examples of plant science applications to our daily lives, human health and wellbeing, and global challenges (with explicit references to sustainable development goals).
- Highlight the importance of plants in the history of humankind. Ensure that there is also an inclusion of Indigenous and non-western perspectives.
- Find engaging ‘ways in’ to complex compulsory plant science topics in the formal curricula, helping students connect technical content to societal challenges. For example, photosynthesis could be taught through the lens of food security and biotechnology rather than through the underlying biochemistry.

2. Plant science education must prepare students for their futures using bold and effective pedagogies

One way we can ensure plant science is an attractive discipline is to use effective evidence-based educational practices that students see the value of. If students perceive that plant science is taught better than other subjects, it will increase recruitment into plant science modules and programmes. Academics teaching plant science and designing curricula must therefore use effective pedagogies, assessments and curriculum design models.

We should not shy away from modules that mainly focus on plants, and we should not apologise for teaching students about plants. Only in this way we can reclaim the breadth of plant science knowledge that is so fundamental to the future of our planet. All students studying natural sciences should develop some fundamental baseline knowledge of plants relevant to the field or subfield of their degree. This includes theoretical content and important hands-on practical experience of working with plants. Given the close relationships between plants and human health there should also be some appropriately tailored plant science content in biomedical focussed programmes. All students studying sustainability should also be at least aware of the importance of plants and plant science. Specialist programmes (e.g., BSc Plant Sciences) would of course include a much greater amount of specific plant science content.

Curriculum design must support, rather than undermine, interest in plant science, and actively tackle the negative preconceptions many students arrive at university with (Stagg *et al.*, 2009). Plant science topics are often relegated to single lecture add-ons to animal content, making this entire kingdom seem like an afterthought. Quality plant science delivery requires the space to tell cohesive stories, especially because plant responses often span biological scales (e.g., from biochemical to genetic to cell to whole plant to ecosystem). Designing in space for plant science immediately signals that it is a worthwhile area of interest, allowing students to build an identity as plant scientists and motivating them to take their studies further.

Wherever possible, plant science subjects should be taught by specialists who have the requisite enthusiasm and knowledge to inspire students. To achieve this, all plant scientists must be willing to contribute, whether through their own teaching or as guest speakers in biology programmes that may lack a plant science representative.

Plant science programmes should be ambitious in preparing graduates with necessary technical and transferable skills. This includes training in the authentic and 'messy' process of science through inquiry-driven practical work embedded into the curriculum, developing student research design, critical evaluation and problem solving skills (Healey & Jenkins, 2009; Bangera & Brownell, 2014; Alvey *et al.*, 2025). This may take the form of fieldwork, lab work and/or computational biology. To produce plant scientists able to meet the challenges of the 21st century, we also need students to develop a range of competencies or transferable skills, including ethical and responsible use of Artificial Intelligence (Francis *et al.*, 2024). This might include awareness of public policy; legislation; intellectual property and ethics; digital, information management and communication skills; project management; leadership; collaboration; self-reflection; and career management (Hubbard, 2024). We will need to be focused and disciplined in deciding what to include in curricula to give an appropriate balance between knowledge, skills and competencies while maintaining manageable student and staff workloads.

Assessment also needs to be clearly designed in order to drive appropriate student learning. We owe our students clarity in terms of what we expect from them. Curricula should be constructively aligned, so that learning outcomes, assessment and teaching align seamlessly (Loughlin *et al.*, 2021). However, students also need flexibility and freedom within curricula to follow their own interests, as personalised curricula can improve motivation and outcomes (Fariani *et al.*, 2022). Asset-based teaching strategies that allow students to play to their strengths can also increase student engagement (Lopez&Louis, 2009). Assessments should help develop authentic skills and competencies, moving away from models that solely prioritise knowledge recall (Villarroel *et al.*, 2018; Hubbard, 2024). Assessments can be designed to embed real-world issues through problem-based learning or assignment briefs provided by employers.

Specific actions that plant science educators can take to develop pedagogy, curricula and assessment:

- Ensure plant science is taught by specialists with the expertise and enthusiasm to champion plant science as an exciting and relevant topic
- Ensure all biology courses deliver fundamental plant science concepts and practical skills, integrated in a cohesive manner and not treated as an afterthought.
- Ensure teaching and assessment supports development of student transferable skills, competencies and societal awareness as well as content knowledge and technical skill.

3. Plant science education must embrace equity, diversity and inclusion

Diverse communities and inclusive environments drive innovation, creativity, and better outcomes in all disciplines (Hofstra *et al.*, 2020; Specht&Crowston, 2022). However, in a UK context, plant science has disproportionately low numbers of Black and Asian students compared to other biological science disciplines (Hubbard *et al.*, 2024). Systemic barriers continue to limit access and retention for historically marginalized groups, such as women, LGBTQ+ individuals, underrepresented ethnic groups, and people with disabilities. Addressing these disparities is essential for equity in plant science research and education (Henkhaus *et al.*, 2022) and should be a central goal of plant science education (Mabry *et al.*, 2024). Our efforts should be aimed at educational settings but also at the broader research culture in our sector.

Early exposure to plant science can broaden participation and build a more inclusive scientific community (Friesner *et al.*, 2021). We should proactively engage with diverse young learners in a range of educational and social contexts, to inspire them to pursue careers in the field (Henkhaus *et al.*, 2022). Inclusive practice is also crucial for recruitment in the sciences (Dewsbury & Brame, 2019; Handelsman *et al.*, 2022). All students should benefit from high-quality plant science education. Many people still associate scientists with a narrow demographic. We must challenge this view and show that scientific contributions span all identities. As educators, we can foster a sense of belonging by showcasing scientists from diverse backgrounds (Benitez-Alfonso, 2022; Henri *et al.*, 2023; Schultheis *et al.*, 2024). Repositories specifically highlighting and indexing research by minoritised groups are valuable tools to support such efforts (Black in Plant Science, 2025; Project Biodiversify, 2025). Inclusivity also must go beyond considering students in our own classrooms, extending to include the global community of plant science students, especially those studying in contexts that lack access to high quality educational and research resources (Williams *et al.*, 2015). Additionally, much of our plant science knowledge originates from Indigenous traditions, often without proper acknowledgment (McAllister *et al.*, 2025). We must be willing to discuss and address these historical imbalances, to create a more equitable discipline (Joshi *et al.*, 2024; Mansfield *et al.*, 2024; Mabry *et al.*, 2024).

Attracting diverse talent is not enough. Ensuring a healthy, supportive environment is also critical for retention. Many scientists from underrepresented groups leave the research environment due to toxic competition, gender bias, mental health stigma, and poor work-life balance (Committee on Advancing Antiracism, Diversity, Equity, and Inclusion in STEM Organizations *et al.*, 2023; Kwiek&Szymula, 2024). Toxic academic environments also affect our undergraduate and postgraduate students and contribute to the exodus of many promising early-career scientists (Ong *et al.*, 2011; Wong *et al.*, 2022). Marginalized individuals face many systemic obstacles, including exclusion from influential networks (Berhe *et al.*, 2022). Women can experience a 58% attrition rate due to multiple factors, including disparities in recognition and institutional support (Kwiek&Szymula, 2024). LGBTQ+ scientists can encounter exclusionary policies and limited mentorship (Field&Rajewski, 2021), while Black scientists often face social isolation, microaggressions, and inadequate mentorship (Cox *et al.*, 2021). Disabled students and scientists are often unnecessarily excluded from laboratory and field work and face repeated ableist assumptions that they do not belong in scientific communities (Reinholz&Ridgway, 2021). Addressing these challenges will require structural reforms. As members of the plant science education community, we can individually contribute to the solutions. Providing mentorship that recognizes the importance of social identity can be a valuable initial action. Without intervention, the scientific sector risks losing valuable talent, undermining both scientific progress and equitable innovation.

Specific actions that plant science educators can take to improve diversity and inclusion:

- Make efforts to broaden access to and engagement with plant science education both within and outside of Higher Education institutions.
- Highlight contributions from diverse scientists and provide relatable mentorship. Help students to see themselves in scientific careers and foster a sense of belonging.
- Advocate for structural reforms in academic institutions to address systemic barriers in academia, ensuring a more inclusive research culture.

4. Plant science education should be enriched by local and strategic partnerships

Plant science educators cannot act alone. For sustained plant science education we need stronger ties between educational institutions, commercial entities, charitable bodies, policy makers and local communities. The global challenges plant science is posed to address are indeed of core interest to all these stakeholders, driving recruitment and employment in the respective sectors. Partnerships can address specific challenges or expand student opportunities across sectors of our societies. This collaborative approach also underpins Education for Sustainable Development (Vare & Scott, 2007; Venkataraman, 2009; Pauw *et al.*, 2015), as students will need to build authentic partnerships to solve major societal and environmental problems. Students will need to understand the perspectives of diverse stakeholders, if they are to adopt sustainable, ethical and responsible approaches.

University-industry partnerships aim to translate research into innovation and economic growth (Atta-Owusu *et al.*, 2021; Bamford *et al.*, 2024). Integration of the skills and needs of both partners can often determine the success of these interactions. Effective plant science education can build relevant skills (e.g. communication, stakeholder engagement, project management) alongside disciplinary knowledge. We should engage with industrial contacts to resolve disconnects between skills developed in academic contexts and those valued by future employers. This will facilitate the transition of some of our students into industry (Sidoti *et al.*, 2023; Walsh *et al.*, 2023). We should also directly involve students in interactions with industry, to make them aware of these opportunities. Commercial partners can also help us showcase diverse and viable plant science careers and can provide applied training opportunities (i.e. industry placements and projects). Lastly, plant science education could also contribute to the continued professional development of individuals. Delivering targeted training on plant science topics of value for specific stakeholders might be an additional route to disseminate knowledge.

Partnerships between academic institutions (including botanic gardens) are similarly crucial. Education providers lacking dedicated plant science programmes or facilities will particularly benefit. Few universities in the UK offer plant science programmes and plant science content being taught can vary significantly (Stroud *et al.*, 2022; Trinder *et al.*, 2025). Opportunities and resources are also often concentrated in non-teaching research institutes (UK Plant Sciences Federation, 2014). Many individuals at our meeting reflected on how challenging it is to be the only plant science educator in a department with little or no plant science research. Structural barriers can include the lack of facilities (e.g. plant growth chambers) and the lack of biological materials for practicals and undergraduate research projects (e.g. mutant lines). Resource sharing will be critical to ensure quality plant science education in departments that lack plant science research. Sustained partnerships might ultimately translate into funding cases for enhanced research infrastructure and for enriched student experiences (D'Souza&Wang, 2012).

Synergy with charitable partners is another productive partnership avenue. The Gatsby Plant Science Summer School, for example, has recruited many UK students to plant science over the years (Levesley *et al.*, 2012). We need to further capture and translate interest towards plant science from third sector bodies.

Plant science education should also spill out from institutional walls into the communities around us. Popular nature documentaries are powerful vehicles to raise plant awareness (Kacprzyk *et al.*, 2023), but we can also achieve this via field opportunities, school outreach, and public engagement (Friesner *et al.*, 2021). These opportunities can promote interest in plant science and encourage recruitment (İri & Çil, 2020; Crawford *et al.*, 2021; Blanton *et al.*, 2024). Strategically integrating plant science into school education (Hsu *et al.*, 2024) as an example) is imperative to improve lingering misconceptions, attitudes and skills. We need enthusiastic people (staff and students) capable of conveying their passion for plant science in those settings. It is important that extramural activities integrate community partners and local environments through co-designed projects (e.g. citizen science initiatives). Such collaborations may lead to novel directions and applications of plant science, benefiting learners, researchers, and partners alike (Ardoin *et al.*, 2020; Snapp *et al.*, 2023; Nguyen *et al.*, 2024). By engaging members of the community (via school gardens and science fairs), we can also raise their plant awareness through direct, hands-on experiences (Stagg&Dillon, 2022). These partnerships can also offer access to unique knowledge not found in literature and may serve as a "testing grounds" for students to authentically develop communication and engagement skills.

Specific actions that plant science educators can take to establish and strengthen partnerships and collaborative working:

- Engage with industrial partners to align curricular skills with those required within commercial sectors.
- Explore (locally) available resources, connections and opportunities that could boost plant science teaching delivery and student employability.
- Bring plant science education outside of academic institutions via outreach in schools and community engagement.

5. Plant science educators need resources, support and opportunities to develop and connect

The success of plant science education ultimately depends on the achievements of the individuals directly involved in teaching, educational support and outreach. We firmly believe that a vibrant community of practice that embraces the diverse expertise within our field is required for effectively engaging a wide range of students. Being able to share resources, exchange ideas and build collaborations between plant science educators are essential for plant science education.

In many countries there are dedicated plant science professional societies that provide natural homes for plant science education, such as the American Society for Plant Biology (ASPB). However, in other countries, including the UK, plant science education suffers from a lack of the same. Authors have noted the fragmented nature of the UK plant science community (Hall *et al.*, 2025). Local professional societies are necessary to support impactful plant science education. International meetings are indeed often prohibitively expensive for teaching focussed individuals without external grant income and are also not inclusive of individuals unable to travel for personal reasons.

An effective plant science education community would have multiple components. An annual conference would support important discussions and the sharing of best practices, while a dedicated mailing list and regular online events would maintain a sense of community. Plant science education networks should provide staff and students with a broad range of opportunities such as teaching swaps, mentoring opportunities and partnerships between different institutions. By working together, members could secure grants to support plant science education. The development of effective approaches to improve plant awareness among students would be a worthy subject for inter-institutional projects (Uno, 2009; Stagg *et al.*, 2025). However, for this to happen, funding bodies must also broaden the scope (and range) of their calls, understanding the importance of educational initiatives. Similarly, journals shall provide clear outlets for plant science education contributions, actively soliciting input from network members. Developing plant science education networks (or broader plant science professional societies) demands significant structural and economical support. We ask public and charitable bodies to proactively come forward and bring together research and teaching focused staff for this ambitious goal.

Recognising the importance of equitable access to high-quality plant science education, sharing resources is also critical. There are high quality, free-to-use platforms for openly sharing teaching resources (such as the National Teaching Repository (NTR) and the Society of Experimental Biology website). We encourage plant science educators to use these, and to clearly tag content as plant science related. We also see potential value in a centralised digital plant science education hub, developed and maintained by the network. It should be a home for resources promoting plant science in all contexts (teaching, outreach and policy). This would critically include teaching materials (for lectures, practicals, workshops and field courses) but also career development opportunities for staff and students (e.g. internships). Funding and staffing would be critical considerations to establish such a hub.

The significant efforts of individuals to build, maintain, and strengthen plant science education communities deserve appropriate visibility and, importantly, formal recognition from their own institutions. Universities must acknowledge these through promotion criteria, particularly for teaching-focussed staff who often face inequitable routes to promotion (Hubbard *et al.*, 2015; Bull *et al.*, 2025). The plant science education community must champion its own members (particularly early career ones and those from underrepresented groups), supporting them to evidence their educational impact and creating recognition mechanisms. For example, the UK based Black in Plant Science network has established mentoring schemes and national level awards. A plant science education community could similarly collect nominations for a *Plant Science Educator of the Year* and put forward individuals for existing prestigious awards. We encourage network members to measure their educational impact through (in)formal routes such as short evaluation forms capturing use and benefits of their resources and activities (Alvey *et al*., 2025). We must encourage each other to provide feedback where we have benefitted from the work of others. Evidencing impact across institutions will strengthen promotion cases and applications, supporting the careers of active network contributors. Establishing this positive feedback culture should be a critical goal of plant science education communities.

Social media can also be used to further credit individuals and raise awareness, and we recommend widespread consistent adoption of relevant hashtags to provide greater visibility of plant science education (e.g. #PlantSciEd).

Specific actions that plant science educators can take to support (and benefit from) educational networks and opportunities:

- Engage with plant science education by participating in activities, sharing resources and opportunities.
- Contribute high-quality teaching and outreach materials to centralised digital hubs, enriching the pool of resources accessible to the community.
- Document and share evidence of the impact of resources and contributions to plant science education. Advocate for the recognition of teaching-focused activities and support career progression of educators within institutions.

Figure 1: A framework for plant science education drawing together the five key themes. *To cultivate the next generation, plant science education for the future must: Position plants at the centre of an education that addresses global challenges and societal values; Be enriched by local and strategic partnerships; Prepare students for their futures using bold and effective pedagogies; Give educators resources and opportunities to connect and develop; and embrace equity diversity and Inclusion. We encourage people to use this graphical summary as a visual tool to prime discussions around the manifesto.*

Call to action

Plant science education has a fundamental role to play in addressing the environmental and societal challenges of our time. To cultivate a future where plant science can effectively contribute to a sustainable planet, it is imperative that we embrace the five key themes outlined across this manifesto in our educational activities: positioning plants at the heart of curricula addressing societal issues; adopting bold and effective pedagogical approaches that prepare students for their futures; fostering equity, diversity and inclusion; nurturing strategic partnerships; and providing plant science educators with the necessary resources and opportunities. Just as investment in plant science research is deemed essential and urgent, so too is a concerted and sustained commitment to plant science education at all levels. We urge educators, institutions, policymakers, and industry partners to actively engage with the recommendations made here. In doing so, we can ensure that the next generation is equipped with the knowledge, skills, and passion to unlock the full potential of the plant kingdom for the benefit of all.

Author contributions

All authors (EA, AP, MEW, MEC, SD, SD, SDD, LRH, AK, PK, SM, CM, SS, SW, HA, YB-A, EB, KJRPB, CPC, BCD, AF, BG, CG, DMJ, JK, KK, GRL, SL-G, EL-J, CM, VDPM, IM, ASN, GJP, JP, AP, BS, LS, SHS, LRT, LT, HKW, KEH) attended the conference (in-person or online) and engaged in the discussions held there. NotebookLM was used during the conference to collate ideas and identify initial themes from contributions by 50 delegates across 8 working tables; all subsequent drafts and manuscript writing was conducted entirely by the authors. MEC, SD, SD, SDD, LRH, AK, PK, SM, CM, SS, SW contributed to the writing of the first draft (and suggested edits to later versions). EA, AP, MEW and KEH conceived the opinion piece and wrote the final version.

Data availability

Data sharing not applicable to this article as no datasets were generated or analysed during the current study

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Conflict of interest statement

Most of the authors of this opinion piece are active educators involved in different charitable entities. Activities or outputs linked to specific contributors might be referenced in this piece. These are meant to showcase practices and frameworks with a record of positive impact. Nonetheless, we make readers aware of this, should they want to contextualise some of our recommendations.

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