Educating Students for Climate Action: Distraction or Higher-Education Capital?

Fernando M. Reimers

This essay examines how universities are responding to demands to educate students for climate action. I argue for a whole-of-university approach, in which sustainability becomes part of the mission of the university, and translates into reimagined forms of education, research, outreach, and management of the university operations. This approach runs counter to the most common response of universities, incremental to new demands, and is likely to take place only in institutions with greater capacity for innovation. Strategy and knowledge are key resources to support such innovation, drawing on the comparative analysis of the global experience of higher education, as there are already high rates of institutional innovation globally in educating for climate action.

Higher education in the remainder of the twenty-first century will be shaped by how universities respond to new demands to address the pressing complexities of finding a sustainable way of life. This essay examines three ways universities could respond to those demands, and suggests that strategy and knowledge of comparative experience could help.

A recent study of higher education in the United States underscores the central mission of universities: supporting the development of higher-education capital – namely, the capacity to engage deeply with intellectual topics – which is undermined when universities pursue too many other missions.[1] Agreeing that the primary goal of universities is teaching and learning, it is also the case that the analytic, reasoning, and communication skills that students develop in universities (their higher-education capital) are acquired in contexts related to their setting. Focusing on sustainability, which includes existential challenges for humanity (such as climate change, democratic decline, or war), provides a capacious framing that allows the leaders of universities to elicit the support of many constituencies. In this essay, I focus on one component of sustainability: addressing climate change.

There is great heterogeneity in how universities approach educating for climate change. After examining three approaches that have been followed, and discussing how to evaluate their benefits and costs, this essay favors a whole-of-university approach that supports pathways to transition toward a green economy, where

every student has multiple learning opportunities to develop the competencies to contribute to adaptation, mitigation, and reversal of the effects of climate change, as individuals, citizens, and professionals. This is different, and more challenging to do, than providing students opportunities to learn the science related to climate change, what I could call "climate literacy."

The varied responses from university leadership to these demands constitute a global laboratory from which we can learn. This variation is shaped by widespread contention over whether universities can (and even should) pursue this focus on climate change, by their choice of which metrics can and should be used, and by faculty capacity, university leadership, and organizational effectiveness. The path of least resistance for universities is to respond to these societal demands in shallow and cosmetic ways, adding some courses or initiatives aligned with climate change, and producing some superficial changes that improve public metrics such as creating a required course on climate change or a new degree on climate change, without meaningful changes to the experience of most students on campus. This facile course of action will be ineffective in helping us tackle climate change and is the *least likely* option to contribute to the formation of higher-education capital.

In contrast, meeting these heightened societal expectations will require greater integration of research, education, outreach, and management of university operations to advance sustainability. If successful, it will lead to a more fundamental reimagining of the student experience, one that engages all students over extended periods, integrating action and reflection on action with deep learning from different disciplines. This more demanding path is also *more likely* to support the development of higher-education capital.

The new societal and student demands that universities address sustainability could signal the exhaustion of the post–World War II order for higher education, shaped by the primary goal of democratizing access.[2] Institutions of higher education have been called to reimagine their role in society, and their mission to serve as catalysts "for a rapid, urgently needed and fair transition towards sustainability."[3] Adding to these demands from alumni, civic leaders, donors, academic leaders, and governing bodies of universities, as well as the public at large, are demands from students, the most educated generation in human history.

This burgeoning interest in getting universities to address the effects of climate change stems also from the considerable increase in the number of institutions and students in the Global South, where the challenges are greater. The number of students in higher education is expanding exponentially, from 100 million in the year 2000, to 250 million in 2020, and projected to be 594 million by 2040, with most of this growth taking place in middle-income developing countries and very limited increases in North America and Europe.[4]

At its General Assembly in 2015, the United Nations adopted a framework to guide efforts toward a more inclusive and sustainable world: the UN Sustainable Development Goals (SDGs), also known as the 2030 development agenda. The seventeen SDGs are understood to be interdependent, so that climate action, for instance, is interdependent with other SDGs such as gender equity, education, sustainable cities, and no poverty.

The growing adoption of the SDGs by many higher-education institutions reflects the globalization of ideas about the mission of higher education, much like the model of a "liberal arts education" has spread globally. Studying universities' varied efforts to advance these goals furthers our understanding of the effects of globalization on universities overall, especially in how they redefine their mission. Such study can also support innovation based on global experience.

There have been several efforts, led by university consortia, UN agencies, and organizations of civil society to support the alignment of higher-education institutional strategies with the SDGs 2030 agenda. The National Committee for the 2030 agenda in Norway is a recent example. Composed primarily of higher-education institutions, it prepared a report calling on universities to align their work more intentionally with the advancement of the 2030 agenda. The report was presented at the UNESCO biannual conference on higher education, which was held in Barcelona in May of 2022.[5]

To support exchange across universities to impact climate action, in 2008, the Hamburg University of Applied Sciences launched the International Climate Change Information and Research Program, focusing on education, communication, and information on climate change. This program convenes a biannual conference on universities and climate change. Similarly, the International University Climate Alliance is a consortium of fifty-six research universities collaborating to exchange practices on research and education about climate change. And in the United States, the organization Second Nature has worked with universities since 1993 to help them integrate sustainable practices in the management of their physical infrastructure and in their programs.[6]

Times Higher Education (THE) has created a novel set of global rankings of universities, the impact rankings, which allow participating institutions access to the self-reported evidence describing each institution's initiatives to meet the SDGs.[7] These impact rankings have made innovations in higher education more visible than they would have been otherwise. Without them, the advances would have been known only to those at their respective institutions. For example, Amrita University, a small private university established in 1994 in Coimbatore, India, operating in seven campuses and offering 207 degrees to 18,000 students with 1,700 faculty, was recognized in the last round of the impact rankings as the most impactful university in India and the 41st most impactful university in the world, to a great extent because many of its programs focus on improving human conditions

in rural communities and among the poor, and require that students spend part of their time living in poor communities so that part of their studies can contribute to those efforts. Other efforts to make innovations in higher education in climate action more visible include various awards, such as those managed by the Times Higher Education to recognize exemplary practices, including in environmental leadership, in the United Kingdom, Asia, and the Arab World.[8]

Underscoring the challenge of finding adequate metrics to support efforts to educate communities about climate change, the impact rankings are imperfect. Two of the indicators address climate change, but only partially. First, SDG 13 (climate action), which integrates indicators on research for climate action, low-carbon energy use, outreach climate education efforts, and commitment to carbon neutrality ; and second, SDG 17 (partnerships for development), which includes indicators of education about the SDGs for university students, as well as research into partnerships to advance the goals, and publication of reports on the SDGs. None of the indicators provide information on what proportion of the students at the institutions learn anything about climate change, or about the type of educational experiences they have access to, or what they actually learn.

Universities must face three central curriculum questions as they seek to address climate action : Who should be taught, what should be taught, and how should it be taught ? This curriculum redesign needs to be aligned with scenarios for a transition to a new economy, which forecasts the impact of climate change on jobs, and include alternative scenarios that adapt to and mitigate the effects of climate change, drawing out the skill requirements of those jobs. The International Labor Organization estimates that a transition to a green economy will eliminate 6 million jobs and create 24 million new jobs by 2030.[9]

But if it is to reinforce higher-education capital, the integration of climate education in the curriculum needs to be deep and rigorous, and engage most students. A fragmented approach to sustainability education might lead to a few (or many) new courses in the curriculum, creating multiple possible avenues that some students may take to reach recognition, study, or even action around one or some of these societal challenges. But they may not follow any pathway that supports progression from novice to expert understanding, or connects these routes to the rest of their academic journey. The result of such a fragmented approach would be that only some students would learn something about sustainability, with no assurance that those opportunities were in fact pursued by all students, and no guarantee that anyone gained the competency to advance sustainability from their eventual professional paths.

In contrast, a whole-of-university approach to teaching climate change would provide coherence in learning opportunities across subjects, throughout the classroom experience and the lived experience on campus. This thorough connection is

more likely in contexts in which there is coherence across curricular, research, outreach, and infrastructure efforts that support student engagement at growing levels of depth and complexity with the subject. Further, students will likely benefit more when university efforts occur across multiple subjects that develop a full range of cognitive and affective dispositions toward the challenges of climate change, as aligned with a green economy transition. But scholarly research on how universities approach climate change education remains scant: "Climate Change Education [CCE] has been an under-researched topic. There have been only a few attempts to conceptualize CCE and define the associated skills, knowledge, and competencies."[10]

A survey administered to 212 university staff in 45 countries found high variability in how institutions approached climate change, most of them focusing on reducing their carbon footprint and only 20 of them mentioning curricular approaches.[11] These curricular approaches in turn were heterogeneous, including *piggybacking* (adding climate change education to existing courses or programs), *mainstreaming* (integrating climate change education broadly across the curriculum), and *specializing* (creating specific disciplinary offerings). Another study found very limited references to climate change in most disciplines.[12]

There are very few evaluations of education programs about climate change. On balance, they suggest that simply teaching students *the facts* about climate change produces knowledge but not commitment to engage in addressing it. Instead, the combination of teaching the science of climate change along with opportunities to design and execute ways to make some difference produce both knowledge and the disposition to engage in climate action efforts. Experimental studies of climate education curriculum in Sweden show that knowledge-based curriculum alone is not correlated to behavior, whereas knowledge-based curriculum integrated with civic engagement with climate action led to competency and actual engagement.[13]

A review of 220 studies of climate change education conducted between 1993 and 2014 concluded that most of them framed it as STEM education or part of environmental education.[14] A recent review of 70 studies on the effectiveness of climate change education concludes that most of them focus on outcomes such as individual energy conservation, with less than a handful addressing effects on collective action of societal transitions to noncarbon fuels.[15] Additionally, many studies examine whether climate change education supports understanding of climate change, not on whether they help students identify pathways for climate action.[16] In other words, they emphasize climate literacy, rather than the development of skills that can support the transition to a green economy. Perhaps the most robust challenge: most studies on climate change education document very limited impact on attitudes and behavior, and in some cases, a negative relationship between knowledge and behavior.[17]

Across these reviews, a pattern emerged. Universities have approached climate change education in at least three ways: 1) through the introduction of a required

course on the subject, 2) through the organic incorporation of climate change education in the curriculum, and 3) through the intentional integration of climate change across the curriculum.

While requiring students to take a course on climate change has the appeal of apparent simplicity, there is no evidence that this approach has been easy to implement or led to depth of understanding. Given the distinction between climate literacy and helping students develop specific competencies that support a transition to a green economy, a required course is more likely to contribute to the former than to the latter. In 2019, the government of Italy took the unprecedented step of mandating a required module on sustainability for all schools and, in partnership with the Sustainable Development Universities Network, an elective interdisciplinary course for universities :

> [This] elective online module for all university students of all disciplines, [was] shaped around the interdisciplinary nature of the concept of sustainability, focusing on the intersection of economic, social, and environmental dynamics. This module, known as "lecture 0," was designed as propaedeutic to any course of further specialization, with a view to training students to think in an integrated fashion across natural and social sciences.[18]

The implementation of these programs, however, has been challenging. As of 2021, only twenty universities offered lecture 0 (from here, Lecture Zero) – even though eighty universities were part of the Sustainable Development Universities Network.[19] The lack of faculty capacity undergirds these challenges. Nonetheless, some universities have engaged more deeply with climate change education, adopting practices the proponents of Lecture Zero hoped all universities would. For instance, the University of Dar es Salaam in Tanzania requires all students to gain a basic understanding of climate change and sustainable development.[20]

A single course designed to educate all students presents a major challenge : finding the faculty who will teach it. An obvious risk in finding the right instructor is that such a "service course" would be taught to very large groups of students, perhaps requiring faculty to extend beyond their usual expertise, and unlikely to have the experience required to help students connect what they learn about climate change to their professional paths. The evaluation of the benefits and costs of such an approach should include what students learn in terms of depth and rigor of knowledge, competencies, and dispositions – and how these lessons inform how they plan to address climate change from their intended professional paths.

A more organic, evolutionary way for universities to include climate change education in the curriculum is to build on the existing interests and expertise of the faculty, as they conduct research or create programs on the

topic. This approach is more likely to emerge in universities with a strong overall commitment to climate action, where there are already programs in place and research in progress, which are more likely to benefit some students than all students. Most of the examples available in sources like the impact rankings are of this sort.

The University of Tasmania, Australia's fourth oldest university, leads the THE rankings on climate action. This affiliation can likely be credited to their many research publications on climate action, as well as their low-carbon energy tracking and their commitment to carbon neutrality – the university has been carbon-neutral certified since 2016. A chief sustainability officer oversees a strategy to advance the school's "holistic institutional sustainability initiatives."[21]

Climate change education is integrated into several courses in various disciplines, such as natural sciences, geography, education, sociology, law, philosophy, and health. The courses include elective classes such as responding to climate change, introduction to the science of climate change, our changing climate, climate change economics, politics and planning, and planning and management for climate change. So far, these courses are the result of organic development. The university is mapping the entire curriculum to identify where education about the SDGs currently exists. They have examined the idea of requiring a course on climate change for all students, but discarded it in favor of a set of transversal competencies, which include sustainability, that could be developed through a variety of pathways and prerequisites, each appropriate to the respective disciplines and fields of study.

Scientists at the University of Tasmania have written research papers on climate action to promote the country's Climate Action Plan. Their Climate Futures Research Group works with industry and government, providing models to support climate-attuned decision-making. They have also advanced several initiatives to educate the community about climate, through their Curious Climate program, which provides students and teachers in local schools an avenue to ask questions about climate change and have them answered by climate scientists.[22] Those questions and answers then become public information. The scientists at the University of Tasmania have also aligned their operations with climate change mitigation strategies, including divesting from carbon-intensive fuels, reducing carbon emissions and carbon in infrastructure, and decarbonizing their operations.

Ranked third in the impact rankings for climate action, Wageningen University and Research in the Netherlands, formerly an agricultural college, focuses on improving and preserving the contributions of nature to quality of life, in food and the living environment. The university's strategic plan addresses four main challenges: climate change, overpopulation, malnutrition, and overconsumption. The plan articulates the transitions necessary to face these challenges and aligns the actions of the university to support those transitions, such as the tran-

sition to circular agri-food systems. The strategy explicitly states another goal : to make an impact that responds to societal needs and the SDGs.

Research at the Wageningen Institute for Climate Research is structured around three main issues : enabling climate action, managing the future biosphere, and advancing circular systems. Courses about climate change and sustainability are integrated throughout the curriculum of all programs and are also available as extension courses or MOOCs (Massive Open Online Courses) for professionals.[23] Such alignment of university strategies with sustainability and climate action has resulted in an abundance of opportunities for students to develop competency in multiple fields, across the curriculum.

The collective benefits of these organic approaches are twofold : 1) instruction is more likely to be led by experts, and 2) it will be well-aligned with coherent programs related to climate. For universities with faculty whose expertise is outside of climate change education, the inherent need is to hire faculty who could (and would) build those programs. Evaluations of this approach should focus on whether a strategy that builds on existing faculty strengths gradually expands to engage more among the nonexpert faculty. Doing so will create a series of concentric groups of interested faculty. In a hub and spokes model, a strong core of expert faculty and robust climate education programs would contribute to building capacity and interest among peripheral faculty, whose primary work is in other domains. From there, all the faculty involved could collaborate across disciplines to determine how to make the lessons accessible to students, depending on the pedagogical methods used in their respective majors, starting with the proportion of the students who are already engaged with such programs.

A more ambitious strategy to educate students about climate change is to integrate this subject across the curriculum, so that all students develop the knowledge and skills they need to contribute effectively to climate action from a variety of disciplinary and professional paths. While this is the most transformational of the strategies, it is also the one likely to take more time and to require more institutional resources, including innovation based on comparative experience, for effective implementation.

For example, the Instituto Tecnologico de Estudios Superiores de Monterrey (Tec), the fifth most highly ranked university in Latin America in the THE impact rankings, has integrated the SDGs into their institutional strategy and released periodic institutional reports of university initiatives aligned with the SDGs. Their strategic plan aims to support human flourishing, a process understood to require capabilities to participate in multiple domains so that "each person can relate to the community and the environment to create a better world, with respect for human dignity."[24] One of the pillars of the institute's strategic plan is sustainable development, explicitly aligned with the SDGs. Another pillar is education : they

aim to ensure all students and faculty are knowledgeable about climate change and sustainability.

Their goal is to educate leaders committed to advancing a sustainable future, and with the SDGs as a framework, they plan to include climate education and sustainable development in the curriculum by 2025. As a first step in that process, they mapped the integration of the SDGs in the entire university curriculum, finding that 19 percent of their subjects reference at least one SDG, and that one-fifth of their academic programs include SDG 13 (climate action).

They also decided that several of their schools (engineering, humanities, social studies and government, architecture, art and design, business, and medicine) would include at least one required course that relates the discipline to climate change. They have also created a series of electives focused on climate education in which students from various careers and disciplines collaborate on projects with civil society organizations.

Future plans entail updating the curriculum to include courses on sustainable development in alignment with cognitive, socioemotional, and behavioral goals. These plans to revise the curriculum focus on reimagining a series of transversal or intersecting competencies across all fields of study, including those for sustainability. These efforts have supported opportunities for faculty to learn about climate change education. They have also included a section on sustainable development in the surveys of graduates to assess how they advance sustainability.

The most recent social impact report of the Tec describes 820 initiatives aligned with the SDGs that make visible a ubiquity of opportunities for student engagement with the SDGs. The approach adopted by the Tec illustrates how integrating the SDGs into the strategy of the university can result in intentional infusion of climate change education across the curriculum. Because these opportunities are integrated within the curriculum of the various departments and disciplines, it is more likely that students will learn how to address climate change within their specific profession than from efforts to offer "generic" climate education courses to all students, disconnected from the rest of their studies, as is the case with the required Lecture Zero course in Italy. This approach is more likely to support the development of competencies that contribute to a transition to a green economy, rather than basic climate literacy. In addition, the integration of sustainability competencies as part of the curriculum-wide transversal competencies are likely to reach more students and offer deeper learning experiences that develop a breadth of skills related to climate change action. Further, the novel action projects that bring together students from diverse disciplines to collaborate with organizations of civil society in addressing various effects of climate change will allow them to gain procedural, rather than conceptual, knowledge. The experience of the Tec also underscores how important it is to offer faculty opportunities to develop the knowledge and pedagogical skills to teach this novel curriculum.

Another institution pursuing a whole-of-university approach to educating about climate change is The University of Victoria (UVic) in Canada, a highly ranked university on climate action in the Times Higher Education impact ranking. Their comprehensive approach to climate provides coherence to activities in academics and curriculum ; research and innovation ; communications ; finance ; operations ; and external, Indigenous, international relations, and community and government interactions. Climate change education and sustainability are integrated into the curriculum across majors. Their programs and courses blend academic and experiential learning. UVic's university-wide strategy includes measurable targets, for example, methods to infuse climate education throughout the curriculum and to create new programs :

> Strategy 7.1. Provide a new lens to existing, and develop new, academic programs and learning outcomes to include climate and sustainability content that actively engages with the challenges posed by colonization and inequities.
>
> ACTIONS
>
> - Provide all undergraduate and graduate students with access to climate and sustainability-related curricula and programming.
>
> - Create a Sustainability Literacy Assessment to evaluate the success of the university's sustainability education initiatives and gain insight into how these can be improved.
>
> - Engage with expertise within academic units and programs, relevant research institutes on campus and affiliated organizations to develop climate and sustainability content.
>
> - Through the development of a community of practice, offer support and mentorship to instructors seeking to integrate climate change and sustainability into their teaching.
>
> Strategy 7.2. Develop diverse, innovative, cross- and inter-disciplinary graduate programs and experiences focused on climate and sustainability challenges.
>
> ACTIONS
>
> - Create a climate and sustainability academic working group to review current content, identify existing barriers to cross-disciplinary teaching collaborations at the graduate level, generate interest and potential for new collaborations.
>
> - Expand non-credit options on climate change and sustainability in existing and new areas.[25]

The plan also includes strategies to expand the faculty's capacity to teach about climate, a cornerstone of the success of any effort to transform the curriculum in practice.

While these integrated efforts across the curriculum appear promising, we do not yet know whether the many opportunities they have generated have led stu-

dents to follow rigorous pathways building mastery in their respective concentrations or professional paths. In this case too, developing faculty's skills and experience stands as a significant challenge of this approach.

Some have proposed a more immersive form of the whole-of-university approach to applying the SDGs at schools: making the university a "living lab" for the SDGs, a microcosm in which those goals are pursued and reflected in everything the university does.[26] One such example came in 2016 from Utrecht University in the Netherlands, where they aligned education, research, and operations with sustainability. This effort resulted in the creation of a series of "Pathways to Sustainability," integrating the work of over twelve thousand scholars addressing climate action through thirteen research centers and five hubs focused on food, negative emissions, cities, water, and a circular economy.

An evaluation of this whole-of-university intentional integration, as with the preceding two, should weigh the benefits to students – how many of them learn, to what level of depth and expertise – against the costs, with particular attention to whether the proliferation of pathways results in shallow engagement through projects with little results, undermining serious development of higher-education capital.

I n these ongoing efforts to support the transformation of higher education toward more effective climate education, we need better metrics and more research to identify education approaches that are coherent and rigorous, and which encompass a sufficiently large set of student experiences to enhance their knowledge about climate change. At present, most of the efforts made visible by the THE impact rankings merely capture the existence of varied initiatives to advance sustainability, not their integration or cohesion from the point of view of the student experience. We cannot easily discern from those rankings which of the three approaches discussed here is pursued by each institution. When metrics are too simple, they can allow institutions to report surface-level changes, improving their standing in those rankings without corresponding substantive changes in the student experience. In effect, the institutions only *declare* a commitment to climate change, rather than demonstrate that they *achieve it*.

Given the nature of complex challenges such as climate change, a superficial declarative approach to addressing them in the curriculum is not only inadequate, but also a distraction. A cursory reading of the latest report of the International Panel on Climate Change makes evident that this multidimensional challenge requires concerted efforts across many domains, not just advancement in knowledge in the disciplines that focus on partial aspects of the challenge, such as atmospheric chemistry, meteorology, or oceanographic geochemistry.[27]

A whole-of-university strategy fostering integration across the disciplines – across core activities of research, education, outreach, and operations, and across

the varied learning opportunities that students engage in, both curricular and co-curricular – would be a more appropriate response to the complexity of the challenge, albeit extremely difficult to carry out and costly. The benefits of such an approach are discernable. Disciplinary integration between the sciences, technology, engineering, the arts, humanities, and social sciences is of the essence to address the multifaceted issues of sustainability and climate change. Integration across research, teaching, extension schools, and operations can create synergies that transform the culture of the institution in service of a seamless and coherent student experience clearly aligned with sustainability. Curricular and cocurricular learning opportunities would help students progressively and coherently master the competencies necessary to understand how they could mitigate the effects of climate change and contribute to sustainability in their respective fields, in this way gaining not only "climate literacy," but also the skills to support a transition to a green economy.

But the costs of such an ambitious – and perhaps idealistic – approach are also discernable. For this reason, a whole-of-university approach to support interdisciplinary integration across activities requires innovation to make the project feasible. Otherwise, the premise runs counter to how universities typically work, and therefore what university administrators are most likely to do. Such innovation can be supported by strategies based on comparative knowledge garnered from all universities, rather than a narrow set of "peer institutions." Considering the efforts at the University of Tasmania or the Tec of Monterrey, integrating the SDGs into a school's strategy can stimulate innovative projects to educate for climate change. We can also learn from the "global laboratory" constituted by other universities, such as the THE impact ranking, an incipient example of a global observatory that might support novel approaches to learning about the effects of climate change.

There are many ways in which universities can have an impact on climate change. They can educate their students about it. They can support their faculty's efforts to develop new curriculum and teaching methods. They can host projects to inform the public on topics related to climate change. They can partner with institutions that are developing alternatives to adapt to, mitigate, or revert climate change. They can manage their resources, particularly their infrastructure, in ways that foster sustainability, such as reducing their carbon footprint. Institutions can pursue each of these initiatives independently and incrementally. Or they can try to create synergies across them in a coherent whole-of-university approach.

An essential element to unleash such an approach is a university strategy, and efforts to monitor the actions that are taking place reflecting the strategy, as I outlined through the example from Tec. Perhaps most important, making this strategy and the associated metrics public allows the institutions to challenge them-

selves using benchmarks to track their growth, and to contribute to advance similar efforts in the larger ecosystem. In effect, the institutions participating in the THE impact rankings are already doing this important work.

The analysis of these three approaches to educate about climate change shows that while efforts integrated with a university strategy are more likely to create synergies across the curriculum, research, outreach, and the operational management of the university's resources, they are also more complex and costly than more superficial approaches such as adding a required course to the curriculum. Clearly, equipping most students with the skills to support a transition to a green economy will be more challenging than providing them with climate literacy. It is also likely to be the most effective approach in a world in which most people believe they know how to reduce their environmental footprint but are unable to recognize the most impactful ways to do so.[28]

ABOUT THE AUTHOR

Fernando M. Reimers is the Ford Foundation Professor of the Practice of International Education and Director of the Global Education Innovation Initiative at Harvard University. A member of the U.S. National Academy of Education and of the International Academy of Education, he has authored and edited fifty-three books and over one hundred articles and chapters, including *Schools and Society During the COVID-19 Pandemic: How Education Systems Changed and the Road Ahead* (2024), *Education and Climate Change: The Role of Universities* (2021), and *Educating Students to Improve the World* (2020).

ENDNOTES

[1] Wendy Fischman and Howard Gardner, *The Real World of College: What Higher Education Is and What It Can Be* (Cambridge, Mass: The MIT Press, 2022).

[2] Lars Engwall, "The Governance and Missions of Universities," in *Missions of Universities: Past, Present, and Future*, ed. Lars Engwall (Berlin: Springer, 2021), 1–20.

[3] Adrian Parr, *Knowledge-Driven Actions: Transforming Higher Education for Global Sustainability* (Paris: UNESCO, 2022), 13.

[4] Angel Calderon, "The Higher Education Landscape Is Changing Fast," *University World News*, June 22, 2018, https://www.universityworldnews.com/post.php?story=20180622 08555853.

[5] Parr, *Knowledge-Driven Actions*.

[6] Cited in Petra Molthan-Hill, Lia Blaj-Ward, Marcellus Forh Mbah, and Tamara Shapiro Ledley, "Climate Change Education at Universities: Relevance and Strategies for Ev-

ery Discipline," in *Handbook of Climate Change Mitigation and Adaptation* (Berlin : Springer, 2022), 3409.

7 *The Impact Rankings : Methodology* 2022 (London : Times Higher Education, 2022).

8 "Awards," Times Higher Education, https://www.timeshighereducation.com/events /awards (accessed April 11, 2024).

9 International Labor Organization, *Greening with Jobs : World Employment Social Outlook 2018* (Geneva : International Labor Organization, 2018).

10 Petra Molthan-Hill, Nicholas Worsfold, Gustavo J. Nagy, et al., "Climate Change Education for Universities : A Conceptual Framework from an International Study," *Journal of Cleaner Production* 226 (2019) : 1093.

11 Molthan-Hill, Worsfold, Nagy, et al., "Climate Change Education for Universities."

12 David J. Hess and Brandi M. Collins, "Climate Change and Higher Education : Assessing Factors that Affect Curriculum Requirements," *Journal of Cleaner Production* 170 (2018) : 1451–1458, https://doi.org/10.1016/j.jclepro.2017.09.215, as cited in Molthan-Hill, Blaj-Ward, Mbah, and Ledley, "Climate Change Education at Universities," 3401.

13 Maria Ojala, "Facing Anxiety in Climate Change Education : From Therapeutic Practice to Hopeful Transgressive Learning," *Canadian Journal of Environmental Education* 21 (2016) : 41–56.

14 David Roussell and Amy Cutter-Mackenzie-Knowles, "A Systematic Review of Climate Change Education : Giving Children and Young People a 'Voice' and a 'Hand' in Redressing Climate Change," *Children's Geographies* 18 (2) (2020) : 198.

15 Simon N. Jorgenson, Jennie Stevens, and Beth White, "Environmental Education in Transition : A Critical Review of Recent Research on Climate Change and Energy Education," *The Journal of Environmental Education* 50 (3) (2019) : 160–171.

16 Robert B. Stevenson, Jennifer Nicholls, and Hilary Whitehouse, "What Is Climate Change Education ?" *Curriculum Perspectives* 37 (2017) : 70.

17 Roussell and Cutter-Mackenzie-Knowles, "A Systematic Review of Climate Change Education," 3.

18 Lorenzo Fioramonti, Claudia Giordano, and Francesco Luca Basile, "Fostering Academic Interdisciplinarity : Italy's Pioneering Experiment on Sustainability Education in Schools and Universities," *Frontiers in Sustainability* 2 (2021), https://doi.org/10.3389 /frsus.2021.631610.

19 Ibid.

20 Molthan-Hill, Worsfold, Nagy, et al., "Climate Change Education for Universities," 1095.

21 "Corey Peterson, Chief Sustainability Officer, University of Tasmania," COP 27 Podcast, November 2, 2022, https://sdgresources.relx.com/podcasts/cop-27-podcast-corey -peterson-chief-sustainability-officer-university-tasmania.

22 "Curious Climate Schools : Answering Students' Questions about Climate Change," University of Tasmania, https://curiousclimate.org.au/schools (accessed March 29, 2024).

23 Richard C. Levin, "Online Learning & the Transformation of Global Higher Education," *Dædalus* 153 (2) (Spring 2024) : 262–274, https://www.amacad.org/publication/online -learning-transformation-global-higher-education.

[24] "Plan Estratégico 2025" [Strategic Plan 2025], Tecnológico de Monterrey, https://tec.mx/es/planestrategico2025 (accessed April 11, 2024).

[25] "These goals were developed by the x̌éʔx̌ə tə́ŋəxʷ|XAXE TEN̲EW Sacred Earth task force, which was an Indigenous-led task force" working in partnership with UVic. For more information, see the Goals & Strategies section of "Climate and Sustainability Action Plan 2030 actions," University of Victoria, https://www.uvic.ca/about-uvic/climate-sustainability-plan/csap-actions.php (accessed April 11, 2024).

[26] Walter Leal Filho, Amanda Lange Salvia, Rudi W. Pretorius, et al., eds., *Universities as Living Labs for Sustainable Development: Supporting the Implementation of the Sustainable Development Goals* (Berlin: Springer, 2020).

[27] Hoesung Lee, Katherine Calvin, Dipak Dasgupta, et al., *Climate Change 2023: Synthesis Report* (Geneva: International Panel on Climate Change, 2023).

[28] Gideon Skinner, Ruth Townend, and Sophie Thompson, "Ipsos Perils of Perception: Climate Change," Ipsos, April 17, 2021, https://www.ipsos.com/en-us/news-polls/ipsos-perils-perception-climate-change.