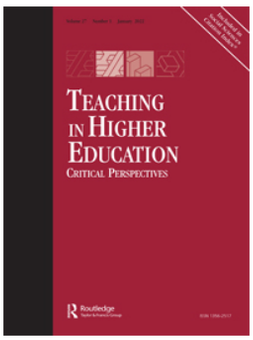

Routledge
Taylor & Francis Group

Teaching in Higher Education
Critical Perspectives

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cthe20

Assessing climate solutions and taking climate leadership: how can universities prepare their students for challenging times?

P. Molthan-Hill & L. Blaj-Ward

To cite this article: P. Molthan-Hill & L. Blaj-Ward (2022): Assessing climate solutions and taking climate leadership: how can universities prepare their students for challenging times?, Teaching in Higher Education, DOI: 10.1080/13562517.2022.2034782

To link to this article: https://doi.org/10.1080/13562517.2022.2034782

Published online: 09 Feb 2022.

TEACHING IN HIGHER EDUCATION
https://doi.org/10.1080/13562517.2022.2034782

Routledge
Taylor & Francis Group

POINT-OF-DEPARTURE PAPER

Assessing climate solutions and taking climate leadership: how can universities prepare their students for challenging times?

P. Molthan-Hill [a] and L. Blaj-Ward [b]

[a]Nottingham Business School, Nottingham Trent University, Nottingham, UK; [b]School of Arts and Humanities, Nottingham Trent University, Nottingham, UK

ABSTRACT

Through this point-of-departure paper we aim to prompt discussion and action around redesigning university learning to help students tackle climate-related challenges in a personally and societally meaningful way. We use the lens of assessment to draw attention to how discipline areas without an explicit environmental or climate science focus can play a fundamental part in prompting climate action. We draw on the very limited number of studies to date of assessment related to climate learning and on an illustrative example of teaching and assessing leadership practices for confronting climate change to make recommendations with relevance for all curricula. We reflect on assessment tools, approaches, strategies, and good practice that not only gauge the level of learning at individual and whole cohort level but also prompt meaningful learning to take place through the way they are designed, with potential impact outside the campus walls and beyond the end of formal university study.

摘要

我们通过本文抛砖引玉，以期围绕如何重新设计大学学习来启迪讨论和行动，从而帮助大学生以惠及自身与社会的方式应对气候的相关挑战。通过运用各种评估视角，我们意在引起各方关注，即学科领域若不明确关注环境或气候科学，该如何在推动气候行动方面发挥根本作用。文中我们还引用了迄今为止与气候学习有关的，数量非常有限的评估研究，并借助教学和评估应对气候变化的领导力实践作为阐述案例，为所有课程提出相关性建议。最后，我们对各类评估工具、方法、策略和良好实践进行了回顾。它们不仅可衡量个人和整个团队的学习水平，还可通过其设计方式推动有意义的学习过程，且在校外和学生结束正式大学学业后依然会产生潜在的影响.

ARTICLE HISTORY
Received 20 October 2021
Accepted 9 January 2022

KEYWORDS
Climate solutions; assessment; climate change education; climate learning

Introduction

'Our house is on fire', Greta Thurnberg's announcement at the World Economic Forum in Davos in 2019, is shared by many of her peers in the climate youth movements as well as by citizens in all age groups. Awareness is increasing that we need to transform our

CONTACT P. Molthan-Hill petra.molthan-hill@ntu.ac.uk

societies substantially in many aspects in a very short timeframe and scientists have released new evidence which maps the intensification, in recent years, of the disruptive impact of climate change on livelihoods across the globe (e.g. IPCC 2021).

Universities are uniquely positioned to be at the forefront of the transformation process. As well as re-evaluating and making relevant changes to their estates or operations and generating knowledge and research that inform climate policy and action, universities have a central role to play, through the taught curriculum, within 'the collective effort of imagination and learning […] required to transition away from ecologically and economically unsustainable behaviours' (Facer 2020, 18).

While there is evidence that some university curricula acknowledge and embrace their leadership role in tackling climate change, as highlighted in several recent publications with sector-wide reach (e.g. QAA and Advance HE 2021), the extent to which attention to climate change across all taught curricula matches the urgency of climate challenges varies. Molthan-Hill et al. (2021), Molthan-Hill et al. (2019), Hiser and Lynch (2021) and Mochizuki and Bryan (2015) are among the voices which emphasize that in order for climate education to lead to the impactful, integrated actions needed to make the planet a good place to live for all, it should be mainstreamed into core curricula, approached from an interdisciplinary, systemic angle, linked to localized knowledge and to the development of effective, real world climate solutions.

Promising steps to give climate change a more central place in curricula have been taken in disciplines such as architecture, where the Royal Institute of British Architects (RIBA) – the professional body which accredits architecture courses[1] worldwide – is in the process of setting climate literacy as a compulsory component of university course accreditation (Nugent 2021). However, many academic disciplines without a direct connection to the physical environment or without a link to a professional accreditation body to add momentum and provide support have yet to recognize the contribution they could and should be making to stabilizing the climate system and to enhancing the lives of present and future generations. The large-scale curriculum review initiatives that some institutions are engaged in provide an excellent backdrop for conversations about climate change to reach all relevant corners of the curricula and result in relevant pedagogic interventions. The attention given to the Sustainable Development Goals (SDGs) in higher education institutions (Chankseliani and McCowan 2021; Price et al. 2020; Leal Filho et al. 2019; Willats et al. 2018) adds further momentum to a discussion of how SDG 13 (Climate Action) could be integrated into the curricula and assessment practices.

Through this point-of-departure paper we aim to prompt discussion and action around redesigning university learning to help students tackle climate-related challenges in a personally and societally meaningful way, in line with UNESCO's (2021) call for universities to renew their pedagogic mission. We use the lens of assessment to draw attention to how discipline areas without an explicit environmental or climate science focus can play a fundamental part in prompting climate action, following on from a chapter we co-wrote on mainstreaming climate change education into all curricula (Molthan-Hill et al. 2021). We draw on the very limited number of studies to date of assessment related to climate learning and on an illustrative example (André 2021) of teaching and assessing leadership practices for confronting climate change to make recommendations with relevance for all curricula. We reflect on assessment tools, approaches,

strategies, and good practice that not only gauge the level of academic learning at individual and whole cohort level but also help create meaningful impact outside the campus walls and beyond the end of formal university study.

Sustainable assessment for climate learning and action

Examples of university learning experiences focused on climate change have begun to be shared across a range of disciplines, within and alongside formally taught curricula. However, the higher education research literature contains less evidence to date of how the learning is assessed and how the insights gained from the assessment process are brought back to enhance the curriculum (Cebrián, Segalàs, and Hernández 2019). We explored the possibility of conducting a systematic review of evidence but found this challenging because of an extremely limited number of studies available that focus on assessing climate change learning. Instead, we offer principles and highlights from our reading. We hope these will inspire colleagues to design relevant assessment of climate change learning and develop a more immediate link between taught curricula and meaningful, impactful action in society (Chankseliani and McCowan 2021).

We have built the present point-of-departure paper on the premise that assessment catalyses learning and that carefully designed assessment at university and the feedback students receive as part of the overall assessment experience have the potential to maximize academic learning and practical, community-oriented action.

Successful learning experiences are underpinned by careful alignment of assessment with learning outcomes, which have been made explicit to students from the beginning. Examples of climate-relevant learning outcomes are available in a guidance document created by QAA and Advance HE in 2021, which draws on UNESCO's (2017) eight key competencies for sustainability. The same guidance document (QAA and Advance HE 2021) argues in favour of assessment 'for and as learning' (34), to facilitate learning experiences which lead to personally and societally meaningful ways of thinking, practising and being, and help students meet the competency-linked climate learning outcomes.

Assessment criteria as and for learning should be co-created with students, carefully scaffolded and should use formats that incorporate self- and peer assessment. They should integrate learning from various domains of life, from across modules and years of study. Dialogue and a climate of mutual respect and accountability should define assessment experiences. Additionally, as Robinson and Molthan-Hill (2021) point out, assessment criteria should focus more broadly on the impact of sustainability-linked learning beyond individual student achievement of intended learning outcomes within the bounded context in which sustainability learning is delivered.

We emphasize the urgency of developing climate learning assessment which scaffolds the creation of relevant, impactful climate solutions and argue that there is great value in engaging external stakeholders in climate-relevant assessment and learning as this not only leads to transformative student learning but also prompts the development of new, innovative educational provision 'fitting to the unpredictable and unanticipated challenges of society and learners' interactions with them' (Mochizuki and Fadeeva 2010, 397).

We acknowledge the value of the 'assessment for and as learning' approach highlighted by QAA and Advance HE (2021) and call for this to be explicitly linked to

Boud and Soler's (2016) concept of sustainable assessment. Sustainable assessment offers a particularly fruitful angle for our discussion, given the focus on sustaining learning beyond the end of a course and the relevance of conceptualizing sustainability (and the climate) not only as course content and as a goal for on- and off-campus action but also as a value underpinning and driving the processes of learning design and delivery. The concept of sustainable assessment arose around the beginning of the millennium in connection with earlier conversations about sustainability. As Boud and Soler (2016) note, it is context-specific and flexibly evolving over time. Sustainable assessment is framed as a co-produced experience, emphasizing reflexivity and self-regulation (with students building capacity to self-assess their performance accurately and to plan future learning), as well as a social practice which is both enabled and constrained by institutional culture and national frameworks. It takes account of both intended learning outcomes and the less immediately apparent but highly valuable unplanned, incidental learning likely to prepare students as future-fit leaders, dealing with complex and unpredictable environments.

In the following section, we offer an illustrative example of how climate leadership from all levels in a system was nurtured through the taught curriculum in a US-based university-wide undergraduate honours course (André 2021). We have chosen this example because it resonates extremely well with the UNESCO (2017) competency framework referenced earlier in the paper. André's five-practice model showcases a coherent, integrated vision and approach to climate leadership premised on strong sustainability (i.e. thinking systemically and impacting positively on the planet rather than merely in the context of a single organization, see Landrum and Ohsowski 2017). Very importantly, the practices outlined by André lend themselves extremely well to the type of sustainable assessment likely to generate immediately relevant solutions and further impactful learning beyond the end of a course.

Rae André's five-practice model to educate climate leaders at university

The model for educating climate leaders that Rae André (2021) advocates includes five practices, which follow a logical progression from knowing to acting and from becoming sufficiently informed to creating a global, systemic response that overrides discrete sector interests. The first practice, 'get the truth', invites awareness of how human beings experience 'truth'. In particular, understanding System 1 and System 2 thinking (Kahneman 2011) – the former being an immediate, intuitive response and the latter involving systematic, slower analysis of facts – helps climate leaders to be both authentic and credible. For non-scientists and students of disciplines without a direct connection to the physical environment, distinguishing between individual truth arrived at through personal experience and abstract, objective scientific knowledge promotes critical evaluation of a range of climate truth interpreters.

The second practice, 'assess the risks', introduces the psychology of risk and explores how managers and organizations make decisions about risk. Understanding scenarios and models of the impact of climate change can contribute to improved decision-making processes and constructive dialogue about climate action in organizations and societies.

The third practice, 'weigh the stakes', focuses on understanding the vested interests of and the relationships among stakeholders and sectors in relation to fossil fuels and the transition to clean, green energy. This practice clarifies business's impact on the environment versus governments' responsibility to preserve ecosystems. It presents research on the practice and limits of altruism.

'Define the business of business', the fourth practice, weighs traditional business goals like increasing profit against business's responsibility to pursue planetary sustainability, and suggests how operational leadership, e.g. organizational leadership, can evolve into systemic leadership, such as leadership for the planet. Understanding an organization's culture vis-à-vis climate change can help organizational members to avoid burnout.

The fifth practice, 'engage global leadership', centres on how climate leaders can reimagine the economics of finite resources to address the climate crisis. It explores the psychology of human cooperation and competition and how climate leaders can draw on both to address the climate challenge. The fundamental question 'Team Humanity' must address is 'What's the plan?'.

The model is presented in André's *Lead for the Planet* (2021), a volume that speaks to a broad range of audiences, challenging readers to step up, embrace systemic leadership and create solutions to the immediate effects of extreme weather events and to the anticipated crises resulting from careless use of natural resources as well as solutions reducing the magnitude of the crisis in the future. On the back cover, a reviewer notes that the author

> takes the reader by the hand and clears the way through the thorny and political field of climate change with grace and intelligence. With simple and clear language, this book confronts what is seen as a complex and overwhelming problem.

The grace and clarity in the writing, coupled with carefully researched and referenced material, makes the volume accessible to students from a broad range of subject areas in line with André's and others' call to mainstream attention to climate solutions in the curriculum, integrating it as a core component rather than locating it in an elective course, giving the climate message maximum exposure and creating conditions for meaningful policies and plans to be developed and implemented.

In the context of a US-based university-wide undergraduate honours course about climate leadership, built on the five principles on which her volume elaborates, André invites students to lead discussions in seminars, as a way to practice climate leadership within the safe context of the classroom first, and to write, in teams, white paper assignments addressed to a key real-life stakeholder. André's course requires students to access policy knowledge related to their immediate geographic context, to connect this to up-to-date scientific findings and to consider the relevance and implications of their recommendations both within the specific context they have selected and within the local, national, and global systems in which their context is situated. As well as resulting in an academic grade that impacts on student progression at university, the assessment adds depth to students' understanding of the world around them and has the potential to lead to real, meaningful climate actions.

André acknowledges that some level of adjustment in terms of course content may need to take place to reduce the cognitive dissonance and psychological distance that might be felt by students who can share experiences of individual, personal climate-

relevant behaviours but who are less ready to engage with climate in society at meso and macro levels or students who are taking subjects with less immediately apparent links to the physical environment. A focus on energy and raw material use, however, acts as a unifying thread for all subject areas and backgrounds, enabling students to make connections between individual consumption decisions and broader systems of energy generation, distribution, and access – and André emphasizes that this knowledge is developed through dialogue and collaboration and shared across team members rather than located in any one individual (Andre 2020; Abzug et al. 2020).

Designing and implementing climate-relevant assessment

Lead for the Planet offers a relevant blueprint to help facilitate climate learning and leadership in university students not only in the specific US context of a university-wide module but also in other types of higher education institutions or national systems. Disciplines with a climate science orientation or with a direct connection to the natural or built environment would benefit from including it into their curriculum to help students develop a systemic perspective and make meaningful connections between ways of thinking about the climate, practising relevant climate action and be(com)ing climate leaders. Disciplines with a social science underpinning or with a broader societal remit (e.g. Business, Sociology, Education, Psychology, Media, Journalism) would find the blueprint a natural fit. Disciplines whose remit is further removed from climate science or planning and leading social action (e.g. Literature, Philosophy, Languages, History) would benefit from exploring how the texts they engage with construct messages about the climate and how these texts can be used as a basis for conversations which raise awareness and prompt more substantial and active engagement with climate debates. Creating space within the curriculum for interdisciplinary conversations and reflection on the valuable and unique contribution of each subject area to making the planet a better place to live would enrich university learning. Equally valuable would be scope to consider how academic knowledge about the climate and relevant climate solutions as well as co- or extra-curricular experiences at university converge to enable students' growth into rounded professionals and citizens.

A range of assessment formats is available for students to evidence their learning about the climate, to develop climate solutions and to enact climate leadership. These assessment formats can be mapped against André's five practices and placed on a continuum, from displaying knowledge and awareness to proposing (innovative) context-relevant solutions on a narrower or broader scale to taking action and impacting directly in different areas of society. Of relevance in relation to this is a study by Sandri, Holdsworth, and Thomas (2018), who looked at developing sustainability assessment which creates 'critical feedback loops between learning outcomes, professional practice, learning and teaching and curriculum design' (406). Their starting point was the 'environmentally aware and responsible' graduate attribute as framed by the RMIT in Australia. Sandri, Holdsworth and Thomas developed several vignettes/scenarios which allowed them to gauge not only awareness of sustainability but also capability to act in an unfamiliar situational context. They established levels of attribute attainment ranging from non-awareness through awareness and responsibility to leadership. Piloting the survey led Sandri, Holdsworth and Thomas to conclude that while this type of assessment allows

participants to share information about likely behaviour (rather than simply reporting self-perceptions of capability), its scalability is problematic because it requires identifying content which speaks to graduates from a wide range of disciplines; unambiguous wording which can be easily interpreted; and should be straightforward to administer and analyse. In a complementary paper published the same year, Holdsworth, Thomas, and Sandri (2018) discuss in more depth ways in which responses to the scenario/vignette questions can be used to feed back into curriculum design, for example, to create more opportunities to develop leadership capacity if this is not sufficiently evidenced in situations where opportunities to exercise leadership are available. We wish to emphasize the value this work can add to discussion about assessing climate learning.

Through the preliminary literature review we mentioned at the start of the paper, we identified a very limited number of studies that discuss assessment specifically in relation to climate learning (rather than more broadly in relation to sustainability). Of note is an article by Cross and Congreve (2020), who focus on UK undergraduate level assessment of climate learning in geography, a discipline which 'sits at the intersection between the study of human society and the physical environment' (2). Our attention was caught by a risk they highlight that the discipline may focus on teaching about the problems rather than scaffolding student exploration of possible solutions through meaningful assessment. A similar point is made by Hiser and Lynch (2021) in an insightful piece which mentions cognitive dissonance – the contradiction between what is taught and what is experienced, coupled with lack of agency or infrastructure for appropriate action. Hiser and Lynch argue in favour of turning this into cognitive resonance, to discover 'strategies towards hope and resilience' (8).

We argue in favour of taking pedagogies which acknowledge the complex, multidisciplinary facets of the climate problem (as detailed in André's five-practice model) and combining these with carefully designed sustainable assessment (Boud and Soler 2016) that scaffolds the formulation of solutions and creates opportunities for these to be implemented, given the potential this has to generate hope and resilience. With regard to hope and resilience, while reviewing the literature, we noted with interest that a US-based study on climate change and curricula (Maier et al. 2018) mentions including student stress levels linked to climate anxiety as an assessment focus. Additionally, Puntha, Touboulic, and Wall (2020) made us aware of the benefits of using storytelling for assessment purposes and as a way of making sense of new and challenging experiences.

Where next?

Assessment and feedback are pivotal to student learning and personal development in higher education, regardless of the subject studied, but when linked to climate learning they become so much more important. We invite colleagues to apply André's (2021) model in their context and to use insights from this paper to align it to sustainable assessment and feedback which centre on climate solutions. To support that process, we have shared in this paper important insights we've gleaned from the limited (to date) published literature about assessing climate learning.

We appreciate the challenges associated with assessing climate solutions in disciplines where attention to climate has not traditionally been a priority. We also acknowledge

challenges that could potentially arise from national regulatory policies or quality assurance procedures. To begin to address challenges of various kinds, we invite colleagues to engage with our paper and to share evidence on how climate-focused sustainable assessment, as and for learning, is designed and implemented across the widest range of curricula to generate positive impact at micro, meso and macro level in society. We emphasize that co-created, collaborative and carefully scaffolded assessment which encourages systems thinking, interdisciplinarity, genuine reflexivity (Macfarlane and Gourlay 2009) and self-regulation is most likely to effect the transformative learning and change required towards a balanced ecosystem. Where possible we encourage co-production of assessment with stakeholders external to the university, who are most likely to be impacted by climate change and who have relevant contextual knowledge that makes them uniquely well positioned to judge the worth and likely impact of the solutions identified.

Note

1. In this paper we are using the label 'course' mainly to refer to a programme of study which leads to the award of a degree. When discussing André's (2021) model later in the paper, we have kept the original term 'course', though in that context 'course' refers to a self-contained unit with in a larger degree programme given that the study originates from the US context.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

P. Molthan-Hill http://orcid.org/0000-0002-4425-1800
L. Blaj-Ward http://orcid.org/0000-0002-5746-3714

References

Abzug, R., A. Adewale, R. André, P. Derfus, P. Hedges, and Y. Shymko. 2020. "Making Management (More) Relevant: Breaking Down Disciplinary Walls and Pursuing Neglected Independent Variables." *Journal of Management Education* 44 (5): 651–662. doi:10.1177/1052562920934155.

Advance HE 2021. *Assessment and Feedback in a Post-Pandemic Era: A Time for Learning and Inclusion*. Advance HE. Accessed 1 Oct 2021. https://www.advance-he.ac.uk/guidance/teaching-and-learning/transforming-assessment.

André, R. 2020. *Lead for the Planet: Five Practices for Confronting Climate Change*. Toronto: University of Toronto Press.

Boud, D., and R. Soler. 2016. "Sustainable Assessment Revisited." *Assessment and Evaluation in Higher Education* 41 (3): 400–413. https://www.tandfonline.com/doi/abs/10.1080/02602938.2015.1018133.

Cebrián, G., J. Segalàs, and À Hernández. 2019. "Assessment of Sustainability Competencies: A Literature Review and Future Pathways for ESD Research and Practice." *Central European Review of Economics and Management* 3 (3): 19–44. https://www.cerem-review.eu/wp-content/uploads/2019/09/cerem_3_3_all-1.pdf.

Chankseliani, M., and T. McCowan. 2021. "Higher Education and the Sustainable Development Goals." *Higher Education* 81. doi:10.1007/s10734-020-00652-w.

Cross, I. D., and A. Congreve. 2020. "Teaching (Super) Wicked Problems: Authentic Learning About Climate Change." *Journal of Geography in Higher Education*. doi:10.1080/03098265.2020.1849066.

Facer, K. 2020. *Beyond Business as Usual: Higher Education in the Era of Climate Change*. HEPI Debate Paper 24. Oxford: HEPI. Accessed 1 Oct 2021. https://www.hepi.ac.uk/wp-content/uploads/2020/12/HEPI_Beyond-business-as-usual_Higher-education-in-the-era-of-climate-change_Debate-Paper-24_FINAL.pdf.

Hiser, K. K., and M. K. Lynch. 2021. "Worry and Hope: What College Students Know, Think, Feel, and Do About Climate Change." *Journal of Community Engagement and Scholarship* 13 (3), Article 7. https://digitalcommons.northgeorgia.edu/jces/vol13/iss3/7.

Holdsworth, S., I. Thomas, and O. Sandri. 2018. "Assessing Graduate Sustainability Attributes Using a Vignette/Scenario Approach." *Journal of Education for Sustainable Development* 12 (2): 120–139. doi:10.1177/0973408218792127.

IPCC. 2021. *Climate Change 2021: The Physical Science Basis*. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf.

Kahneman, D. 2011. *Thinking, Fast and Slow*. London: Penguin.

Landrum, N. E., and B. Ohsowski. 2017. "Content Trends in Sustainable Business Education: An Analysis of Introductory Courses in the USA." *International Journal of Sustainability in Higher Education* 18 (3): 385–414. doi:10.1108/IJSHE-07-2016-0135.

Leal Filho, W., C. Shiel, A. Paco, M. Mifsud, L. V. Ávila, L. L. Brandli, P. Molthan-Hill, et al. 2019. "Sustainable Development Goals and Sustainability Teaching at Universities: Falling Behind or Getting Ahead of the Pack?" *Journal of Cleaner Production* 232: 285–294. doi:10.1016/j.jclepro.2019.05.309.

Macfarlane, B., and L. Gourlay. 2009. "The Reflection Game: Enacting the Penitent Self." *Teaching in Higher Education* 14 (4): 455–459. doi:10.1080/13562510903050244.

Maier, Karl J, George I. Whitehead, and Mark I Walter. 2018. "Teaching Psychology and Climate Change." *Teaching of Psychology* 45 (3): 226–234. doi:10.1177/0098628318779261.

Mochizuki, Yoko, and Audrey Bryan. 2015. "Climate Change Education in the Context of Education for Sustainable Development: Rationale and Principles." *Journal of Education for Sustainable Development* 9 (1): 4–26. doi:10.1177/0973408215569109.

Mochizuki, Y., and Z. Fadeeva. 2010. "Competences for Sustainable Development and Sustainability: Significance and Challenges for ESD." *International Journal of Sustainability in Higher Education* 11 (4): 391–403. doi:10.1108/14676371011077603.

Molthan-Hill, P., L. Blaj-Ward, M. Mbah, and T. Ledley Shapiro. 2021. "Climate Change Education at Universities: Relevance and Strategies for Every Discipline." In *Handbook of Climate Change Mitigation and Adaptation*, edited by M. Lackner, B. Sajjadi, and W. Y. Chen. New York, NY: Springer. doi:10.1007/978-1-4614-6431-0_153-1.

Molthan-Hill, P., N. Worsfold, G. J. Nagy, W. Leal Filho, and M. Mifsud. 2019. "Climate Change Education for Universities: A Conceptual Framework from an International Study." *Journal of Cleaner Production* 226: 1092–1101. doi:10.1016/j.jclepro.2019.04.053.

Nugent, C. 2021. "The Unexpected Ways Climate Change Is Reshaping College Education." *Time*, April 16. https://time.com/5953399/college-education-climate-change/.

Price, E., J. Longhurst, R. White, C. Preist, K. Mori, Z. Robinson, P. Baughan, et al. 2020. "Education for Sustainable Development in Higher Education." *Environmental Scientist* 29 (4): 38–45. https://www.the-ies.org/sites/default/files/journals/value-environmental-science-education.pdf.

Puntha, H., A. Touboulic, and T. Wall. 2020. "Use of Storytelling Within Assessment to Support Sustainability Literacy." In *Storytelling for Sustainability in Higher Education: An Educator's Handbook*, edited by P. Molthan-Hill, H. Luna, T. Wall, H. Puntha, and D. Baden, 168–189. Abingdon: Routledge.

QAA, and Advance HE. 2021. *Education for Sustainable Development Guidance*. Accessed 1 Oct 2021. https://www.qaa.ac.uk/quality-code/education-for-sustainable-development.

Robinson, Z., and P. Molthan-Hill. 2021. "Assessing Competencies for Future-Fit Graduates and Responsible Leaders." In *Assessment and Feedback in a Post-Pandemic Era: A Time for Learning and Inclusion*, edited by P. Baughan, 196–213. York.

Sandri, O., S. Holdsworth, and I. Thomas. 2018. "Vignette Question Design for the Assessment of Graduate Sustainability Learning Outcomes." *Environmental Education Research* 24 (3): 406–426. doi:10.1080/13504622.2016.1263280.

UNESCO. 2017. *Education for Sustainable Development Goals: Learning Objectives*. UNESCO. Accessed 1 Oct 2021. https://www.iau-hesd.net/sites/default/files/documents/247444e.pdf.

UNESCO. 2021. *Reimagining Our Futures Together: A New Social Contract for Education*. UNESCO. Accessed 17 Dec 2021. https://en.unesco.org/news/what-you-need-know-about-unescos-futures-education-report.

Willats, J., L. Erlandsson, P. Molthan-Hill, A. Dharmasasmita, and E. Simmons. 2018. "A University-Wide Approach to Integrating the Sustainable Development Goals in the Curriculum – A Case Study from the Nottingham Trent University Green Academy." In *Implementing Sustainability in the Curriculum of Universities: Approaches, Methods and Projects*, edited by W. Leal Filho, 63–78. Berlin: Springer.