

RE-PURPOSING UNIVERSITIES FOR SUSTAINABLE HUMAN PROGRESS

EDITED BY: Iain Stewart, Victoria Hurth and Stephen Sterling
PUBLISHED IN: Frontiers in Sustainability





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ISSN 1664-8714

ISBN 978-2-88974-858-7

DOI 10.3389/978-2-88974-858-7

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RE-PURPOSING UNIVERSITIES FOR SUSTAINABLE HUMAN PROGRESS

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Citation: Stewart, I., Hurth, V., Sterling, S., eds. (2022). Re-Purposing Universities for Sustainable Human Progress. Lausanne: Frontiers Media SA.
doi: 10.3389/ 978-2-88974-858-7

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Editorial: Re-Purposing Universities for Sustainable Human Progress

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Keywords: universities, sustainability, purpose, wellbeing, transformation, futures

Editorial on the Research Topic

Re-Purposing Universities for Sustainable Human Progress

Humanity is confronting the most acute and urgent threat it has ever consciously faced. Soaring inequality, accelerating climate crises, ecological collapse, and social and psychological breakdown represent a multi-faceted socio-ecological crisis that is threatening viability of life on Earth. The undeniable evidence of this is fueling a growing global recognition that something has gone badly wrong with the ways in which our society has sought to optimize its wellbeing and that of non-human life which it brings into its ethical sphere of care. But what is the culpability of universities in allowing this systemic unsustainability to emerge? And how can this existential threat be dealt with if academic institutions are not firmly in the vanguard?

Whilst the need for fundamental change in universities is acknowledged in various quarters, thus far these largely narrow disciplinary perspectives have failed to resonate across the global higher education sector. What has been lacking is both a deep-level dissection of the roots of the crisis and a cross-sector, cross-disciplinary consensus about how we might address it—both in terms of research but also *via* urgent practical change regarding how the institutions are governed, managed and structured. Moreover, given the complex makeup of academia and its institutions, and the pressing and “wicked” nature of the socio-ecological challenges that threaten long-term wellbeing for all (“sustainability”¹), solutions need to offer a realistic plan for how prudent, meaningful change might be operationalized at scale and at pace. With that mission in mind, the 23 articles within this Research Topic bring together multiple voices—university academics and practitioners from business, government and civil society—blending theory and practice and bridging disciplinary silos to offer a radical re-imagining of what needs to change within universities worldwide.

Several papers focus primarily on laying bare the deep epistemic roots of the current unsustainability crisis. Maxwell restates his philosophical critique that it is in no small part a calamity of academia’s own making, with universities’ favoring a fixation with collecting, cultivating and curating knowledge for its own sake at the expense of the creation of wisdom about how to tackle the “problems of living.” Maxwell’s long-standing accusation that this pursuit of *knowledge inquiry* over *wisdom inquiry* constitutes a “betrayal of humanity” resonates throughout the volume. This is specifically taken up in the policy dimension by Green in a provocation that

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 21 January 2022

Accepted: 25 January 2022

Published: 15 March 2022

Citation:

Stewart IS, Hurth V and Sterling S
(2022) Editorial: Re-Purposing
Universities for Sustainable Human
Progress. *Front. Sustain.* 3:859393.
doi: 10.3389/frsus.2022.859393

¹The most widely accepted definition of the goal of sustainability is that conceptualized by the Brundtland Commission report in 1987 as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The essence of this—long-term wellbeing for all—can be considered as an expression of society’s “meta-purpose,” as also argued in the Brundtland report.

argues that universities' failure in their fundamental mission for society and the planet means they are increasingly regarded as part of the problem rather than the solution. Sterling dissects that collective failure from an educational standpoint, highlighting how higher education has maintained and disseminated a dominant but restrictive Western modernist paradigm that now needs to be transformed urgently toward a holistic, relational, and ecological worldview.

From such theoretical underpinnings two principal premises emerge. First, that universities must retain and expand their potential to become essential and pivotal change agents, critical for helping society deliver humanity's meta-purpose of long-term wellbeing for all.

Second, that as currently configured, universities will fail in that mission.

Higher education can advance and accelerate the learning that supports socio-ecological sustainability transitions, develop the human capacity for societal change at scale, and provide the moral leadership by driving change within their own institutions (Fazey et al.). However, to date, despite growing pockets of excellence (e.g., Tyndale et al.; König et al.), those very institutions have been criticized for their slow response and inadequate action, for simultaneously promulgating high carbon and consumptive lifestyles and economies, and for entrenched intellectual practices and pedagogies that underpin these miscarriages. Invoking the notion of system failure, Sterling argues that universities are largely maladaptive, echoing a sentiment across the collection that our academic institutions are no longer fit for purpose.

For many, a fundamental barrier to change is that academic institutions are beholden to the same economic forces that have brought society to the brink of crisis (e.g., Green; Bauer et al.; López-López et al.; Hurth and Stewart). The late twentieth century's "great acceleration" in global economic growth and material consumption has been reflected in the re-direction of academia toward the marketisation and commodification of university operations, alongside the adoption of a global accountancy culture of rankings and metrics. Hurth and Stewart reappraise this conventional economic framing in the light of the rise of the "Wellbeing Economy" and the recent emergence in the business sector of "purpose-led" companies, which operationalise this new, sustainability-aligned economic imperative. They argue that concept of "purpose" offers universities a roadmap to a rapid journey toward being fully wisdom-driven and sustainability-driving organizations.

To deliver on this call for change, "*universities will need to renew their commitments to serving the public good, be dedicated to an unwavering challenge-orientation, create post-disciplinary structures, and be the change one seeks to see in the world*" (Fazey et al. p. 1). These authors see three levels of threat to this happening: (1) the risks to operations and business models (*manifest emergencies*); (2) risks that arise because assumptions, ideologies, systems, and structures cannot match the scale of the manifest challenges (*conceptual emergencies*); and (3) risks posed as a result of current identities and sense of purpose being incapable of supporting

the changes needed to overcome the conceptual challenges (*existential emergencies*). Despite its potential for collective action, Gardner et al. argue that the academic sector's response to these threats has been limited to three partial adjustments: (1) promoting solutions-focused research; (2) institutionalizing "education for sustainable development;" and (3) reducing their own institutional footprints. But to be proportionate to the scale and seriousness of the planetary challenge, reform will have to go beyond universities merely getting their respective houses in order by greening their research, curricula and campuses and signing up to reputation-enhancing public commitments without commensurate action (Latter and Capstick; Green).

A vital first step in that transformation process is for universities to recognize that there is a problem. Multiple contributors emphasize the deep reluctance within the closed world of universities to confront the culpability of the academic enterprise in our current unsustainability crisis. Historically, universities have proved to be remarkably resilient institutions, keeping external social change at arms-length by traditional practices of inquiry, tight-knit communities of scholars and students, and autonomous governance structures. O'Neil refers to the defensive posture institutions adopt when their autonomy is challenged as *institutional fragility*; to counter this intrinsic intransigence, universities will have to deliberately develop *transformational intent*—interventions to actively disrupt the status quo to open up the possibilities of seeing the world from fresh frames of reference and create capacities for deep transformational change (Fazey et al.).

Transformational intent necessitates a whole-institution cultural shift in mindsets, across research, teaching, knowledge transfer, and campus operations. From the top, it needs to be supported by a facilitative rather than directive executive leadership, allowing everyone—staff, students, and stakeholders—to co-produce the mission and shape the transformation (Bauer et al.). This challenge, according to O'Neil, demands that universities flatten their hierarchical structures, think systemically, collaborate, be authentic, be just, be equitable, be inclusive, build relationships, and enact a collective vision that requires collective decision making. Within the heart of the organization, it will necessitate systemic change in and across diverse sectors, and compel academics to reappraise their role as change agents (König et al.). For López-López, the transformation must go further by promoting a "pedagogy of care" that extends the academic worldview to a "Community of Life," blending learning with compassion in a practical application of Maxwell's wisdom inquiry to the problems of humanity. It is a premise that has deep parallels with the environmental theology of Thomas Berry, which Mickey argues underpins the need for sustainability transitions at universities to embrace the intrinsic, not merely instrumental, value of nature in a whole-Earth perspective.

As well as more enlightened worldviews, new governance paradigms and fresh metrics of accountability and responsibility will be required for university renewal. For Robinson and Laycock Pedersen that means destabilizing prevailing governance structures and processes to create a new stable academic system, and the authors use resilience principles to show how this

might be operationalised. Recurrent throughout the Research Topic is the view that the current competition for contemporary views of “scientific excellence” prevents participating universities from fully engaging in a wider set of alternative activities. The widespread use of league tables and accounting to capture and assess teaching and research performance tell us little about how well academic institutions are faring in terms of their core mission (Green). Mono-disciplinary research is still accorded greater value than innovative citizen science, but authentic dialogues will be required with a wide range of stakeholders, including grassroots groups and informal but dynamic social movements (Bell et al.). As Bauer et al. outline, effective engagement with community organizations opens up new ways of learning—individually and as an institution—around urgent social and environmental issues but this also requires radical new structures and processes for participation, facilitation and cooperation between stakeholders from different fields and sectors. Conventional university norms would suggest that “*it is not the proper job of the Professor to go out into the community and stir up political activism!*” (Maxwell) but this is rejected head-on by Gardner et al., who argue convincingly for advocacy and activism to be placed at the heart of the new academic purpose.

There are signs that more organized levels of change, driven from the top, are underway in some institutions and institutional contexts. Fioramonti et al. give a first-hand view of the political innovations occurring in Italy to systematically and inter-disciplinarily align education to a sustainable future. Similarly, Davidson outlines how the 2015 Welsh Wellbeing of Future Generations Act is starting to influence the way universities are approaching research and curriculum. Specifically, Davidson argues that delivering “wellbeing of future generations” or “sustainability” is becoming shorthand for a commitment to designing in future-proofing, systems thinking, creative problem solving, self-awareness, open-mindedness toward difference, understanding of global issues/power relationships, and optimism and action for a better world. Tyndale et al. outline University College London’s decade-long journey to live out their founding commitment to: “innovation, accessibility, and relevance for the benefit of humanity.” They remind us of that there are many foundations in place in universities that can be harnessed and they provide an optimistic view that universities do not need to re-purpose but rather more fully build on the foundation already in place.

Despite such aspirational enlightenment, the reality for many universities, especially in low and middle income countries, is that sustainability remains an accessory to catching up on economic and social development. A telling example comes from Jordan, from where El Hassan et al. describe an unsustainable university sector firmly shackled to the state-building process, which is hindering its academic community re-imagining higher education for wider public good.

But clearly changes are afoot. It is significant that the backdrop to the growing disaffection with the academic endeavor has been the twinning of a Climate and Ecological Emergency (CEE) (Green; Gardner et al.) with a global pandemic. It is a powerful pairing that has provided both the impetus for systemic change and major asperities to hinder it (e.g., Bell et al.).

The way that UK universities addressed Climate Emergency Declarations highlights similar tensions. With many declarations arising less from internal academic concerns and more from external public pressure, and projected less as a collective sector response and more as individual promotional statements (Latter and Capstick). For Green, the lackluster response of universities globally to the CEE is an indication that climate change and sustainability remain “add-ons” or peripheral to core academic business, highlighting the challenge of building long-term thinking on the back of short-term concerns—even those as impactful as a global pandemic. Perhaps more optimistically, Bell and Payne highlight how Fernando Reimers’s edited book on “*Education and Climate Change: the role of universities*” provides examples of how the inherently contextual nature of climate impacts are revitalizing global concerns at the local level. Writing here, Reimers explores how the pandemic has motivated universities to develop more socially-embedded learning systems, although these reactive initiatives generally lack clear strategic intent or theories of action.

What seems clear is that the skills, graduate attributes and modes of learning demanded by a re-energized socially-embedded populous who are emerging from a pandemic and gaining deep awareness of the structural unsustainability faced, will be very different to those currently offered. For a start, the fast pace of technological change will mean that technical skills are likely to quickly become obsolete. This, in turn, necessitates a more fluid curriculum and intellectual experience that provides the tools for students to think critically, systemically and creatively about multiple problems that cross traditional disciplinary divides. This may require a complete rethinking about how universities are conceived and located. The COVID19 pandemic has impelled renewed impetus to this, particularly given the rapid transition to online learning. For Costanza et al. this reconfiguration potentially recasts the traditional role of universities as storehouses of knowledge and academics as conveyors of that content. The massive and growing availability of information on the internet provides an opportunity to open up access to top-quality university education in developing countries with relatively modest educational infrastructure. The authors set out a vision for global collaboration—a coordinated “meta-university” that could provide students anywhere access to world-class online pedagogic tools and analysis-based courses, thereby allowing local faculty to focus on interactive, transdisciplinary, in-person, solutions-focused courses that address real-world problems.

Despite the collection’s overarching message that universities are not moving far enough or fast enough, this Research Topic demonstrates a consensus on the nature of the ultimate goal and the immediate need for radical change, as well as, vitally, an emerging roadmap of how to get there. The 23 contributions offer differing visions on how that radical change might be operationalised, but some common calls emerge:

1. Transformative change is not an option: Across the world, academia is set for profound reform, whether it likes it or not. The growing global urgency for purposeful change, not least from student bodies, will present universities with threat

multipliers too overwhelming to resist or forestall. Discussions within higher education institutions, therefore, need to switch from “should we change?” to “how should we change?”

2. Purpose is key: At the highest level, universities need to rethink their ethos and purpose—their *raison d'être*—to center on a bold and ambitious strategic contribution to long-term wellbeing for all (aka sustainability), engaging all stakeholders in this shared journey. Two standards focused on achieving a purpose-driven organization in practice are available to support leadership, and those who can help hold them accountable: ISO 37000—Governance of Organizations: Guidance and PAS 808: Purpose-driven Organizations: Worldviews, Principles, and Behaviors (forthcoming);
3. Deep change can unlock win-wins: This essential deep-level, root-and-branch rethinking of the primary academic mission has the potential to re-energize teaching, research and external engagement, blending the bespoke strengths of individual universities to create genuinely distinctive, meaningful and legitimate institutional identities;
4. Remember, we are all in this together: The operational route to transformative change will be unique to each university, but the broad path will involve a shift to interdisciplinary, participatory, reflexive academic mindsets and endeavors, in which researchers and students are more closely coupled with the communities they serve and the environmental systems within which their ultimate survival is deeply embedded;
5. The writing is on the wall: This challenge presents an exciting but closing window of renewal for a university. Those universities unwilling or unable to rise to the call are likely to find themselves increasingly marginal to the emerging needs of society as it clarifies its core purpose and re-organizes the transformation of resources (the economy) to achieve this purpose securely.

Ultimately, perhaps what emerges most strongly from this collection of perspectives is the realization that at the heart of the current academic identity crisis there lies a leadership void.

It is our sincere hope that this Research Topic inspires the universities' leadership (governing bodies and senior executives) as well as the entire academic body, to dig into their deepest levels of assumptions about the point of universities, and through this unleash their desire and direct their ability to drive the urgent re-purposing of universities. Although we primarily make a plea to university leadership to drive this change, the question of re-imagining and re-purposing higher education for sustainable human progress is a challenge that all stakeholders—including academics, students, policymakers, and those in business and the media—need to embrace fully, if collectively we are to assure a future beyond the apocalyptic one in prospect.

AUTHOR CONTRIBUTIONS

IS prepared the initial draft. VH and SS contributed equally to major edits and revisions for the text. All authors contributed to the article and approved the submitted version.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Book Review: Thomas Berry: A Biography

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Keywords: religion, spirituality, cosmology, Thomas Berry, religion and ecology

A Book Review on

Thomas Berry: A Biography

Mary Evelyn Tucker, John Grim, Andrew Angyal (New York, NY: Columbia University Press), 2019, 360 pages, ISBN: 978-0231176989

Universities and other educational institutions are among the most influential sectors of society, and they are at a fork in the road. There are two options. On one hand, universities can continue reinforcing the status quo, whereby education trains humans to enter a destructive, extractive relationship with the environment. On the other hand, universities can be repurposed to facilitate a transition toward mutually beneficial relationships between humans and the Earth community. The former option is evident in the prevalence of university investments in fossil fuels, notwithstanding a relatively small number of universities that have partially or completely divested from fossil fuels. The former option is also evident in pedagogy that fails to treat ecological literacy and outdoor education as integral components of education; it is a pedagogy that sees the natural world as a series of objects, not as subjects with whom one might commune. The latter option—repurposing universities for mutually beneficial human-Earth relations—is part of the Great Work of our time, as envisioned by Thomas Berry (1914-2009), a cultural historian and scholar of religion who developed an integrative perspective on humanity, Earth, and the universe. This “Great Work” is a matter of reorienting educational, political, economic, and religious institutions toward mutually enhancing human-Earth relations (p. 199). It means reorienting universities to a vision of the universe as a “communion of subjects,” not as a “collection of objects” (p. 167). In other words, sustainability transitions at universities require recognition of the intrinsic, not merely instrumental, value of nature.

Berry’s life and thought are exemplary guides for those who seek ways of reconnecting universities with the universe to empower a just and sustainable civilization. To put it quite simply, Berry’s vision is about reconnecting the university to the universe. Berry is widely influential, both for the breadth of his intellectual pursuits and the depth of his spiritual sensitivity. Yet, although his life and work have touched environmentalists, poets, activists, scholars, and religious practitioners, there has been no thorough account of his biography, that is, until the publication of *Thomas Berry: A Biography*. This book is the collaborative effort of three authors. Two students of Berry—Mary Evelyn Tucker and John Grim—worked with the Andrew Angyal, who has written biographical accounts of other prominent figures oriented toward reintegrating humans with the natural world (e.g., Wendell Berry and Loren Eiseley). Following a brief introduction, the book is followed by 12 chapters and a short epilog.

The first eight chapters describe the trajectory of Berry’s life. Growing up in his hometown of Greensboro, North Carolina, Berry developed a sense of independence, a concern for social justice, and an understanding of the challenges of religious diversity and inclusion. “Growing up Catholic in the South in the 1920s was not easy,” since his values and customs “were not well-understood

OPEN ACCESS

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 24 November 2020

Accepted: 08 March 2021

Published: 30 March 2021

Citation:

Mickey S (2021) Book Review:
Thomas Berry: A Biography.
Front. Sustain. 2:633199.
doi: 10.3389/frsus.2021.633199

or appreciated” in the “overwhelmingly Protestant” context of Greensboro (p. 7). It was also in his youth that Berry began developing an affinity for the wild and a feeling of intimate belonging in nature. Berry describes a definitive encounter with the transformative power of nature when, at the age of 11, he was enchanted by the beauty and wonder of a meadow (p. 16). Berry’s connections to nature and faith continued developing, leading him into a religious life with the Passionist order of Catholic priests, graduate studies in cultural history, and formative journeys to China and Germany. He was continually building connections with the wisdom of the past, the living scholars of the present, and emerging scholars like Mary Evelyn Tucker and John Grim, who would go on to found and direct the Forum on Religion and Ecology.

Berry was committed to teaching, even when it seemed at odds with his Passionist order (p. 80). His teaching and ongoing studies expanded to include Christian and non-Christian traditions, including detailed engagements with Asian religions (e.g., Hinduism, Buddhism, Taoism, and Confucianism) and contemporary forms of spirituality. That commitment to education brought him to New York, where he taught at Fordham University and established the Riverdale Center for Religious Research. Increasingly, Berry sought to articulate the cosmological context of religions, viewing the world’s wisdom traditions as expressions of the universe. Evolution, ecology, and the importance of responding to environmental crises became central to Berry’s work (p. 100). Breaking new ground, Berry expressed these topics in writings, which were collected and published in influential books like *The Dream of the Earth* (1988), *The Great Work* (1999), *The Sacred Universe* (2009), and others (p. 116). Berry developed a profound partnership with the cosmologist Brian Thomas Swimme, with whom he would write a book that presents an integrative narrative of the evolving universe and the place of humans therein—*The Universe Story* (1992). For the rest of his life, Berry continued sharing his vision with others, influencing a wide array of people, and inspiring others to take up the Great Work of our time.

Following the eight biographical chapters of this book, a brief interlude provides summary reflections before proceeding to the final four chapters, which elaborate on the details of Berry’s ideas. The ninth chapter covers Berry’s understanding of time and evolutionary processes in terms of narrative structures. Chapter 10 discusses the ideas of the French Jesuit paleontologist and theologian Pierre Teilhard de Chardin (1881–1955), whose evolutionary conception of the intertwining of spirit and matter was deeply influential for Berry’s vision. The eleventh chapter elaborates on Berry’s engagement with Asian religions, specifically his appreciation for the Confucian understanding of the complex unity of humanity, Earth, and the cosmos. The

final chapter outlines the influence of the “cosmovisions” of Indigenous peoples (p. 240).

On its own terms, this book is a remarkable representation of Berry’s life, thought, and influence. However, in terms of the specific challenges of reconnecting universities to their ecological and cosmic contexts, specific details are lacking. It is understandable that a biography would not address the particularities involved with the pedagogical, curricular, and administrative involved with repurposing universities for sustainability. The reader must look elsewhere for those details. Furthermore, the reader must look elsewhere for any sustained critique of Berry’s integral vision. While the authors note that Berry is a historically situated thinker who, like anybody, has a limited perspective shaped by their unique context, the authors do not take him to task for any of his theoretical positions or philosophical assumptions.

Between the biographical writing skills of Angyal and the intimate knowledge of Berry shared by Tucker and Grim, this book is masterfully composed. Since Berry passed in 2009, one could say that this book is long overdue, yet it seems more relevant now than ever, as intensifying ecological crises are waking many humans up to the Great Work of this historical moment and the need for a new story that can empower communion between the diversity of the human community, the Earth community, and indeed, the evolving universe. Berry was a “thinker always moving toward becoming a cosmic person” (p. 263). Particularly relevant to the challenge of repurposing universities for sustainability, this biography provides an inspiring model of life and thought for the kind of integrative education required to meet this moment, an education that engages multiple perspectives across cultures to unite religion and ecology, bringing into the university a diverse variety of spiritual and scientific ways of knowing the universe. “Sensitized to such guidance from the very structure and functioning of the universe, we can have confidence in the future that awaits the human venture” (p. 264).

AUTHOR CONTRIBUTIONS

The author of this book review is SM.

Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The University at the Crossroads of Eco-Social Challenges: Pedagogy of Care and the Community of Life for a Transformative Learning

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OPEN ACCESS

Edited by:

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United States
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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 17 January 2021

Accepted: 08 March 2021

Published: 01 April 2021

Citation:

López-López MC,
Martínez-Rodríguez FM and
Fernández-Herrería A (2021) The
University at the Crossroads of
Eco-Social Challenges: Pedagogy of
Care and the Community of Life for a
Transformative Learning.
Front. Sustain. 2:654769.
doi: 10.3389/frsus.2021.654769

What kind of responsibility do universities have with regard to the current emergency created by ecological and socio-economic collapse? This work begins by considering the colonization of universities by neoliberal globalization. Education is one of the areas that appears as a fundamental source of business in the globalized economy, thus reorienting the role of the State in accordance with the New Public Managements (NPM's) educational policy. The NPM is the main instrument responsible for modifying the structure and culture of state services by means of introducing privatization and market-specific mechanisms. But, in so doing, something very important is created: a process of "re-culturing," the establishment of the "one-track thinking." It is "endogenous neoliberalism" that promotes the construction of a new identity: the neoliberal view of education from the "entrepreneurial self." Next, and based on the criticism of the Frankfurt School, we question whether the use of reason—as instrumental reason—exists in neoliberal logic, and how its use is related to morals and ethics. We need alternative ideas that configure a new worldview for a new scenario, one which facilitates a deep civilizational reconstruction. The Community of Life is the fundamental certainty on which we can base a new worldview. We are one human family and, even more, one Earth Community with a common destiny. This perspective exists at an even more inclusive level, in order to integrate all living beings. We need care for the community of life with understanding, compassion, and love. It implies a synthesis, which places us at the doors of wisdom. The ethics of care and its educational translation as Pedagogy of Care, should have, as its main objective, the experiential learning of our reconnection with the Community of Life. Therefore, it would be necessary a truly transformative learning that we, as humanity, will need to carry out. This is where universities are called on to play a strategic role. The changes that must take place in universities have to be based on a new worldview: the Ethics of Care of the Community of Life. Finally, some practical consequences are proposed in this sense.

Keywords: university, neoliberalism, community of life, ethics of care, transformative learning, worldview

INTRODUCTION

What kind of responsibility do universities have with regard to the current emergency created by ecological and socio-economic collapse? How should universities reorient themselves in order to establish a benchmark for achieving a sustainable lifestyle? We argue that universities must rethink their role and commitments, because neoliberalism has had a profound impact on higher education around the world, considering it a source of business. Universities should become aware of this neoliberal colonization if they want to lead the transition toward a more sustainable and equitable society. Next, looking more in depth, and based on the criticism of the Frankfurt School, we question whether the use of reason—as instrumental reason—exists in neoliberal logic, and how its use is related to morals and ethics, as understood by humanistic psychologists. This, as will be shown, is an important issue if we want to act from ethics. The perspective is deconstructive.

However, we need to advance positive responses. What can we do? We have one uncertainty and three certainties. The uncertainty refers to our ignorance about what kind of world will replace the progressively decaying capitalism of post-modern globalization. There is an interesting proposal to consider which is being assumed by the European Union and other countries. We refer to that which appears in Jeremy Rifkin's latest publications. If this proposal were to materialize, it would give rise to the third industrial revolution which would have socio-political and economic characteristics very different from the previous ones. However, now what we have is the capitalism of the post-industrial, "liquid" (Bauman) society, the capitalism of the risk society (Beck, Giddens).

We need courageous and alternative ideas that configure a new worldview for a new scenario, one which facilitates a deep civilizational reconstruction. This is where universities are called on to play a strategic role. The university, as an institution, should promote this new worldview with the certainty that, when there is a conjunction of suitable new ideas and the opportune moment in the crisis—in a humanity which already operates as a single learning subject—, these ideas will have unstoppable power.

We intend to outline the elements which we believe should be present in this new worldview, and we express them through three certainties:

1. The central and inspiring value of the Community of Life (with scientific certainties such as the Gaia Theory, or approaches as the ethics of care, a pedagogy of care...). Everything should be redefined from the perspective of the Earth's community, human beings being the ethical thread, in charge of the fabric of life.
2. The need for a true commitment that is both intercultural and inclusive, can be shared in different worldviews which allow us to respond to the complex challenges posed. The need for a true intercultural, and inclusive, commitment in order to share different worldviews which allow us to respond to the serious challenges we face. We refer, here, to indigenous cultures and traditional Eastern Philosophy. Diversity brings a wealth of perspectives.

3. The third certainty (related to the second) refers to the consideration of reason in modernity, which limits the diversity of perspectives sought by its rationalistic colonization of mind. We also need other intelligences (socio-emotional, ecological, and spiritual). Consequently, rational knowledge alone is insufficient. This "confession" opens the doors to something new: wisdom. This is a subject introduced by Nicholas Maxwell, who, in addition to knowledge, proposes research, and development of wisdom in universities. We urgently need this wisdom which brings us back to the central subject, which that of is the individual.

In this context of global change we are committed to two strategic elements of a general nature. They are closely related, and are key in order to create practical changes in universities. The first is that we should not fight against the neoliberal system. We should apply Taoist principles—hence the importance of approaching other cultures—and adopt the methods of martial arts, like judo, which are based on defense and in which the strength of the rival is used to destabilize the opponent. In this way, the action-reaction principle would not give energy to this already decadent neoliberalism. Thus, we would avoid wasting our energy which we could then use for those creative actions which are so necessary for the creation of the world that we want to see born.

The second strategic element involves referred uncertainty: we do not know what kind of world will replace that of globalized capitalism. Let us "turn toward the individual" because we know what the human beings, who will build this new world, should be like. These ideas are developed in this paper.

THE COLONIZATION OF UNIVERSITIES BY NEOLIBERAL GLOBALIZATION

The academic world, should exercise a clear form of ethical and scientific leadership in the face of the serious global socio-ecological crisis. We have, therefore, to examine the neoliberal "pollution" which has deeply colonized higher education around the world by perceiving it as a source of business within today's knowledge economy (Goodman, 2012; Comisso, 2013; Maisuria, 2014; Uzuner-Smith and Englander, 2015). In the final third of the last century a series of economic, political, and cultural transformations took place. They acquired a strong role in all of society and were grouped together under the term "globalization." More and more social spaces submitted to the mercantilist logic of economic benefit, privatizing public companies and social services, and cutting budgets which financed the Welfare State. For the economic benefit to multiply, this neoliberal philosophy must reach the entire society. So, under this system, public institutions are required to be managed like private entities, but with public money (Navarro, 2007). According to Harvey (2005, p. 19) neoliberalism has historically manifested itself "as a political project to re-establish the conditions for capital accumulation and to restore the power of economic elites." In order to create a suitable environment for

the accumulation of world capital the New Public Management (NPM) was born.

As Kincheloe (2007) argues, the privatization of state educational institutions has resulted in them being strongly mediated by economic powers. This is because they are perceived as corporations that must engage with the logic of the free market like private companies. Under this outrageous attack by the forces of privatization, students have become consumers of education, rather than citizens. Furthermore, the educational institution becomes a company specializing in issuing degrees. This view of education as a business, as a mere commodity, reflects what lies at the very heart of the NPM, which is based on the “three E’s:” efficiency, effectiveness, and economy.

According to Ball and Youdell (2007, p. 23), the NPM is the main instrument responsible for modifying the structure and culture of state services by means of introducing privatization and market-specific mechanisms. But, in so doing, something very important is created which affects “how” and “where” decisions are made, without consulting education professionals. These professionals are subjected to new forms of control, through performance management systems, encouraging them to identify with other types of commitment and priorities. This is what these authors call *a process of “re-culturing.”* The NPM, as a form of neoliberal colonization, is present in university operations where forms of business management are applied to the public sector. Its *characteristics* are: accountability (early assessments, classification, quantification, accreditation, standardized tests, performance criteria, orientation toward excellence, and stratification of achievements). It also involves privatization and outsourcing of services, decentralization, perceiving the student as a client, strategic planning, organizational, and management flexibility. In addition, it implements market mechanisms, in particular those related to competitiveness and incentive (prizes and penalties), profitability, weak public administration, focus on competencies, emphasis on results rather than processes, budgetary cuts ... (Gruening, 2001; López-López and Crisol, 2020).

It is about providing an educational level that allows them (students) to find jobs. The objective of education will not, therefore, be the full development of the human personality in respect for the democracy principles of coexistence and fundamental rights and freedoms (Bernal and Vázquez, 2013, p. 49).

What is sought is the subversion of the ethical order of things: integral training so that we are critics and owners of our lives, understanding that economy is a means at the service of human ends is not sought. Rather, the intention is that citizens rebuild themselves as clients thus aligning with the economic interests dictated by the market. All of this reframes the identity of students and teachers, and marks them ontologically and epistemologically. In this way, neoliberalism creates a profound impact on higher education throughout the world (Hursh and Wall, 2011), leading to a global homogenization of educational systems, but without eliminating the nuances of each state. Thus, they promote processes which are focused on results, on

standardized assessments and, consequently, on credentialing (Martínez-Rodríguez et al., 2018).

De Lissovoy (2013) points out that there is an ideological effect which is very dear to neoliberal philosophy: the establishment of the “one-track thinking.” It seeks to spread the belief that there is no hope of another possible world, and thus assumes with resignation, the “inevitability” of neoliberal capitalist globalization as the only ideology.

This imposition of one-track thinking manifests itself as the “natural” way of perceiving social and institutional realities. It, therefore, becomes neoliberal *common sense* (Leistyna, 2007). This implies an extraordinary triumph for the ideological dimension of globalization. It has universalised the interests of capital, to the detriment of the interests of labor, and those of the global economic forces that support it (Harvey, 2005). By showing itself as “natural,” it renders its true nature invisible: a self-interested social construction; that is, a way of seeing reality which is internalized and which already has its own dynamism. It is “endogenous neoliberalism,” which grants privilege to the rationality of the market, erodes the pre-existing forms of self-government, and the “relative autonomy” of academic work (Commisso, 2013). From within the context of this internalized view, education is no longer a public good, but a business, a good for individual consumption, a private good, one more commodity (Bauman, 2008).

Neoliberal “common sense” is the springboard from which *what* needs to be seen, and *how* to be seen, is imposed. In our market society, the rules of the market are the foundation which establishes the essential meaning of our vital reality. This meaning has been internalized. Therefore, it is no longer essential for the neoliberal agenda to continue working on the construction of identities within the context of the logic of the market. This is because we have it inside us, like a “Trojan horse.” Foucault (2008) calls this “biopolitics,” a term used to designate the exercise of power, not over territories but over the lives of people and populations (biopower). As argued by Hellberg and Knutsson (2018), when referring to a statement by Peters (2007), biopolitics is the ability to govern without the governed subjects perceiving that they are being governed. We do not need to be governed from the outside as we already govern ourselves. Neoliberalism, with its “one-track thought,” promotes the construction of a new identity: the neoliberal view of education from the “entrepreneurial self” (Fernández-Herrería and Martínez-Rodríguez, 2016).

According to Olssen and Peters (2005, p. 315), “in neoliberalism the state seeks to create an individual that is an enterprising and competitive entrepreneur.” University education is reconstructed from this perspective. The state, like the university, serves the interests of the market, favoring individual initiative, competition, and self-interest (even “self-exploitation”) over collective interest. Thus, it creates a series of rules, laws, and institutions that help to rebuild the individual as a consumer. According to Darder (2012), education, in general, becomes new benchmarks for neoliberal strategy. Canaan (2013) argues that a “deep neoliberalization” is taking place because neoliberal policies are instrumentalizing supranational organizations such as the European Union. Thus, they

are dismantling the Welfare State and commercializing various state institutions, including universities. Loh and Hu (2014) state that economic globalization is the new context which redefines the role of the state, putting it at the service of large trans-national corporations and guaranteeing opportunities for entrepreneurship initiative, competition, and profit.

Applying these neoliberal values to the field of education shows that they are completely consistent with the goal they aim to shape. Furlong (2013) maintains this is a prototype of a highly competitive form of “human capital” in order to put it at the service of a globalized economy. “To shape” must be understood in a deep sense, since it has become obvious that neoliberalism intends to build a new identity, that of the “entrepreneurial self.” This is like a business project in which individuals govern themselves throughout their lives. According to Du Gay (1996) this new identity, created by globalization, has changed the lives of individuals and the nature of organizations, including universities. Concepts such as incentives, revenue, quality, non-standardized services ... are redefining more entrepreneurial and less mechanistic organizational forms, that is, less bureaucratic forms, from the traditional perspective. Bureaucracy, understood as behaviors adapted to situations of stability, becomes the first victim of an uncertain environment created by globalization. The new bureaucracy is flexible. From the perspective of neoliberal rationality the individual must be receptive to the changes that occur in their environment. In this sense the concept of company, according to this author, is a key element in the discourses relating to organizational reforms. What is actually being proposed is a *universalization* of the model of a “commercial company” to any form of organization, including universities, and also individuals.

It is obvious that this new neoliberal governmentality perceives the individual as an inherently manipulable construction, characterized by behavior control by means of changes in the environment. This is behaviorism. “In other words, entrepreneurial government ‘makes up’ the individual as a particular sort of person—as an ‘entrepreneur of the self’” (Du Gay, 1996, p. 156). Here, Du Gay takes up an idea, put forward by Foucault in the late 1970s, which is that of the individual as an “entrepreneur of the self,” in other words an entrepreneur of him/herself. This means that, regardless of their personal circumstances, identity assumed by these individuals is that life, understood as a business, is dedicated to a unique undertaking: preserving, rebuilding, and increasing their own human capital. The individual is, therefore, the only one responsible for their successes and failures in the “business of life.” So there are no structural responsibilities and there are no socio-economic or ecological injustices.

Within the neoliberal identity of entrepreneurial self, we find, among other features, a strong sense of individualism, a self driven by profit, a way of life defined by conquest, control, and utilitarian view, a concept of nature – from which one is disconnected – as a store of resources. In addition, it has a notion of time which relates to the service of material necessities (Fernández-Herrería and Martínez-Rodríguez, 2016, p. 317).

According to Han (2019), and in line with Foucault’s “society of disciplinarity” of today, we are in the “performance society.” Here, competition takes on its full meaning. Through it the performance subjects give meaning to their lives and project themselves into the future seeking to achieve greater personal and professional “successes” through the valorization of effort. They move from subjects of “obedience,” due to external conditions, to subjects of “performance” who exist in a “self-exploiting relationship.” The performance subject continues to be disciplined, but has shifted from that external conditioning factor of Foucauldian “duty” to an internal “power” which is focused on always achieving more. This causes all kinds of disorders (stress, occupational burnout syndrome, anxiety, depression ...). This is what Han calls the “burnout society” which is increasingly colonizing university life.

LOOKING DEEPER: NEOLIBERALISM AND INSTRUMENTAL REASON MORALS AND ETHICS

Thinkers from the Frankfurt School elaborated on the concept of instrumental reason in far reaching works such as Horkheimer’s *Critique of Instrumental Reason* and Horkheimer and Adorno’s *Dialectic of Enlightenment* (1947). They highlight the dark side of Modernity: the world wars, Stalinism, the extermination camps ... everything that humanity is paying for in the supposed advancement of “progress,” which threatens to destroy what it was trying to realize: the idea of man. The central thesis of Horkheimer and Adorno’s book is that the holocaust is not exactly a coincidence, but an ideological consequence of the way in which the West, and all its power, has been constituted (Horkheimer and Adorno, 2002). It has been shown that irrationalism is not a phenomenon which is typical of the most prominent political totalitarianisms; rather, that it is deeply rooted as a “civilizing” process, hidden under the mask of reason.

Freeing man from the influence of irrationality was the goal of the bourgeois philosophy of the Enlightenment. Kant’s *sapere aude* (dare to know, to think), Condorcet’s highly optimistic picture of the progress of the human spirit, based on science, and with no guidance but reason, has led us to a time when promises and realities fail to correspond. In this sense a critique of Enlightenment is a critique of thought. According to Horkheimer and Adorno (2002, p. 2), what is understood by reason functions as a mechanism of dominance: “What human beings seek to learn from nature is how to use it to dominate wholly both it and human beings. Nothing else counts.” Reason has become instrumental reason. This began with the birth of science in the sixteenth and seventeenth centuries.

Since then, it has shown a desire to dominate. Reason has become technical, focused on the usefulness of actions as a means to an end. The end result is what matters, not the means used. It is a pragmatic reason: the important thing about anything is what it is for. Instrumental reason falls into objectification by turning the realities it deals with into objects or instruments; in other words, into “means to an end” which it neither establishes nor poses. Horkheimer and Adorno denounced this split between

ends and means. As a result instrumental reason ends up being a blind, pragmatic thought. It renounces examination, the pursuit of the truth and the ethics of the end to which it serves. Thus, it reproduces the status quo and serves domination. This is the disease that has taken hold of a reason which has been reduced to a mere instrument limited to the uncritical acceptance of reality. The Enlightenment, with its rationalist mechanistic worldview, developed a concept of reason as an instrument for the domination of nature and human beings. As Comins (2016, p. 135) argues, this concept of reason “was perfectly adapted to the exploitation requirement of nascent capitalism, as authors such as Carolyn Merchant (1980, p. 182) and Shiva (1991, p. 45) have sharply denounced.” The positivism of the nineteenth Century led this worldview to its final outcome, presenting it as the only possible worldview “which has accompanied not only the industrial revolution, but also the development of capitalism and globalization” (Comins, 2016, p. 134).

The exercise of instrumental reason is expressed in the technical rationality of current societies and their alienation. The individual ends up being a mere thing, just a cog in the mechanism of the economy, reducing him/her to a mere official. The individual no longer needs to make decisions about what to do, as for this there are institutions and mass culture. The world of economics, of instrumental reason, has its own dynamism. It governs itself independently of individuals in order to impose its dominion over them, to serve the interests of the objectifying mechanisms of the anonymous, capitalist, and impersonal economic apparatus.

From this heartless form of knowledge, from this instrumental, functional, analytical-mechanistic reason, the programme of Modernity arises. It converts knowledge into power which is expressed by domination of nature, women, peoples, and cultures. It takes shape as colonialism, slavery, machismo, ecological depredation, and aversion to the different.

This is what it was hidden in capitalist industrialism which becomes neoliberal globalization: a change in worldview in which reason appears as an instrumental reason. In its nature reification is found as an instrument of domination. The crisis of modernity is the crisis of the Enlightenment project. Now we are in the final phase of this barbarism with its global ecological-social challenges, before which we question what the university can do. It cannot be said that history has failed to show the successes or errors of human projects when they are allowed to flow along the river of time.

MORALS, ETHICS, AND BUREAUCRATISM

The Enlightenment project, with its claim to rescue the human being from barbarism, has chosen the external path in order to realize progress, instead of advancing and delving into the knowledge and development of human nature itself. Is this a way of externalizing the need for an unmet inner journey?

Indeed, humanistic psychology speaks of the process of “individuation” of the human being (Erich Fromm, Viktor Frankl, Abraham Maslow, Carl Rogers, Carl Jung ...). It refers to the vital unfolding in which individuals take control of their

own personal development. It is a process that gives meaning to people's lives and cannot be carried out by anyone other than that person. In this way one builds from autonomy. Conversely, this sphere of freedom is the one that frightens human beings the most. Fromm raises this, particularly in his work, *The Fear of Freedom*.

This self-construction is done from ethics, which travel along the same path as that of individuation, involving autonomy, self-awareness, inner work, commitment to self-realization. It means taking responsibility for yourself, your actions, and your own freedom. But this is not the path chosen by instrumental reason as a means of domination and control in order to make the human being merely an element in charge of a mechanism. A human being built in this way cannot, and would not, have the capacity to come up with the creative, innovative answers which we are looking for, as he or she would act from morality rather than from ethics. From the humanist perspective, morality is not conceived as something negative in itself. It is seen as opposed to ethics, since morals refer to laws, norms, values, and behaviors which are defined by something, or someone, external: institutions, culture of the masses, religion, ideologies, economic pressure. All these factors seek to internalize within individuals, subjecting them, defining them, regulating them in the way that endogenous neoliberalism has done. The individual who regulates appears as an authority. Whoever disobeys is disapproved of by the group and can even be expelled from the community.

Furthermore, morality does not allow questioning of its own content or of its norms. It creates a comfort zone. It is not necessary to risk looking for answers from one's own autonomy, but requires one to follow what is already pre-established and supported by the community. There is no experience of fear or insecurity. On the other hand, ethics is “reason in action.” It involves evaluating, pondering, questioning situations, accepts the possibility of making mistakes regarding judgment or not choosing the best option.

The writings of the afore-mentioned authors aim to understand the *failure of reason*. How is it possible that ordinary people could commit atrocities in such a banal way? Hannah Arendt wrote about the banality of evil in 1963, in her work *Eichmann in Jerusalem*. Here, she analyses Adolf Eichmann's responses during his trial in Jerusalem, in which he was accused of the genocide of the Jewish people. He told the court that he had done his duty, that he had carried out the job for which he had been hired, well. He had complied with what the system, and the bureaucracy, demanded of him. This is a perfect example of what morality can do when it adjusts itself to an instrumental form of thought that dictates the best means to achieve an end, an end that does not have to be considered.

In *Psychoanalysis of Contemporary Society*, from 1955, Erich Fromm exposes how bureaucratism is the enemy of humanism. Both communism and capitalism lead to bureaucracy. People end up becoming “officials” who reduce their questions to the morality of whether *I work well* or if *I do it well*—questions asked from instrumental reason—instead of focusing on what is really important, which is the ethics of asking oneself whether *I'm doing well*. This bureaucratism is what Adorno and Horkheimer, in their Critical Theory, appears as a product of “instrumental

rationality,” where reason is valid as long as it is a means to achieve some end. In this sense an individual within an institution, be it a company or a university, is considered a strategic unit with a purpose. They are required to fulfill certain functions, fear punishment, and be guided by the stimuli designed by the experts who are the new authority.

However, the field of ethics, of autonomy, is what allows human beings to think and perceive themselves as above the conditioning that rewards or punishes them. This is in order to have the ability to see themselves not so much as instituted, but as institutents. This enables institutions to think of themselves as meta-institutions, since they can question themselves and learn.

In short it is clear that, within neoliberalism, there is a diseased form of reason, instrumental reason, which seeks domination and needs human beings who act from morality rather than from ethics. In this way they can be fully constructed as mere obedient instruments even in the face of appalling atrocities and within bureaucratic structures which, as reifying mechanisms, reduce individuals to mere instruments. The human being who assumes their own construction from an ethical standpoint is the only one who can do, and experience, something which is alternative to neoliberal logic. Hence the self-realization of the individual is crucial if we want accurate answers to the serious challenges of the present. But the university has not become aware of this, and it cannot do it if it looks at reality through the lens of “endogenous neoliberalism.” Consequently, the first responsibility of the university is to become aware (have critical awareness) of the internalized perspective from which it views reality.

A WORLDVIEW BASED ON THE COMMUNITY OF LIFE (FIRST CERTAINTY) THE EARTH CHARTER

The Community of Life (CL) is the fundamental certainty on which we can base a new worldview. It appears in the Earth Charter (www.earthcharter.org). At the Earth Summit, celebrated in Rio during 1992, the plan was to present a charter that would regulate the relations of states and human beings with Nature, but an inter-governmental agreement was not reached. However, in 1994, Maurice Strong, Secretary General of the Rio Summit, together with Mikhail Gorbachev, re-started the idea as a civil society initiative and this resulted in the most participatory and inclusive global consultation and drafting process ever in the creation of an international document. “A consensus of shared values had been reached. The official launching of the Earth Charter took place at the Peace Palace in The Hague on 29 June 2000” (Vilela and Corcoran, 2006, p. 21). In 2003, with the support of many countries, UNESCO recognized the EC. Endorsed by thousands of organizations, countries, and individuals, and translated into more than 40 languages, the EC is now widely accepted.

The Earth Charter

The EC has a Preamble, which includes fundamental statements, 16 Principles and, by way of a conclusion, “The Way Forward.”

The 16 Principles, which are interdependent, are divided into four chapters each with four principles. The first is the central chapter: “Respect and Care for the Community of Life.” The other three chapters expand on the first. Chapter II. Ecological Integrity. Chapter III. Social and Economic Justice. Chapter IV. Democracy, Nonviolence and Peace. The EC is conceived as a declaration of fundamental ethical principles for environmental conservation and sustainable development. It exceeds what had been said in previous agreements and declarations on the environment.

In the Preamble there are a series of propositions which focus on the values and perspective inherent in the EC. The key statement that supports the EC is: “we are one human family and ...” The perspective assumed by the EC is not from just one human group (social class, religion, race, political party, nationality ...) It assumes the perspective of *all human beings*. The EC maintains that we are a single human species (decoding of the human genetic code in 2003). Besides being a *scientific truth*, this is also a *legal truth*. Article 2.1 of Human Rights states that everyone has the rights and freedoms therein proclaimed “without distinction of any kind, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status” (<http://www.un.org/en/universal-declaration-human-rights/>). The facts indicate that we have failed to place ourselves in this context, at this level of consciousness. We have serious problems of division and class, in addition to ideological, ethnic, economic, social, and belligerent confrontations ... These conflicts give rise to a humanity which is split into opposing groups which prevent us from seeing ourselves and living as a *single humanity*.

The second part of this Earth Charter’s statement is that, in addition, we are: “... one Earth community with a common destiny.” This perspective exists at *an even more inclusive level*, in order to integrate *all living beings*. This Earth community is the “Community of Life.” We need to raise two levels of consciousness in a generation, to extend the inclusiveness of our identity to these two great dimensions: (1) that of *all human beings* and (2) that of *all living beings* so as to solve our serious global socio-ecological problems. It is focused on *expanding our identity* to the point that we feel united with the entire terrestrial community, to the *Community of Life, the backbone of the EC*.

The central message of the Charter is completed with principle 2 of the first chapter: “Care for the community of life with understanding, compassion, and love” in “Earth, our home” (Preamble). From this perspective everything is *redefined*. It is not the same talking about rights, citizenship, development, common good, peace, ethics, economy, coexistence, etc., from the only reference of the human family than from the entire CL. Everything changes from the perspective of the CL, and that change implies a *new worldview* which is at the true heart of the EC.

The concept of citizenship extends from the human world to a citizenship shared with all living beings. The idea of development must ensure, as a fundamental criterion, harmony with the rest of life. Common good would be defined in terms of the community of all beings on Earth. Peace must also be a peace with Gaia. Economy must be cyclical, decarbonised, with zero emissions,

and mindful not to exceed the regenerative possibilities of the Earth. This means a closer connection with nature, simpler ways of living and consuming in a much more responsible way. As the EC states, at the end of the Preamble, “when basic needs have been met, human development is primarily about being more, not having more.” This is, therefore, a form of economy which is subject to politics, and not just to human ethics, but to the broader ethics of the Earth. This is an ethics of caring, which is not anthropocentric, but ecocentric. We are that ethical thread in the fabric of the Community of Life, with the function of caring for the planet ... (Fernández-Herrería, 2018).

The Gaia Theory

Faced with the mechanistic and colonial view of nature, a novel scientific conception arises: the Gaia Theory. This is implicit in the statement of the EC Preamble: “Earth, our home, is alive with a unique community of life.” This theory was formulated by Lovelock (1979), an atmospheric chemist, and was immediately supported and complemented by Margulis and Sagan (2002) with her line of research. This research was based on demonstrating the huge importance of bacteria in the chemical transformations of the biosphere. Lovelock was forced by the facts to postulate a *global self-regulating mechanism of the Earth system* (Lovelock, 1987, 1990; Margulis and Sagan, 2002).

This theory holds that life does not find the right conditions for its evolution on Earth, as claimed by the classical theory of evolution (Neo-Darwinism). It is life itself that creates these favorable conditions for its existence, making the environment, generating it, keeping it, shaping it, and changing it. This in turn feeds back new life, which evolves and changes in that environment (Fernández-Herrería and Martínez-Rodríguez, 2020). Consequently, the Gaia Theory dissolves the differences between what is organic and what we consider inorganic, thus giving rise to highly complex inter-influences which we are now beginning to understand. This network inter-relates micro-organisms, plants, and animals with the soil, the oceans, and the atmosphere, all functioning as a living super-organism: Gaia. She, through collective, interdependent, and cooperative work, is capable of regulating herself in order to adapt and maintain an environment optimal for life (Lovelock, 1987; Margulis and Sagan, 1997; Margulis, 1998).

Margulis introduced the theory of endosymbiosis, which is her main contribution to the Gaia Theory. It holds that all the cells of plants and animals (eukaryotes) have been formed by symbiotic union of bacteria (prokaryotes). This highlights the importance of cooperation in the general plan of life, as opposed to Neo-Darwinism which emphasizes random mutations and natural selection based on competition. Margulis (1998) argues that the evolutionary process is guided by *symbiosis*, stating that cooperation between organisms and the environment is the driving force of natural selection, rather than competition between individuals. According to this author, Darwin's view is incomplete rather than incorrect. Symbiogenesis, as an explanatory theory of evolution, in addition to being a revolutionary theory is also attractive, since it places cooperation at the center of the functioning of the Earth's community.

The Gaia Theory has already earned the respect of the scientific community. There are different interpretations of the Gaia Theory. The holistic perspective, cooperation, the common good of the Earth community, participation, the transversal inter-existence which intertwines us, the sense of community, co-responsibility, the networks of inter-influences ... all characterize the concept of the Gaia Theory. This is very different from the previous mechanistic paradigm, which seeks to tame nature. This is what instrumental reason does. It is the mentality of white people: we often have to destroy to “understand.”

“CARE FOR THE COMMUNITY OF LIFE WITH UNDERSTANDING, COMPASSION, AND LOVE” THE PEDAGOGY OF CARE FOR A TRANSFORMATIVE LEARNING AS A PATH TO WISDOM (SECOND AND THIRD CERTAINTIES)

Chapter 6 of Heidegger's *Being and Time*, 1926, is dedicated to analyzing “The care as the being of Dasein.” According to Heidegger (1971), care is the essential way of being, of Dasein, of being there, of being-in-the-world which is the human being. It is irreducible to any other previous category. It alludes to the way in which a being is structured and how it manifests itself. Care, according to this perspective, would belong to the essence of the human being.

Caring for the Community of Life, which includes us, requires us to “build democratic societies that are just, participatory, sustainable, and peaceful” (principle 3) and doing so with “understanding, compassion, and love” (principle 2). This means integrating, symbolically, “head,” “heart,” and “hands” (understanding love as a committed action). It implies a synthesis of a loving and empathic intelligence, which leads us to action, and an epistemology of integration, an experience of these other intelligences. In addition to cognitive intelligence, we have emotional, social, ecological, and spiritual intelligences (the last one not to be confused with the religious belief). The spiritual is understood as in line with the thinking of Capra (1998), which coincides with that of Boff (2001, p. 90) “as that attitude by which the human being feels linked to the whole.”

This synthesis, or integration, implies an epistemology which is a living experience which places us at the doors of wisdom. The philosopher Anne W. Schaefer (1995, p. 53–54) states: “Knowledge that is abstracted and disembodied from parts of our brains, and unconnected to our beings, may be useful for creating technology, and it will never move us to wisdom.” Knowledge is not enough. Rather, it is dangerous if it is not coupled with compassion, as shown many times throughout history. Louis Farmer, Onondaga elder, and a member from the Iroquois Confederation, conveys to us, through Schaefer (1995, p. 20), the message which says that “without the balance of the heart, the mind is an enslaving master. Only through the heart can the mind be balanced.” Only if we are willing to learn with our whole beings can we use information wisely, because the mind cannot be trained without the heart and, indeed, without the whole being.

Mind divides, objectifies, splits subject from object, while heart unites. Knowledge is not, therefore, a centrifugal act of possession of the object (epistemology of the hunter), but a way of growing in harmony with the environment. We can find this in the wisdom of the indigenous peoples. “Knowledge can be learned. Wisdom must be lived” (Schaefer, 1995, p. 20). But education and university are still anchored in the paradigm of modernity which privileges rational and cumulative knowledge. “Education is not the filling of a pot, but the lighting of a fire,” said William Yeats, poet and playwright. In reality human development, which is synonymous with integral learning, is a process that occurs from within the human being.

Nicholas Maxwell (1984, 2014), a British philosopher, proposes a revolution in the academic world in which its activity focuses not only on knowledge but goes beyond, in the search for wisdom. This is because science and technology have failed in solving the great problems of humanity. We urgently need a radical change in scientific and technological research, so that it is directed unambiguously toward the goal of survival. We have a militarized science but it is not exactly at the service of humanity, as Maxwell would like. The goals of science and technology must be reformulated. If we want to work on wisdom at university level, and not turn it into a study of wisdom, we have to make a “turn” toward the person, toward the individual him/herself.

The traditional paradigm of the Age of the Enlightenment conferred an absolute value on reason. It ignored what Pascal said in his *Pensées* when speaking of the logic of the heart and its “reasons,” unknown to reason. Today we have an *inflation of reason*, especially *instrumental* and *analytical reason*, to the detriment of other intelligences. We can consider the ethics of care, which is the most important feminist moral theory of recent years, and its *educational translation* into an *Ecopedagogy as Pedagogy of Care*. This focuses on three major fields: caring for ourselves, caring for others and caring of the planet (Fernández-Herrería and López-López, 2010). Care is the opposite of disinterest, indifference, forgetfulness. Caring, as a way of being, implies concern and activity, responsibility, sensitivity, closeness, affective commitment to the other, and to the world. This is what makes us fully human. *We are born to care*. The ultimate effect of this ethics of care will be peace on Earth and with Earth.

The Pedagogy of Care should have, as its *main objective*, the experiential learning of the essential, radical experience of our interconnection and interdependence with the CL. It is feeling that we are one more thread (the ethical, caring thread) within the complex weave of the Earth Community (Fernández-Herrería, 2018). This is an essentially spiritual goal, belonging to the realm of wisdom which profoundly transforms our consciousness. It would be the fundamental, truly transformative learning that we, as humanity, would have to carry out. It is a spirituality that will reconnect us with the world. This is what the West has forgotten. A “conversion to life” is an essential path of wisdom for the current global situation. For this reason ethics, wisdom, and ecology cannot be seen as external interventions aimed at solving socio-ecological challenges, unless we want to convert them into moral, legal, or purely formal actions.

Sterling (2010) argues that “education for change,” that is, those forms of education with “adjectival adjuncts” (Martin, 1996), such as education for peace, for sustainability, gender ... should focus less on labels and more on the meaning of the times in which we are living. We understand that Sterling’s plea goes deeper by facilitating a *change in worldview*. This is what should underlie the different forms of education for change. What is the problem? Sterling (2007) looks to Bateson (1972) for an answer. Bateson distinguished three types of learning related to social change: *Learning I*, a maintenance, adaptive learning; *Learning II*, which creates profound changes in the systems. Sterling argues that this kind of learning involves a questioning that readjusts our conceptual frameworks and basic assumptions. Finally, there is *Learning III*. For Bateson, this is learning which leads to a *radical change in worldview*. He identifies it with *transformative learning*, which involves a structural change in the basic premises of thought, feelings, and actions. It is a *shift in consciousness* which, as Sterling argues, dramatically and permanently alters our way of being in the world.

Consequently, if we want a form of learning, which is capable of changing our civilization, we will need to promote Learning II. But there is a condition, as Bateson argues and Sterling assumes. It is that, in order to access this kind of learning, educators should be at the Learning III level. However, there are not enough educators at this level of learning. So, when we come across a document like the EC, it is often downgraded to a mere programme of methodological change which may be innovative, but which does not incorporate the potential for transformative learning: *changing the worldview*. The explanation for this degradation is that each one “*adapts*,” “*reduces*” the content of the EC to their own level of consciousness. Actually, the EC implies a *new state of consciousness*. Boff (2008) speaks of a *new re-enchantment of the world*, an ethical revolution, the expansion of our sense of identity: the “ecological Self,” as defended by Seed, Macy, Fleming, Naess, and all deep ecology (Macy and Brown, 1998). This is a *global biophilic consciousness* (Fernández-Herrería and Martínez-Rodríguez, 2016), “a change of mind and heart,” “a new beginning,” as stated in the EC, specifically in “The Way Forward.”

When we pose a problem the answers are generally sought in the external environment (change of economic, social, institutional structures ...). However, in traditional Eastern thought it is typical to hold like Gandhi: “If you want to change the world, change yourself.” The global nature of our problems forces us to be intercultural, but not in a superficial way. Cultures have different ways of expressing reality. Interculturality is communion with other experiences of the world, with other ways of feeling, perceiving, and sharing reality. We need to understand them because they can complement, or improve, our own. If we continue to follow the traditional Eastern perspective, we can look to Krishnamurti, an unusually lucid philosopher of Indian origin, who maintained that:

The world is the projection of myself. What I am, that is the world, because the world is not different from me (...) The world and I are two separate entities. Society is myself. There are no two different processes. The world is an extension of myself, and to

understand the world I must understand myself. (Krishnamurti, 1963, p. 225).

In other words: “the movement of the external is, undoubtedly, connected with the flow of the internal. Both are the same thing (...). The society we have created is the external, and then the internal becomes a slave of that society” (Krishnamurti, 1989, p. 177–178). Life is an unfragmented whole, a unitary process. “As long as we consider ourselves as entities separated from society we will never understand society, or ourselves, and we will always be in conflict with society” (Krishnamurti, 1977, p. 63).

Trying to solve outer problems without solving the inner ones is, as previously stated, a waste of time and represents a fall into hopelessness. How do we apply this to the change we demand of the university? Let us find an answer in the following text by Ken Wilber, who is considered the father of transpersonal psychology:

The ecological crisis –or Gaia’s main problem– is not pollution, toxic dumping, ozone depletion, or any such. Gaia’s main problem is that not enough human beings have developed to the post-conventional, world-centric, global levels of consciousness, wherein they will automatically be moved to care for the global commons (Wilber, 2000, p. 137)

In short, let us work on that single movement, starting from both sides: our-own-change-while-we-change-the-university¹, and vice versa.

It is very typical of the Western mentality to pose problems and try to solve them in a rational way. This is the direction that Western philosophy has taken since Ancient Greece. Therefore, it was linked to logos when it was born, and was an overcoming of myth. The love of wisdom (philos-sofos) is solved in the West as a “talkistic”, argumentative, symbolic, and speculative practice. However, Eastern philosophical traditions (Indian more than Chinese) look at reality, its investigation, involving the whole human being in an operational practice aimed at the transformation of his/her consciousness, of his/her life. Reasoning alone is an inadequate way of penetrating fundamental issues, as shown by the dead ends into which the rationalist monopoly of the mind has put us, thus evidencing the tyranny of reason. The best method is the mode of existence, the path that becomes methodology itself, and which opens life to truth, rather than to propositions that only seek to objectively describe the real. It is the totality of the human being, and not only of his/her intellect, which can walk this path. We must have an experiential learning and, in our case, a learning based on our reconnection with the Community of Life, which involves a change of “mind and heart,” as advocated by the EC. This is Learning III, a really transformative learning, which implies a change in worldview. Just thinking about it is not enough. We need the wisdom of experiencing reconnection. We have lost our reconnection with others and with nature because we have lost our reconnection with ourselves.

¹Hyphens are to show that the internal and the external form a single back and forth movement.

In the King and Schneider’s report to the Club of Rome, it was rightly said that “we are rich in knowledge, but poor in wisdom (...). Probably a fundamental outbreak of wisdom can only take place through the internal development of the individual” (King and Schneider, 1991, p. 241). This is an inner culture which is largely forgotten by the educational system. However, an undeniable reaction is taking place worldwide: many groups are cultivating ecology, meditation, spirituality, and carrying out social and ecological activism ... We need an environmental education and, in general, a different education (Jickling and Sterling, 2017).

SOME PRACTICAL CONSEQUENCES

1. Which vision and procedure?

- We are, here, proposing another way of seeing reality and our place in it. The changes that must take place in universities have to be based on a worldview, otherwise they would be mere practices and disconnected actions which would end up being swept away and colonized by neoliberalism.
- Having a life-centered worldview. Here, the Community of Life and Ethics of Care have been proposed as the central core from which everything is redefined. This view should illuminate our actions, both critical and constructive, and our agreements.
- The “discussion” and decision-making *procedure* is important. It is not about each individual and small groups defending some positions against others. This would be the traditional method, which does not fit with the way life works. Therefore, the procedure would be the first thing that should be redefined from the Community of Life and its way of acting. We suggest the following: each person issues their proposal, just as life does with its complex and countless exchanges. But, by doing so, they place it in a space which is common and, at that point, it is no longer “theirs.” (In this way we move from competition and defense of personal stances to cooperation.) In this space everyone “works on” the proposal in relation to the other proposals. In many ways they complement it, redefine it, embellish it, reposition it ... as life does with the materials it exchanges. Thus, we create, without haste, a work of collective construction which gives rise to moments of silence. Regarding the “inner” part of this work, we should seek mental and emotional relaxation, in a state of observation, free from self-censorship, and letting ideas flow. In this way creativity can be expressed. Regarding the fruits of the procedure, we should not expect a logical Cartesian design. Life does not work in this way. Its “logic” is complex, “dirty”, intricate, it has intersections, overlaps and networks on different levels. This is to be expected. With the practice of the proposals, redundancies will be eliminated and areas of weakness will become visible. This could be the functioning of a “community of vision”.
- This transformative Learning III, which constitutes a change from the Community of Life as an experiential and

integrative (head, heart, and hands) learning, is not fully teachable. We can establish the means, prepare the stage with good experiences and reflections, but that learning arises from within each individual. We only help in this delivery, as Socrates suggested.

2. What structure and functions would the university, as an Organization, have?

- Become critically aware, using the procedure described, of how education, and specifically universities, are seriously threatened by neoliberal globalization. It is important to identify the ways in which the business management of the university is specified according to the characteristics of the NPM (see above), and to agree on which of these characteristics can be reversed. We can eliminate some of them, but we have others such as decentralization, flexibility, creativity, adaptability, wake state administration, less bureaucratic organizational forms... which seem advanced and innovative to us. Let us use these characteristics of the system against the system itself, reversing its meaning, as with judo. In this way they would be redefined in that worldview which places all life at the center of social and institutional organization; in this case, the university. Thus creativity, for example, would be at the service of a university community that seeks socio-economic and ecological justice in our common home, the planet.
 - This will entail general institutional changes: the university must dissociate itself from the instruments, institutions, regulations, practices, organizational style, management, objectives, functions... which promote a colonized university. We call for the promotion of a practice based on ethics, not morals or instrumental thought and action. It will also entail creating chairs, seminars, innovative projects, investigations ... in order to promote the paradigm shift, in addition to its practical, structural, organizational, curricular, and didactic implications in higher education and in individuals. Universities must form networks in order to become collectively aware of this and act accordingly.
 - We can apply the principles that make ecological systems sustainable to universities. This can be done by following the CFE, which highlights concepts such as interdependence, integrity of the system, biodiversity, cooperation and association, appropriate size, common goods, life cycles, networks and flows, among others. According to Capra (2005), we should perceive our social organizations, our universities, our cultures, human communities, like any other living organism: as dynamic communities in evolution processes. In another publication, Capra (2013) argues that, if we use nature as a source of knowledge, we can identify existing patterns in ecosystems in order to apply them to our social institutions, which are also seen as ecosystems.
- ## 3. How can personal transformation and the path to wisdom be promoted?

- Working on the personal aspect and interculturality, to which this work gives great importance. The academic contents are important but, even more important, is that the university promotes the development of the individual by means of the search for self-realization. This can be done within the context of humanistic and transpersonal psychology, working with group techniques, gestalt, relaxation, visualization, creative imagination, expressive arts (theater, music, dance, yoga...), meditation, silence, commitments to the community, and social and ecological activism... This entails that turn inwards, toward the inner person. It introduces us into the trans-verbal and transcultural dimensions of human development and, consequently, of education and wisdom. In our educational system there is no wisdom, and this is why it is so full of words. Furthermore, it lacks silences as a way of opening up transpersonal spaces. We also need to learn to listen, to observe from silence without judgment or evaluation, without words, without choice, without manipulation of what is observed. A specific practice would be the development of sensory awareness in nature. At the Faculty of Education Sciences of the University of Granada, some of these methodologies have been undertaken for years. They include relaxation, creative imagination, sensory awareness in nature, and meditation.² A fascinating field that universities should address, and that would connect us with the great wisdom traditions of humanity such as Buddhism, Taoism, Zen, indigenous peoples, and shamanism...
- Regarding the ethics of care, practical experiences can be undertaken in three areas, since caring is learned by caring. This type of practice should be considered in universities, since it supposes an integrating exercise of the various intelligences. It would mean caring “with understanding, compassion, and love” and thus we introduce ourselves to the path of wisdom. Let us start by taking care of ourselves. This involves healthy eating, exercise, rest, eliminating habits like harmful consumption ... taking care of emotions and thoughts, so as not to harm, and taking care of actions in different contexts. We must take care of the lives of others: helping to cover their basic and material needs. We must look after them and their lives by listening, hugging, dialogue, support, searching for justice, volunteering, social activism ... (Martínez-Rodríguez and Fernández-Herrería, 2017). We must also take care of things and Mother Earth. We must ensure adequate consumption, reuse, and recycling, reduction of the ecological footprint, environmental activism, implication in networks ... This includes service-learning, which

²The publications are in Spanish. Those interested in them can contact Alfonso Fernández-Herrería: alfonsof@ugr.es. On the occasion of the celebration of the end of the decade of Education for Sustainable Development, a book was published by Earth Charter International, based in Costa Rica. It was in English and Spanish, and included a selection of good practices in accordance with the Earth Charter carried out in different countries. Two were chosen among those carried out at the University of Granada. This is the link: <https://earthcharter.org/library/the-heart-of-the-matter-infusing-sustainability-values-in-education/> (English).

integrates learning with social commitment by performing a service to the community.

- Promoting critical reflection processes on a personal level in order to analyse the influence of “endogenous neoliberalism” in the construction of an individual’s subjectivity. An example of this colonization is in professional careers, where teachers become entrepreneur of themselves and self-exploit in order to achieve an increasingly demanding curriculum, with teaching itself being side-lined. When teachers fail to spend the maximum of time on increasing their “productivity,” they have problems and feel guilty.

4. What should be done at the curricular level?

- Given that an education colonized by the neoliberal globalization transforms people into mere instruments through the professional curriculum, profound changes must be made in the design, development, and assessment of the curriculum. It must focus on the Community of Life and not on market forces. It has to foster an interdisciplinary and transdisciplinary epistemology in order to avoid a curricular fragmentation that transforms reality into a set of subjects
- The influence of education involves not only *what* is academically done but also, and in a very relevant way, *how* it is worked and the *context* in which it is carried out. As an example of this, we refer to the education that is undertaken in the Center for Ecoliteracy (CFE), based in California and co-founded by Fritjof Capra. This education aims to present a sustainable educational model for formal education. For reasons relating to lack of space, we make only one comment and refer the reader to this publication (Martínez-Rodríguez et al., 2018). In it, the characteristics of its educational model are contrasted with the theoretical principles of the NPM as an instrument for the implementation of neoliberalism. The CFE is based on four great principles: (1) Nature is our teacher, where ecological literacy is the unifying principle of the curriculum, which is sustained on six premises. Promoting “Collaborative Learning” which develops empathic commitment in addition to enriching the educational process in many ways. (2) Sustainability is a community practice. (3) The real world is the optimal environment for learning. Hence the promotion of the strategy of the Project Based Learning, direct experiences in nature, community activities, and reflection on the constructed environments. (4) Sustainable living is rooted in deep knowledge of the environment. This implies a profound change in the organization of learning, in spaces and times, and its typical time fragmentation in subjects. It involves collaborative and experiential methodologies based on real situations in the natural world and in the community. All this is typical of projects which have a systemic holistic view, with practice in empathy, using different intelligences and seeking a commitment with the socio-natural environment. In this way, the foundations of

the connection with the socio-natural environment, which we have repeatedly highlighted throughout this work, are laid. The CFE is an advanced example of how, in general, universities should change.

- Other practices: community coexistence retreats in nature in order to carry out different educational activities, learning about creative means of conflict resolution. Training of students to become mediators, gaining knowledge from indigenous cultures and their stories of wisdom. We refer here to the research carried out by Cutanda (2020) in which, in its practical section it proposes, among other things, an educational use of traditional stories—collected from around the world—as key resources for the transmission of a worldview centered on the Community of Life.

5. What kind of teacher training?

- The university should have a commitment to a new form of teacher training, one which is different from normative and technological approaches constructed from a fragmented view of reality, disconnected from practice and oriented toward an effective teacher model. This has led teachers to become a de-professionalized, vulnerable group, dependent on the official and hegemonic discourses colonized today by neoliberalism. From these approaches, teacher training programmes have proven incapable of responding to the profound changes which are affecting educational institutions and teaching (Hargreaves and Lo, 2000). We need to rethink the way in which university teachers are prepared, and adopt critical approaches which are sensitive to global problems. This should include biophilic approaches which take into consideration their academic, political, ethical, and personal development training as a key factor in responding to the complex changes which affect individuals and contemporary contexts.
- These approaches, backed by more comprehensive and transformative training models, should promote reflective, collaborative, and inquiring dynamics within the teaching profession. This should reinforce their integral development, their permanent commitment to innovation in their professional activity in addition to the improvement of reality from the perspective of this new vision of the Community of Life.
- The adoption of these approaches and models from this new view has a direct impact on teacher training plans and proposes the reconstruction of teachers’ professional identities within the university context, as well as in organizational cultures. It would entail, among other issues, reconsidering the contents of the training proposals. This would be reinforced by the inclusion of ethical, emotional, ecological, and intercultural aspects. Also, it would institutionalize new ways of learning to teach which are more inter and transdisciplinary and based on coordination and collaboration (project learning, problem-based learning, service learning,...). All this must always spring from an ethical framework, one which has, at its

core, the vision of the Community of Life, and its care the backbone of the commitments and duties (in relation to the students, colleagues, profession, university, and environment). This would define the teaching profession in University.

6. What kind of leadership?

- Far from the performance of an authoritarian, personalized, and eminently bureaucratic leadership, current trends advocate a more pedagogical and distributed form of leadership, a leadership committed to democratic values and the fight against structural and cultural inequalities (Ryan, 2012; Shields, 2013; Harris et al., 2017). This type of leadership could be a good ally in the need to reverse the presence of neoliberalism in the university, if it is accompanied by a commitment to ecological values. Leaders are needed in order to strengthen the commitment of universities to sustainability problems and address issues related to the most disadvantaged in society (development of aid programs, aid to marginalized groups, and those at risk of social exclusion,...). There is a need for leaders who are capable of promoting teaching innovation projects sensitive to the many existing diversities, and expressing support for research projects that contribute to guaranteeing inclusion and social justice for all. This is in addition to fostering greater sustainability on the planet, as required by the 2030 Agenda for Sustainable Development (UNDP, 2015), and, more radically, the worldview proposed by the Earth Charter.

FINAL REFLECTIONS

The growing socio-economic inequalities, and the ecological devastation of the Earth, show that we currently face a paradigm in decline. Mechanistic rationalism, together with anthropocentrism, reduces nature to a mere economic resource

to be exploited, and people to instruments trapped within the mechanism of neoliberalism. Instrumental reason, as the epistemology of domination, is endangering human survival. A new worldview, the paradigm of care specified in the Earth Charter in the context of the planet as a living superorganism, in alternative movements... must replace the decadent paradigm of domination that emerged from the Enlightenment. A new ethic, the ethics of care, of solidarity, of shared responsibility, compassion, reverence, and veneration before the mystery of life, drives us with passion toward a new way of living in the world, with the motivation to contribute to the healing of the planet.

In recent centuries, humanity has exiled itself from the Community of Life, placing itself above and against it. We have disconnected ourselves from the fabric of life and from others. This process of alienation and uprooting has made us, personally and socially, ill (depression, anguish, lack of meaning, stress, chronic fatigue, insomnia, drug addiction, alcoholism, suicide...). We live as lost souls—a mere element among others—manipulated by the Market which has become the Absolute in these times of neoliberal globalization.

We need to get to the root and have a significant “critical mass” in order to take a leap toward an empathetic global and biophilic consciousness, in just one generation, if we want to respond to the serious socio-ecological problems of humanity (Fernández-Herrería and Martínez-Rodríguez, 2019).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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How Universities Have Betrayed Reason and Humanity—And What's to Be Done About It

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OPEN ACCESS

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 24 November 2020

Accepted: 11 March 2021

Published: 12 April 2021

Citation:

Maxwell N (2021) How Universities
Have Betrayed Reason and
Humanity—And What's to Be Done
About It. *Front. Sustain.* 2:631631.
doi: 10.3389/frsus.2021.631631

In 1984 the author published *From Knowledge to Wisdom*, a book that argues that a revolution in academia is urgently needed, so that problems of living, including global problems, are put at the heart of the enterprise, and the basic aim becomes to seek and promote wisdom, and not just acquire knowledge. Every discipline and aspect of academia needs to change, and the whole way in which academia is related to the rest of the social world. Universities devoted to the pursuit of knowledge and technological know-how betray reason and, as a result, betray humanity. As a result of becoming more intellectually rigorous, academic inquiry becomes of far greater benefit to humanity. If the revolution argued for all those years ago had been taken up and put into academic practice, we might now live in a much more hopeful world than the one that confronts us. Humanity might have begun to learn how to solve global problems; the Amazon rain forests might not face destruction; we might not be faced with mass extinction of species; Brexit might not have been voted for in the UK in 2016, and Trump might not have been elected President in the USA. An account is given of work published by the author during the years 1972–2021 that expounds and develops the argument. The conclusion is that we urgently need to create a high-profile campaign devoted to transforming universities in the way required so that humanity may learn how to make social progress toward a better, wiser, more civilized, enlightened world.

Keywords: knowledge, wisdom, enlightenment, reason, scientific progress, social progress, academic revolution

THE BETRAYAL

Decades ago, in the George Orwell year of 1984, I published a book called *From Knowledge to Wisdom*¹. In the book I argued that, in order to solve the grave global problems that threaten our future, we need to bring about a revolution in universities, affecting to a greater or lesser extent every discipline and every aspect of the University. Instead of giving priority to solving problems of knowledge, universities need to give priority to problems of living—to the problems we encounter in our lives, from the personal to the global.

¹ Maxwell (1984), available free online at <https://philpapers.org/archive/MAXFKT-3.pdf>. An original chapter 2 of the book got to be too long; it was published separately as Maxwell (1980), and republished as chapter 9 of Maxwell (2017c). It develops an argument that runs in parallel to that of *From Knowledge to Wisdom*—an argument that is picked up again in Maxwell (2020). Among other things, it puts forward the solution to the problem of rampant specialization. There is more about my work on my website: <https://www.ucl.ac.uk/from-knowledge-to-wisdom/>.

The basic task of the University needs to be to put forward and critically assess possible solutions to our problems of living, possible *actions*, policies, political programmes, ways of living, philosophies of life. A basic task needs to be intelligently conducted public education about what our problems are and what we need to do about them. The University needs to devote itself to helping people achieve what is genuinely of value in life. The pursuit of knowledge and technological know-how is, of course, vital, but it needs to be conducted as a secondary matter, not the primary pursuit of the University.

From Knowledge to Wisdom was widely and favorably reviewed at the time. It received a glowing review in *Nature* by Christopher Longuet-Higgins,² and another by Mary Midgley in the *University Quarterly* (Midgley, 1986). The book went into paperback twice. And then went out of print and was forgotten.

If what I argued for, in 1984, had been taken up and put into academic practice in ensuing years, we might now live in a very different world from the one we find ourselves in. We might have come to grips with global warming long ago, and might not now face the appalling climate crisis that menaces our future. Much more might have been done to rid the world of nuclear weapons. The Amazon rain forests might not face destruction. We might not be faced with mass extinction of species. The oceans might not be full of plastic. The internet might not have been allowed to corrupt democracy and public life. Brexit might not have been voted for in the UK in 2016, and Trump might not have been elected President in the USA. Many more nations might have dealt with the coronavirus pandemic swiftly and competently, thus preventing hundreds of thousands of deaths. It is my personal view that we would now live in a much saner and more hopeful world.

What gives me such confidence that my 1984 book would have had such an astonishing impact if taken up and put into practice? It is this. If what I argued for had been put into practice, all those years ago, universities would have been actively and energetically engaged in helping people resolve conflicts and problems of living in increasingly cooperatively rational ways. All those who now seek knowledge in the social sciences and humanities would have acted very differently; they would have gone out into the community to do what they could to spread social awareness about what our problems are, and what we need to do about them. Peoples' Councils would have been formed, up and down the land, all around the world, devoted to working out what needs to be done to resolve local and global problems—what governments need to do to enable populations to resolve such problems, and what needs to be done to get governments so to act. Rapid population growth, destruction of natural habitats, loss of wild life and mass extinction of species, war and the threat of war, the menace of nuclear weapons, vast inequalities of wealth and power around the world, pollution of earth, air and sea, threats to democracy from social media, and perhaps most serious of all, global warming: what to do to resolve these global

problems would have received sustained public discussion and attention³.

If, during the past 30 years or so, our institutions of learning, our schools and universities, had been actively and energetically engaged in promoting public learning about such problems as these, and what to do about them—actively and energetically engaged in promoting public action to help resolve these problems—we have every reason to suppose that this would have had an impact—although how big an impact may be open to question. Many people, many communities, would have learnt about what our problems are, what needs to be done to solve them, and would have *acted* to help bring solutions about⁴.

But universities have done none of this. They have, as I have said, devoted themselves to the pursuit of specialized knowledge and technological know-how. Universities have been dominated by the idea: the primary task is to acquire knowledge; once acquired, it can then be applied to help solve social problems. Even those working in fields of social science and the humanities believe they should restrict themselves to such an approach. It is not the proper job of the Professor to go out into the community and stir up political activism!

Thus, for the last 30 years universities have singularly failed to engage in public education about what our problems are, and what we need to do about them, so as to make progress toward a better world. Universities have not even remotely conceived of their task in such terms. And as a result, not surprisingly, humanity has shown few signs of learning how to cope better with the grave global problems that confront us. It is hardly too much to say that Extinction Rebellion and Greta Thunberg have done more in 1 year to bring the climate crisis to public attention than all the universities of the world have done in 60 years—ever since we first really knew that global warming would occur.

The central argument of *From Knowledge to Wisdom* is, I must stress, an *intellectual* argument, concerning the intellectual dimension of science, and of academic inquiry more generally. It concerns reason, intellectual integrity, intellectual aims and methods, intellectual values. Academia devoted to the pursuit of knowledge represents a monumental *intellectual blunder*, when judged from the standpoint of helping to promote human welfare. Both aspects of inquiry suffer from this blunder, inquiry pursued for its own sake, and for the sake of other, practical ends. It is that intellectual blunder that we need to identify, and put right, if we are to have what we so urgently need: a kind of academic enterprise rationally devoted to helping us solve problems of living, from the local to the global, so that we may make progress to a better, more civilized, more enlightened world.

“Our planet earth carries all too heavy a burden of killing, torture, enslavement, poverty, suffering, peril and death.”

³For my most up-to-date discussion of the multitude of ways in which the University I argue for would have an impact on public understanding of what our problems are, and what we need to do about them, see Maxwell (2021, chs. 4–7). For my discussion of this issue in 1984 see Maxwell (1984, ch. 7).

⁴That the way the University interacts with the social world is transformed, given the kind of academic inquiry I argue for, is a basic theme of Maxwell (1984). See especially chapter 7, which concludes with a brief account of the cooperative movement in Mondragon, Spain.

²Longuet-Higgins (1984): see <https://www.ucl.ac.uk/from-knowledge-to-wisdom/reviews#goodness>.

That is the first sentence of the book. The rest of the book spells out how natural science, and academic inquiry more generally, have to change, and why, if they are to help prevent avoidable suffering and death, help what is genuinely of value in life to flourish, in the best possible way, by intellectual, technological and educational means. I develop the argument by considering two conceptions and kinds of academic inquiry which I have subsequently come to call *knowledge-inquiry* and *wisdom-inquiry*⁵. Both hold that the basic social or humanitarian aim of inquiry is to help promote human welfare. But the *intellectual* aims and methods of the two conceptions of inquiry are very different. Each has a conception of science associated with it: *standard empiricism* and *aim-oriented empiricism*, respectively.

Knowledge-inquiry is what dominates universities today. It is, I argue, profoundly irrational, in a wholesale, structural way, when judged from the standpoint of helping to promote human welfare. It is this institutional, structural irrationality that is responsible for the failure of knowledge-inquiry to help humanity learn how to solve problems of living so as to promote human welfare. *Knowledge-inquiry betrays reason and, as a result, betrays humanity*.

Wisdom-inquiry is what emerges when knowledge-inquiry is modified just sufficiently to cure it of its gross irrationality. According to wisdom-inquiry, the basic aim of inquiry is wisdom, construed to be the capacity, the active endeavor, and possibly the desire, to realize what is of value in life, for oneself and others. Realize, here, means both apprehend or experience, and create or make real; both aspects of inquiry are included, inquiry pursued for its own sake, and inquiry pursued for the sake of other ends. Wisdom includes knowledge, understanding and technological know-how, but much else besides, such as the capacity to discover what is of value, and the capacity to solve those problems that need to be solved if what is of value is to be realized.

In my work, I should mention, I referred to and discussed the work of many others critical of modern science, of modern academia more generally, or who dealt with the issues that were of concern to me. Thus, in *From Knowledge to Wisdom* I referred to or discussed, often sympathetically, the work of Popper (1959, 1962, 1963), Carson (1972), Commoner (1966), Ellul (1964), Allen (1980), Eckholm (1982), Foley (1981), Maddox (1972), Barzun (1964), Roszak (1969, 1970), Dubos and Ward (1972), Meadows et al. (1974), Goldsmith et al. (1972), Allaby (1977), Schumacher (1973), Heilbroner (1975), Higgins (1978), Easlea (1973), Lakatos (1970), Kuhn (1962), Berlin (1979), Ravetz (1971), Greenberg (1971), Feyerabend (1965), Brandt (1980), Gay (1973), Jungk (1960), George (1976), Dickson (1974), Pirsig (1974), Calder (1981), Midgley (1978), Habermas (1972), Collingridge (1981), Norman (1981), Passmore (1978), Rotblat (1983), Schell (1982), Snow (1964), Wootton (1950), and many, many others. Many of these authors argued, in one way or another, that the modern world was heading toward disaster, and there was an urgent need for radical change. I saw my work as making an important contribution to this view. None however

argued for aim-oriented empiricism or wisdom-inquiry. None even criticized science and the academic enterprise in quite the way I did. A few years after the publication of my book, an academic dispute broke out between those who attacked, and those who defended, scientific rationality, provoked in part by Sokal's (1996) spoof article published in a journal called *Social Text*⁶. But both parties to this dispute missed the crucial point. Scientific rationality, attacked by some, defended by others, was not authentic scientific rationality at all; it was, and is, a characteristic kind of *irrationality* masquerading as rationality—a point I made in the second edition of *From Knowledge to Wisdom*⁷. I argued for *enhanced scientific rationality*, the need for which was overlooked by both parties in the “Science Wars” dispute, and by many others too. It is still overlooked today⁸.

MY CAMPAIGN FOR WISDOM-INQUIRY FROM 1972 TO 2020

My campaign for wisdom-inquiry emerged from a critical look at Karl Popper's philosophy of science in 1972 (Maxwell, 1972). Popper famously argued that science makes progress by means of a process of conjecture and refutation (Popper, 1959, 1963). Popper then generalized this idea: whatever we are doing, progress can be achieved, problems can be solved, by means of conjecture and *criticism* (Popper, 1959, p. 44, n.*1). Popper then applied this idea of *critical rationalism* to social and political issues in his great work *The Open Society and Its Enemies* (Popper, 1962).

It dawned on me that Popper's philosophy of science is untenable. Physicists only ever accept unified theories, even though infinitely many empirically more successful disunified rivals always exist. That means physics makes a big, implicit, metaphysical assumption about the nature of the universe: it is such that some kind of unified pattern of physical law runs through all phenomena. But this assumption is profoundly problematic: it needs sustained criticism, as an integral part of science, in an attempt to improve it. We need, I realized, a new conception of science—*aim-oriented empiricism*—that acknowledges this assumption and seeks to improve it as science proceeds (Maxwell, 1974).

Then, treading a path parallel to Popper's, I generalized my new conception of scientific method to form a new conception of rationality—*aim-oriented rationality*. Whenever we pursue a worthwhile but problematic aim, as very often we do, we need actively to try to improve our aim as we act, as we live. Aim-oriented rationality helps us to do just that.

From these considerations, the basic idea of *From Knowledge to Wisdom* emerged. It was first expressed in *What's Wrong With Science: Toward a People's Rational Science of Delight and*

⁵In my 1984 book I called them *the philosophy of knowledge* and *the philosophy of wisdom*.

⁶For an account of this dispute, the so-called “Science Wars”, see Maxwell (1984, 2nd ed., 2007, pp. 40–46, 141–3); Koertge (1998); Segerstråle (2000).

⁷Maxwell (1984, 2nd ed., 2007, p. 143).

⁸Alan Sokal, however, went on to endorse aim-oriented empiricism. He declared “Maxwell's aim-oriented empiricism is in my opinion a very significant contribution to the philosophy of science”: see <https://www.paragonhouse.com/xcart/Understanding-Scientific-Progress-Aim-Oriented-Empiricism.html>.

Compassion, published in 1976 (Maxwell, 1976). Most of this book consists of a furious argument between a scientist and a philosopher about the issues I have indicated. It was written in 3 weeks, to meet a deadline. I had high hopes for the book, but “it fell dead-born from the press.” I struggled to find a publisher for another book. Blackwell expressed interest, I worked hard on *From Knowledge to Wisdom* for 3 years, and it was published in 1984.

After its publication, and its glowing reception in reviews—despite some criticism from philosophers⁹—I hoped that what I was arguing for would gradually be taken up by the academic enterprise and put into academic practice. This did not happen—and has still not happened. During this period from 1976 to 2020, academia has changed in many ways. Some of the changes can be interpreted as small steps toward wisdom-inquiry; but others have been dramatically in the opposite direction¹⁰. Unrelenting specialization has grown and grown in science, and in academic inquiry more generally. Money, funds for research, has become more and more important, so that what comes to matter most, it almost seems, is the money you bring into the University, not the quality of your research. There has been a considerable loss of intellectual freedom, in the UK at least, so that an academic can no longer pursue an obscure research issue without a successful outcome for years, and survive—something that was once possible. Even when changes stem from the kind of concern behind wisdom-inquiry, nevertheless they fail to achieve what is hoped-for because they are enmeshed in the constraints of knowledge-inquiry. Thus, the emphasis on “impact” may come from the concern that research should be of human value, but *impact per se* does not mean that the impact is of value, and the demand that research should have impact tends to disqualify research of great potential, long-term value, of one kind or another, that has no immediate impact whatsoever. Nevertheless, during the period in question, some changes have taken place that have been genuinely of value. Thus, at my own University, UCL, David Price, vice-Provost for research, introduced the Grand Challenges Programme: this seeks to bring specialists together to tackle global problems—and there is even an input from my work. But it is not wisdom-inquiry.¹¹

Once *From Knowledge to Wisdom* went out of print, at some time in the early 1990s, I realized I had a struggle on my hands to try to put the call for an academic revolution into the public domain. During the period 1976–2020, I published 14 books and 160 articles¹² all devoted, in one way or another, to arguing for the urgent need to bring about a revolution in universities to help save humanity from disaster. During this period I also gave countless lectures on this theme, at universities and conferences

all over the UK, Europe, north America, and even as far afield as Taiwan. I took part in “Start the Week” on Radio 4. On another occasion I gave a talk up a tree (at The Treehouse Gallery) in Regent’s Park in London. In 2003 I started up an emailing group called *Friends of Wisdom*, devoted to the idea that universities should seek and promote wisdom, and not just acquire knowledge.¹³ Today (August 2020), this group consists of 361 scientists, scholars and educationalists scattered around the world. Some are engaged in promoting projects related to the one I have described here.

I gained no academic credit for the work I undertook. In fact, in 1993 my Department accused me of not teaching the philosophy of science because I considered, in my teaching, not just the intellectual aims of science, but the social or humanitarian aims as well, and the humanitarian aims, not just of science, but of the whole academic enterprise. For 20 years or so, I had been way ahead of my contemporaries in what I was teaching, and I was still ahead. I went to see UCL’s Provost to complain about my treatment. “Well, your work does seem to have been moving in new directions,” he said. “Oh, so Universities in Britain have sunk so low one is now penalized for originality,” I replied. He said my work would be investigated. It was, and on the strength of it, a long-delayed promotion to Reader came through. But the harassment in my Department continued, I knew I would not be able to work in such a poisonous atmosphere, and so I decided to take early retirement in 1994, to carry on my work. I mention all this to highlight that originality is still frowned on in academia. A price has to be paid if you seek to upturn the applecart.¹⁴

The 12 books that I have published since 1984 have, in the main, developed themes briefly sketched in *From Knowledge to Wisdom*. In *The Comprehensibility of the Universe: A New Conception of Science*, 1998, I spell out the argument for aim-oriented empiricism—for holding that we should see science as having already established that the universe is physically comprehensible (insofar as science can ever establish anything theoretical) (Maxwell, 1998). I spell out in detail how this view solves major problems in the philosophy of science, including the problem of induction. This book, published by OUP, received a number of excellent reviews, but then was ignored. Alan Sokal expressed his agreement with the basic thesis.

In *the Human World in the Physical Universe: Consciousness, Free Will and Evolution*, 2001, I tackled the fundamental problem: How can our human world, imbued with the experiential, consciousness, free will, meaning and value exist in the physical universe? (Maxwell, 2001). The argument of *From Knowledge to Wisdom* brings this problem sharply into focus: it is tackled in chapter 9 of the book. The basic task of wisdom-inquiry is to help people realize what is genuinely of value in life. But a key step in the argument for wisdom-inquiry is the adoption of the progress-achieving methods of aim-oriented empiricism,

⁹Some philosophers criticized me for defending doctrines that I explicitly criticized in the book.

¹⁰For discussion of the question of the extent to which academia, over the years, has moved toward, and has moved away from, wisdom-inquiry, see Maxwell (1984, 2nd ed., 2007, chs. 6, 11, and 12; 2014a, ch. 4; 2019a, ch. 6).

¹¹For UCL’s Grand Challenges see <https://www.ucl.ac.uk/grand-challenges/>.

¹²For thirteen articles that summarize the from-knowledge-to-wisdom argument in different ways, published across the decades, see Maxwell (1991, 1992, 2000, 2005, 2007, 2008, 2009, 2012, 2013, 2016, 2017d, 2019c,d). Any one of these articles gives a lucid outline of the basic argument. They are all available free online.

¹³See <https://www.ucl.ac.uk/friends-of-wisdom/>.

¹⁴My departure from UCL was unfortunate, but I must add that, before that, I spent nearly 30 wonderful years at UCL, free to do the teaching and research I wanted to do, in the way I wanted to do it. I formed many intellectual friendships. UCL gave me the opportunity and freedom to pursue my research and develop my ideas.

which require us to appreciate that physics presupposes that the universe is physically comprehensible. Thus, we have the problem: How can there be life of value embedded in a physically comprehensible universe? This book received some good reviews, one or two rather supercilious ones from philosophers, and then was forgotten¹⁵.

Then, in 2004, I published *Is Science Neurotic?* (Maxwell, 2004). This book expands brief remarks about Freud and psychoanalytic theory to be found in *From Knowledge to Wisdom*. There I point out that psychoanalytic theory, in line with what I say about social science more generally, should be interpreted as *methodology*—the methodology of aim-pursuing things, whether persons, animals, robots or institutions, sufficiently sophisticated to represent, and so misrepresent, the aims they pursue. Aims are likely to be misrepresented when they are problematic. The more “rationally” one pursues one’s misrepresented aim, the worse off one is from the standpoint of achieving one’s real aim, and the worse off from the standpoint of solving the problems associated with one’s real aim. This pattern of methodological confusion—the methodological counterpoint of psychoanalytic repression and rationalization—I called *rationalistic neurosis*. Psychoanalytic theory is enormously increased in intellectual power and scope as a result of being reinterpreted methodologically, in the way I have just indicated. First, instead of psychoanalytic theory failing to meet the high intellectual standards of science, it is all the other way round; natural science fails to meet the high intellectual standards of methodologically interpreted psychoanalytic theory. Second, the methodological version of psychoanalytic theory applies, not only to individual people, but to institutions, to groups of people, to movements, to animals, and to robots! (Maxwell, 1984, pp. 110–7).

In *Is Science Neurotic?*, I pointed out that science suffers from rationalistic neurosis in that it misrepresents its aim to be truth, when its real aim is the profoundly problematic one of truth *presupposed to be unified or explanatory* or, more generally, truth *that is of value*, and furthermore truth *to be used by people, ideally to enhance what is of value in life*. More generally still, the whole academic enterprise suffers from rationalistic neurosis. Both science, and academic inquiry more generally, need to throw off their rationalistic neurosis, acknowledge real, problematic aims, and seek to realize them in the best possible way by putting aim-oriented empiricism, aim-oriented rationality and wisdom-inquiry into practice.

In 2008 I edited and contributed to *Wisdom in the University* (Barnett and Maxwell, 2008) with Ronald Barnett, a prolific author on Higher Education at the London Institute of Education. This was a collection of essays devoted to wisdom-inquiry themes.

In 2009, Leemon McHenry edited and published *Science and the Pursuit of Wisdom: Studies in the Philosophy of Nicholas Maxwell* (McHenry, 2009). I opened with an account of my work; then a number of authors discussed various aspects of issues around wisdom-inquiry, and the book closes with my responses.

In 2010 I published *Cutting God in Half—And Putting the Pieces Together Again* (Maxwell, 2010), a book that develops what might be called the religious dimension of wisdom-inquiry. The traditional notion of God is not without value; it suggests, for example, that there is one explanation for everything that occurs—the will of God. However, the idea that God exists and is all-powerful, all-knowing, and all-loving, the source of all value, faces a devastating objection: such a God would be knowingly responsible for all human suffering and death brought about by natural causes. Such a God would be a monster, far worse than our petty human monsters such as Hitler or Stalin. How can the concept of God be improved, so that as much as possible of what is of value in the traditional notion is preserved, but this dreadful problem is overcome? The answer is to cut God in half, severe the God-of-Cosmic-Power from the God-of-Cosmic-Value. The first is Einstein’s God, the underlying physical unity inherent in the physical universe. This has some of the attributes of the traditional God: omnipotence, omnipresence, eternal existence. It is however an It. It cannot know what It does, and so can be forgiven the terrible things that It does do. The God-of-Cosmic-Value is what is genuinely of value associated with our human world, or the world of sentient life more generally.

Having cut God in half in this way, the problem then becomes: How can the two halves be put together again? How can the God-of-Value exist in the God-of-Power? How can our human world of value exist and best flourish embedded as it is in the physical universe? As a result of improving our conception of God a bit, we are brought face to face with the fundamental problem in life—our fundamental religious problem, properly conceived. The basic task of wisdom-inquiry is to help us improve the answers we give to this problem in our lives, as we live—a religious problem.

Despite publication of this work, my argument for wisdom-inquiry continued to be ignored, both by most of my philosophy colleagues, and by the academic enterprise as a whole. In 2014 I published another exposition of the argument in a short, accessible book called *How Universities Can Help Create a Wiser World: The Urgent Need for an Academic Revolution* (Maxwell, 2014a). I placed great stress on how urgent it is to put a stop to global warming. It was published as an inexpensive paperback. It received some good reviews, and was then ignored. Later the same year I published *Global Philosophy: What Philosophy Ought to Be* (Maxwell, 2014b), a collection of essays on education for a wiser world; that suffered the same fate.

I decided, next, to return to another theme of *From Knowledge to Wisdom*, namely that putting aim-oriented empiricism into scientific practice would have the consequence that science would be transformed into natural philosophy, a synthesis of science on the one hand, and metaphysics, methodology, philosophy, and epistemology on the other hand. This is one of the themes of chapter 9 of my 1984 book, the subtitle of which is “From Science to Natural Philosophy.”

I began to write *In Praise of Natural Philosophy: A Revolution for Thought and Life* (Maxwell, 2017a). I would begin with the crucial point that science had begun as natural philosophy, in the hands of Kepler, Galileo and others, an admixture of science and metaphysics, but had then been destroyed by Isaac

¹⁵For reviews of my books see <https://www.ucl.ac.uk/from-knowledge-to-wisdom/reviews>.

Newton who, in his *Principia*, asserted firmly: “whatever is not deduced from the phenomena is to be called an hypothesis; and hypotheses, whether metaphysical or physical... have no place in experimental philosophy. In this philosophy, particular propositions are inferred from the phenomena, and afterwards rendered general by induction. Thus, it was that... the laws of motion and of gravitation were discovered” (Newton, 1962, p. 547). Thus, was modern science born. But this was the third edition of Newton’s great work. As I explored further, I discovered that the first edition was quite different. In that edition there were nine hypotheses, all labeled hypotheses, some clearly of a metaphysical character. The first edition of the *Principia* is quite clearly a great work of natural philosophy, even if Newton did not agree with the metaphysical outlook of Kepler or Galileo. This edition was criticized for its hypothetical character. Newton hated criticism. He set to work to doctor the *Principia* to conceal its conjectural, natural philosophy character. In subsequent editions, the first two hypotheses became two *rules of reasoning*, the last five became five *phenomena*, one disappeared altogether, and the other one was tucked away among the theorems. And Newton added statements banning hypotheses from natural philosophy and extolling the virtues of induction. And because of Newton’s immense prestige, those who came after him believed him, and sought to do science in the way Newton had advocated. Natural philosophy (which gave birth to Newtonian science) was destroyed, and standard empiricist science was born because Newton, disreputably, sought to conceal the vulnerable, conjectural character of his great work. The argument for creating a modern version of natural philosophy within the framework of aim-oriented empiricism seemed to me to be overwhelming—a first step toward wisdom-inquiry. I spelled it all out in the book. In particular, in chapter 5, I spelled out the consequences of aim-oriented empiricism for physics—for its history, for the discovery, interpretation and assessment of physical theory, including quantum theory.

While *In Praise* sought a publisher, I began another book out of an impulse of sheer delight in the interplay of ideas. This book almost wrote itself. It became *Understanding Scientific Progress* (Maxwell, 2017b). In it I demonstrated that aim-oriented empiricism solves all the fundamental problems in the philosophy of science: the problem of induction; the problem of underdetermination; the problem of verisimilitude; two problems of theory unity; the problem of the nature of the progress-achieving methods of science, and their justification; the problem of rational discovery in science. Almost all the problems of the philosophy of science had arisen because philosophers had tried to make sense of science in terms of standard empiricism; abandon the attempt, adopt aim-oriented empiricism instead, and the problems disappear like morning mist. This book provides by far the best formulation of the argument for aim-oriented empiricism that I have produced over the years.

These two books, *In Praise* and *Understanding Scientific Progress*, were published in 2017, as was a third book, *Karl Popper, Science and Enlightenment*, a collection of essays, some never published before, that show how my work grows out of and improves on Popper’s, and that of the Enlightenment. It was

published by my home publisher, UCL Press, and is available free online¹⁶.

In 2019 I published two more books: *Science and Enlightenment: Two Great Problems of Learning* (Maxwell, 2019a), and *The Metaphysics of Science and Aim-Oriented Empiricism: A Revolution for Science and Philosophy* (Maxwell, 2019b). The first of these reformulates the argument of *From Knowledge to Wisdom*. I stress the underlying reason for the crises that we face: we are confronted by two great problems of learning—learning about the universe and ourselves and other living things as a part of the universe, and learning how to become civilized. Our global problems stem from the fact that we have solved the first of these two problems (we did that when we created modern science in the 17th century), but we have not solved the second one. The astonishing success of modern science and technology have led to modern industry, agriculture, transport, power production, hygiene, medicine, and armaments, which have in turn led to much that is good, but also to population growth, habitat destruction, loss of wild life, mass extinction of species, lethal modern war, the menace of nuclear weapons, gross inequalities of wealth and power around the planet, pollution of earth, sea and air, and what is perhaps the most serious global problem of all, the climate crisis. In the book I argue that we need to learn from our solution to the first problem how to go about solving the second one. This was the basic, implicit idea of the Enlightenment but, in developing the idea, the *philosophes* blundered. We still have these ancient blunders built into our universities today, and that is why we still fail to solve the second great problem of learning—learning how to become civilized. A striking indication of the current failure even to recognize the blunders we have inherited from the Enlightenment, let alone resolve them, is provided by Steven Pinker’s recent book *Enlightenment NOW* (Pinker, 2018). This reproduces 18th century Enlightenment thought without any awareness of its dangerous and destructive defects.¹⁷ In the book I spell out what needs to be done: on pages 70–73 I list 23 structural changes that need to be made to knowledge-inquiry to turn it into wisdom-inquiry, and on pages 73–77 I compare and contrast the two conceptions and kinds of inquiry, feature by feature.

The second book published in 2019 arose because I discovered a new research industry had emerged in philosophy called “the metaphysics of science,” a spate of books and articles published from around 2007 that entirely ignores what I had done in the field from my earliest publications, in 1966 and 1968 onwards. I wrote a paper pointing this out; it was rejected and rejected. I wrote another; it was rejected and rejected. However, after the third or fourth rejection, the editor of the journal in question, *Synthese*, said he would publish a book on the subject in the *Synthese Library* series, if I cared to write it.

In chapter 1 of the book in question, *The Metaphysics of Science and Aim-Oriented Empiricism*, I give a lucid account of what I had to say about the problem of how our human world can exist and flourish embedded in the physical universe, in three

¹⁶<https://www.uclpress.co.uk/products/88289>.

¹⁷See Maxwell (2018) for a criticism of Pinker’s book along these lines.

papers of 1966 and 1968. The content of these papers had an immense impact on subsequent philosophy, but unfortunately for me, via the later work of others. My original work still remains almost entirely unknown. This was, for me, doubly unfortunate; first because only bits and pieces of what I had to say emerged into mainstream philosophical literature, seriously distorted and degraded; secondly because, when I came to publish the far more important *From Knowledge to Wisdom*, 16 years later, few in the philosophy profession had heard of me, and the book was ignored by philosophers. In chapter 2 I discuss subsequent work in philosophy that echoes bits of my earlier work; in chapter 3 I expound aim-oriented empiricism, and indicate its implications for science and philosophy; in chapter 4 I critically assess work on the metaphysics of science published from 2007 onwards that blandly ignores the revolutionary implications of aim-oriented empiricism for the field; and in chapter 5 I spell out briefly the argument for wisdom-inquiry.

Earlier, in 2017, I again began a writing exploration of a problem out of sheer delight, for my own pleasure, and without a thought of eventual publication. I imagined, for some reason, that I was a fictional character dreamed up by Franz Kafka; I was writing a report to the academy. (Later, when I looked it up, I discovered the ostensible author in Kafka's short story with that title is an ape!) What I was writing led me up the garden path, and it became eventually the text of my latest publication *Our Fundamental Problem: A Revolutionary Approach to Philosophy* (2020) (Maxwell, 2020).

Our fundamental problem can be put like this: How can our human world, the world of experience, consciousness, meaning and value, exist and best flourish embedded as it is in the physical universe? This problem encompasses all other problems of life, science and thought. In the book I argue for, and do, a new kind of philosophy that I call *Critical Fundamentalism*. Its task is to keep alive imaginative and critical—that is rational—thinking about our fundamental problem. Far from this problem being the exclusive province of philosophers, it is all the other way round: a basic professional task of philosophers who pursue Critical Fundamentalism is to encourage everyone to think about the fundamental problem, from time to time. We need to put it at the heart of the University, and at the heart of education. It is especially important that imaginative and critical thought is devoted to interactions, in both directions, between the fundamental problem, and more particular problems of life, science and thought.

Academic philosophy, whether analytic or Continental, is not known for its fruitful implications for fields outside philosophy. In this respect, Critical Rationalism is very different. It has radical implications for physics, for neuroscience, for evolutionary theory, for the nature of the natural sciences, for social science, for the humanities, for academic inquiry as a whole, for the future of the world. I spell out these implications in the book.

A vital step that needs to be taken is to create a Symposium in each University, open to everyone at the University, that meets regularly, and is devoted to sustained exploration of the fundamental problem, and its interactions with the more particular and specialized problems of life, science and thought. Creation of such a Symposium can easily be done. It does not

require that radical structural changes are made to the University. Such a Symposium would however provide an arena within the University where fundamental questions can readily be raised about the purpose of the University, how it can best help humanity solve global problems, make progress toward a better world. The University as it exists at present, composed as it is of multiple specialized disciplines, provides no such arena for discussion of such vital questions. The Symposium might well be a vital stepping stone toward the creation of wisdom-inquiry.

My latest book, *The World Crisis - And What To Do About It* (Maxwell, 2021) gives a detailed, fiercely argued account of how transformed, wisdom-inquiry universities really could solve the world crisis. Everyone should read it!

My argument for wisdom-inquiry has been summarized in different ways many times over the years: any one of the papers referred to in note 12 gives a good account of it. These papers are all available free online, as are my first two books and the one on Popper. It is striking, however, that the 14 books and 160 papers that I have published over the decades, all arguing for the urgent need to transform universities, have had no discernible impact on the academic enterprise whatsoever. Academic resistance to change is deep-rooted.¹⁸

Why is science, and academic inquiry more generally, so resistant even to considering my long-standing argument for the urgent need for radical change? This is a question I have tackled and answered a number of times in my publications.¹⁹ There is, first, what I have called the “lobster pot” effect.²⁰ Standard empiricism, once accepted, banishes criticism of itself from science. According to standard empiricism, an idea, in order to enter into the intellectual domain of science, must be empirically testable. A criticism of standard empiricism is not itself, however, a straightforwardly factual statement that is empirically testable; hence, it has no place in science. It is *philosophy* of science, not science, and thus deserves to be ignored by scientists. And, in line with this, scientists do tend to hold that the philosophy of science has no relevance for science; see my *Understanding Scientific Progress*, page 12, for pretty withering remarks about the sterility and irrelevance of philosophy of science by scientists John Ziman, Steven Weinberg and Stephen Hawking. Unfortunately, these scientists do have a point: most philosophy of science (like the scientific community) takes the untenable doctrine of standard empiricism for granted, and that condemns the discipline to scientific irrelevance and triviality. In order to become fruitful, the philosophy of science needs to adopt and advocate aim-oriented empiricism!²¹

In an analogous way, knowledge-inquiry, once accepted, also protects itself from criticism, although much less effectively. Granted knowledge-inquiry, a contribution to academic thought

¹⁸This resistance is likely to be articulated as a defense of traditional standards of intellectual rigor, but my argument reveals just how untenable such a defense would be: traditional standards of rationality, associated with knowledge-inquiry, are actually characteristic kinds of irrationality masquerading as reason. It is the irrationality of traditional knowledge-inquiry that is the problem.

¹⁹See especially Maxwell (1984, pp. 27, 122–4, 153–5; 2nd ed., 2007, pp. 37–8, 134–5, 177–9). See also Maxwell (2010, pp. 43–7).

²⁰Maxwell (1976, p. 71). See also pages 70–75.

²¹See especially Maxwell (2017a,b).

must be, in one way or another, a potential contribution to knowledge. A criticism of knowledge-inquiry—a view about what the aims and methods of academic inquiry ought to be—is not even a criticism of a claim to knowledge, and thus has, according to knowledge-inquiry, no right to enter the intellectual domain of academic thought. In practice, however, such criticism does exist—although often quite different from, even the very opposite of, the criticism I have of knowledge-inquiry, the academic status quo.²²

There is another reason why academia is reluctant even to consider the argument I have propounded over the decades for the urgent need for radical change. Standard empiricism and knowledge-inquiry are about matters of vital concern to all scientists, all academics. They specify the requirements a scientific or academic paper must satisfy to be published. All scientists, all academics, passionately want their work to be published, for a variety of motives, from the noble to the less noble. The flourishing, even the existence, of an academic career depends on publication. An argument which implies that requirements for publication need to be transformed is bound to be perceived as a potential threat. If taken seriously, it might mean that contributions to science, to academic thought, highly prized, might be revealed abruptly to be of far less worth. Reputations might tumble. Senior scientists and academics, who have the greatest say over what is, and what is not, taken note of, are likely to be among those who have the most invested in the academic status quo, and who are thus likely to be the most reluctant to countenance the very idea of radical change.

Furthermore, those who govern universities, the deans and vice-chancellors, are even more likely to be opposed to the very idea of transforming universities so that wisdom-inquiry comes to replace knowledge-inquiry. Wisdom-inquiry transforms unacknowledged, implicit political objectives into explicit objectives that may well be at odds with those of the Government: that is likely to incur opposition, if not outrage, from the Government. Those who provide funds for universities—industry, benefactors, the public, students—may object too. Vice-chancellors, sensitive to PR considerations, are unlikely to welcome the idea of radical academic change.

An additional factor is that universities today, pervaded by rampant specialization, provide no arena within which proposals for radical academic change, such as the one I have argued for, can be discussed. Academic philosophy, obsessed with its arcane intellectual puzzles, does not provide such an arena, and the Symposium discussed above does not yet exist. The absence of such an arena within academia means that proposals and arguments such as the one indicated here are just ignored.

And there is another point as well. Despite all their faults, science as it exists today, and academia as it exists today, do provide something of superlative value to humanity: objective, factual knowledge of extraordinary detail and scope, and theories of astonishing explanatory power. Is it really sensible to tamper with long-established methods which enable us to procure these absolutely vital necessities of our modern world, just on the strength of a flimsy philosophical argument that can

hardly be said to be generally endorsed and confirmed by the academic community of philosophers and philosophers of science? Many may well hold that, as things are, it would be absurd and dangerous to take the argument for aim-oriented empiricism and wisdom-inquiry seriously, to the extent of putting the implications of the argument into scientific and academic practice.

I have sympathy for this point of view. But there is no argument here, whatsoever, for *ignoring altogether* the argument for wisdom-inquiry. The world crisis we face, I have argued, has arisen in part because science, and academia more generally, have put into practice a profoundly irrational philosophy of science—a profoundly irrational philosophy of inquiry: standard empiricism and knowledge-inquiry. A vital step toward coming to grips with the world crisis—above all, the climate crisis—is to cure science and academia of their rationality defects; that requires that we put aim-oriented empiricism and wisdom-inquiry into scientific and academic practice. Problems of living need to be given priority over problems of knowledge. The basic academic task needs to become to help humanity get a better understanding of what our problems are, what we need to do about them.

Given the very serious situation that we are in, it is the height of intellectual and moral irresponsibility to just ignore such an argument. It deserves serious attention, discussion and assessment. We do need, unquestionably, to make some changes in the way academia proceeds. Academics, without question, need to become more actively engaged with the public about our problems, and what we need to do about them. The Symposium, already mentioned, really ought to be brought into existence in at least some universities. What kind of inquiry best helps us create a good world?—to echo the title of one of my papers—really ought to be a question seriously discussed and debated within the University. At present it is not.

We urgently need, in my view, to create a high profile campaign to overcome this resistance and bring wisdom-inquiry to our universities. This revolution needs to be brought about by helping the kind of research, public engagement and education we require to grow and flourish.

SUMMARY OF THE ARGUMENT

Humanity is confronted by two great problems of learning: learning about the universe, and about ourselves and other living things as a part of the universe; and learning how to create civilization. We have solved the first problem. We did that in the 17th century when we created modern science and technology. But we have not yet solved the second problem. That combination of solving the first great problem of learning but failing to solve the second one puts us in a situation of great danger. Almost all our current global problems have arisen as a result. For, as a result of solving the first problem, we enormously increase our power to act. Modern science and technology lead to modern industry, modern agriculture, modern power production, modern travel, hygiene, medicine and armaments, and so to much that is of great benefit, but also to global warming, habitat destruction, mass extinction of species, lethal modern

²²See Maxwell (1984, 2nd ed., pp. 40–46).

war, and most of our other current grave global problems. Before the advent of modern science, lack of civilization, lack of wisdom, did not matter too much; we lacked the power to act to do too much damage to ourselves or the planet. Now that we have modern science and technology, and the power to act it bequeaths to us, wisdom has become, not a private luxury but a public necessity. Science without civilization, without wisdom, is a menace.

But how can we acquire wisdom? The historical record is not encouraging. There is, however, a solution. *We can learn from our solution to the first great problem of learning how to solve the second one.* We can learn from scientific progress how to achieve social progress toward a genuinely civilized, wise world.

This is not a new idea. It goes back to the 18th century Enlightenment, especially the French Enlightenment. That was the basic idea of the *philosophes*, Voltaire, Diderot, Condorcet, and the rest: to learn from scientific progress how to achieve social progress toward an enlightened world.

In order to develop and implement this profoundly important idea properly, three crucial steps need to be got right.

- (1) The progress-achieving methods of science need to be got right.
- (2) These methods need to be generalized properly, so that they become fruitfully applicable, potentially, to any problematic, worthwhile endeavor.
- (3) The generalized, progress-achieving methods then need to be got into social life, into government, industry, agriculture, finance, law, the media—so that all these institutions and social endeavors cooperate in contributing toward progress toward an enlightened world.

Unfortunately, the *philosophes* got all three steps wrong. They got the nature of the progress-achieving methods of science wrong; they failed to generalize these methods properly; and most disastrously of all, they applied progress-achieving methods derived from natural science, not directly to social life, but instead to the task of improving *knowledge* of social life, to the task of creating the *social sciences* in other words. If this third step had been got right, social inquiry would have been developed as *social methodology*, devoted to getting progress-achieving methods, derived from those of science, into the fabric of social life, so that social progress can be made toward an enlightened world. But the *philosophes* blundered. They developed social inquiry, not as *social methodology*, but as *social science*.

This trebly botched version of the profound Enlightenment idea was then further developed throughout the 19th century by J.S. Mill, Karl Marx, Max Weber and others, and built into academia in the early 20th century with the creation of academic disciplines and departments of social science: economics, sociology, anthropology, psychology and the rest. The outcome is what we still have today: knowledge-inquiry, academia devoted in the first instance to the pursuit of knowledge. The basic idea is simply this: first, knowledge must be acquired; once acquired, it can be applied to help solve social problems, and thus help promote human welfare.

But, judged from the standpoint of helping to promote human welfare, knowledge-inquiry violates, in a structural way, the two

most elementary rules of rational problem solving conceivable. In order to promote human welfare, the problems we fundamentally need to solve are problems we encounter in life, problems of suffering, injustice, avoidable death. These are problems solved by *action*, by what we *do*, or *refrain* from doing. When knowledge or technological know-how is required, as it is in medicine or agriculture, it is always what this knowledge or technology enables us to *do* that solves the problem, not the knowledge or technology as such. Thus, a kind of inquiry that helps promote human welfare *rationally* would give intellectual priority to the tasks of (a) articulating, and improving the articulation, of the problems of living to be solved, and (b) proposing and critically assessing possible solutions—possible *actions*, *policies*, *political programmes*, *philosophies of life*, *ways of living*. Solving problems of knowledge and technology would be important, but secondary. But knowledge-inquiry, in giving priority to problems of knowledge, violates both (a) and (b). The two most basic rules of reason are violated, in a structural way. And as a result, knowledge-inquiry academia fails to do what it most needs to do to promote human welfare, namely give priority to helping humanity solve problems of living. It fails to help the public improve its understanding of what our problems are, and what we need to do about them. Reason is betrayed, and as a result humanity is betrayed too.

Universities, as they exist today, embody in their structure the profound idea of the Enlightenment: to learn from scientific progress how to achieve social progress toward an enlightened world. Unfortunately, universities also embody the three blunders of the Enlightenment. That is, however, a point of immense significance. It means that, in order to develop a kind of academia rationally and effectively devoted to promoting human welfare, we do not need to grope in the dark, guessing at what needs to change. What we need to do is identify the three mistakes of the Enlightenment, as still built into universities today, correct them, and make the changes to the structure of academic inquiry that that entails.

Here, very briefly, is what needs to be done to correct the three blunders of the Enlightenment.

- (1) The scientific community today takes standard empiricism for granted, the view that the basic aim of science is truth, the basic method being the impartial assessment of laws and theories with respect to evidence. But this view, inherited from Newton and the Enlightenment, is untenable. Physics only ever accepts unified theories even though infinitely many empirically more successful disunified rivals always exist. The aim of physics (and so of natural science) is not truth *per se*, but rather truth *presupposed to be unified*. There are problematic metaphysical assumptions inherent in the aims of science, and problematic value and political assumptions as well. If science is to proceed in such a way as to maximize its chances of success, it needs to adopt and implement a new conception of the progress-achieving methods of science—*aim-oriented empiricism*—which represent the problematic assumptions implicit in the aims of science in the form of a hierarchy of assumptions, these assumptions becoming increasingly insubstantial as one goes up the hierarchy, and so increasingly

likely to be true, and increasingly such that their truth is required for science to be possible at all. In this way, a relatively stable framework of assumptions and associated methods is created, high up in the hierarchy, within which much more substantial assumptions, and associated methods, low down in the hierarchy, and very likely to be false, can be critically assessed, and improved, in the light of which lead to the most empirically successful research programmes. As science advances and improves knowledge, it improves its aims and methods, its knowledge about how to improve knowledge.

- (2) It is not just in science that basic aims are problematic; this is the case in life too. Indeed, most of our global problems have arisen because we have pursued aims that seemed, initially, good and unproblematic, but subsequently turned out to have highly undesirable, unforeseen consequences (such as global warming). Aim-oriented empiricism is not just vital for science; when generalized, it becomes vital for personal and social life too. We need to generalize aim-oriented empiricism to form a conception of rationality—*aim-oriented rationality*—designed to facilitate the improvement of problematic aims whatever we may be doing. According to aim-oriented rationality, whenever aims are problematic, as they often are, we need to represent them in the form of a hierarchy, aims becoming increasingly unspecific and unproblematic as we go up the hierarchy, so that we create a framework of unproblematic aims and methods within which much more specific and problematic aims and methods, low down in the hierarchy, can be improved as we act, as we live.
- (3) The proper task of social inquiry and the humanities is to help humanity resolve conflicts and problems of living, including global problems, in increasingly cooperatively rational ways. It is also the task of social inquiry to help humanity build aim-oriented rationality into the fabric of social life, into all our other institutions and social endeavors besides science, so that we can make use of progress-achieving methods, that enable us to improve problematic aims as we act, that are derived from the progress-achieving methods of science. The hope is that, as a result, we can begin to make social progress toward a civilized, enlightened world with something of the success that science achieves in making progress toward greater knowledge.

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As a result of correcting the three blunders built into academia today that we have inherited from the Enlightenment, knowledge-inquiry is transformed into wisdom-inquiry. Almost every discipline and aspect of academia is transformed. The social sciences become social methodologies, actively engaged in helping people resolve conflicts and problems of living in increasingly cooperatively rational ways, and providing the methodological means to do that. Natural science is transformed into natural philosophy, a synthesis of science and metaphysics, science and philosophy. Social inquiry becomes intellectually more fundamental than natural science. The relationship between academia and society is transformed; social inquiry and the humanities do not just study society; they interact with society, promote learning and appropriate action in the social world. Academia becomes a kind of people's civil service, doing openly for the public what actual civil services are supposed to do in secret for governments.

Humanity is in deep trouble, in part because our institutions of learning, our universities, have long been seriously defective intellectually, and thus dysfunctional. Most academics today appreciate just how serious is the plight that we are in, and there is the beginning of an awareness that universities are not doing all that they might do to help put a stop to climate change and the degradation of the natural world. This special issue of *Frontiers* is an indication of the growing awareness among academics that universities need to change. I hope my academic colleagues will burst free of the irrational constraints of knowledge-inquiry, and do all they can to inspire the public to put pressure on governments to *act now* to put a stop to impending disaster.

DATA AVAILABILITY STATEMENT

The original contributions generated for the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Book Review: Education and Climate Change: The Role of Universities

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Keywords: climate education, universities and higher education institutions, education, partnerships, contextual education

A Book Review on

Education and Climate Change: The Role of Universities

Fernando M. Reimers (New York, NY: Springer), 2021, XIII, 201 pages, ISBN: 978-3-030-57927-2

Reimers's new edited book, *Education and Climate Change*, reimagines the role of higher education institutions as avenues through which to drive contextual climate change education (CCE). Fernando Reimers and various contributors write chapters about their experiences and efforts to expand the capacity for education systems to address climate change and equip students worldwide with the skills, knowledge, and ethical frameworks to tackle localized climate challenges. The authors of this review are both former students of Dr. Reimers at the Harvard Graduate School of Education.

The volume contains a collection of climate education case studies delivered by graduate students. Reimers and his co-authors analyze the settings of Israel, Guatemala, Haiti, Pakistan, and the United States to position universities as innovative partners in the quest for relevant, rigorous CCE. They argue university partnerships can spur localized educational content specific to regional needs and that the inherently contextual nature of climate impacts necessitate a granular approach to climate education.

The chapters vary in the extent to which they elaborate on the role of universities in contextual CCE. In chapter two Rhodes and Wang describe coordination with the Arava Institute in Southern Israel to create a curriculum to “enable students to conceptualize and help address climate change problems in the region” in the setting of secondary formal schooling institutions (p. 45). Chapter six, by Nam and Lee, outlines the process of building CCE curriculum at the graduate school level, elevating the concept that a multilateral approach (in this case, one that centers graduate students within tertiary schools of education) facilitates innovative design efforts in this field. Due to the variable nature of the roles universities can play in CCE in each chapter, it is unclear how the authors recommend universities get involved in developing and disseminating CCE. The assorted chapters are not a collection of “best practices” for how tertiary institutions can play a role in progressing the field of CCE, but rather a selection of case studies outlining various forms of involvement that universities can choose to pursue based on community needs.

The common use of Reimers's five perspectives (cultural, psychological, professional, institutional, and political) works well throughout the book, urging a multifaceted and systems-level view of the challenges and opportunities facing the design and implementation of climate change education in various contexts. In a rapidly changing world where adaptation is necessary, Reimers is wise to refrain from suggesting a “silver bullet,” instead offering a framework for locales to construct more authentic and reasonable climate change education reforms. Even within countries, challenges and opportunities vary across regions or cities, as shown in chapter two and chapter three, so it is critical to leverage high-capacity institutions, such as universities and colleges,

OPEN ACCESS

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 29 January 2021

Accepted: 26 March 2021

Published: 22 April 2021

Citation:

Bell P and Payne A (2021) Book
Review: Education and Climate
Change: The Role of Universities.
Front. Sustain. 2:660771.
doi: 10.3389/frsus.2021.660771

to craft localized CCE curricula.

The insights from the book might be operationalized more powerfully through comparison to existing literature. For example, the particular salience of action-oriented learning in this field has been identified by (Stevenson, 2007, p. 146), who argues that the necessary knowledge and skills emerge in the context of taking action, while Uzzell, 1999, p. 398) has highlighted how self-efficacy in the context of CCE distributed within a community drives meaning-making.

Perhaps most importantly, this volume is concerned with the mechanics of building capacity to deal with the complex problems thrown up by climate breakdown. (Scott and Vare, 2007, p. 192) proposal of three levels of ESD (Education for Sustainable Development) has been seminal in theorizing the importance of critical reasoning as a component of ESD. The first level involves building the short-term skills and behaviors needed to deal with known and fixed problems, the second with critical reasoning that allows learners to question paradigmatic assumptions. The third, which is rare to see in practice, involves building the capacity to deal with radical uncertainty and imprecise problems. This widely used model might be used as

a framework to categorize and analyse the CCE interventions in this book, and to signpost where each case study sits on the spectrum from instrumentalist skill development to deep capacity-building. Ultimately, this model might serve as a platform to confront the trade-offs inherent in any scheme of CCE. For example, should deep critical engagement be prioritized over interdisciplinarity (as Scott argues) if it is not possible to achieve both?

Taken together, the chapters in this book represent a powerful argument for a symbiosis between universities working with educational organizations to create climate curricula that are context-specific. More than anything, this book shows that from Sindh to Port au Prince to the Western Highlands of Guatemala, universities can be an effective partner in realizing effective climate education.

AUTHOR CONTRIBUTIONS

We appreciate the opportunity to work as co-authors on this book review. Both authors contributed to the article and approved the submitted version.

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Conflict of Interest: PB and AP are former students of Dr. Reimers at the Harvard Graduate School of Education.

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Challenging Conventions—A Perspective From Within and Without

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OPEN ACCESS

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 05 February 2021

Accepted: 24 March 2021

Published: 22 April 2021

Citation:

Green AJK (2021) Challenging
Conventions—A Perspective From
Within and Without.
Front. Sustain. 2:662038.
doi: 10.3389/frsus.2021.662038

Academics globally are calling for urgent and proportionate action on the climate and ecological crisis (CEC), not only from governments and corporations but from leaders of academic institutions themselves. In this article, I argue that academic institutions are failing in their over-arching mission to humanity and the planet, and that they are increasingly part of the problem, not the solution. I explore the widespread use of league tables and metrics to capture and assess teaching and research performance and argue that these tell us little about how well academic institutions are faring in terms of their fundamental mission. I go on to chart the lackluster response of academic institutions to the CEC and a tendency to develop responses to the CEC that are centered on achieving carbon neutrality across estates and operations. I explore the moral and ethical case for transformative change within academia and give some examples of actions that institutions could readily take. The article concludes by stating that responsibility can no longer be shirked and that academic institutions must embrace Radical reform.

Keywords: climate emergency, activism, deliberative democracy, transformative change, mission

“Knowledge implies responsibility.”
Lord Deben, November 2020¹.

INTRODUCTION

On October 29th 2019, the Times Higher Education (THE) published an open letter I had organized,² signed by over 1,000 academics and scholars, calling on universities to act independently and swiftly on the climate and ecological crisis (CEC). The letter called on Vice Chancellors, Universities UK and UK Research and Innovation (UKRI) to support a “series of new programmes, fellowships, sabbaticals, and voluntary placements to help the critical efforts needed to save all life on our planet.”

Weeks earlier in September 2019, hundreds of Australian academics signed an open letter³:

“We can no longer tolerate the failure of the Australian government, or any other government, to take robust and urgent action to address the worsening ecological crisis.”

¹<https://www.youtube.com/watch?v=dIRit6dapBg> The Climate Commission for UK Further and Higher Education “One Year on” event (November 2020).

²<https://www.timeshighereducation.com/opinion/universities-must-act-swiftly-and-independently-climate-change>

³<https://www.theguardian.com/science/2019/sep/20/we-declare-our-support-for-extinction-rebellion-an-open-letter-from-australias-academicsstating>

Scientists for Future organized a further global open letter,⁴ endorsed by over 3,000 scientists including Michael Mann, Katharine Hayhoe, Stefan Rahmstorf, Kevin Anderson, Gregor Hagedorn, and myself, expressing support for the striking school children.

That so many academics, including many distinguished scholars, around the world are openly calling for action on the CEC and supporting activism lends credibility to a key premise of this volume—that our academic institutions have somehow failed in their fundamental civic duty to enhance the quality of human life by intellectual, cultural, educational, technological, and practical means. In fact, it was this conclusion that led me to resign from my post as Pro Vice-Chancellor and to trade academia for advocacy. I had experienced at first hand over some years the numerous ways in which financial sustainability considerations drove decision making.

The severity of the present situation was recently echoed by the new US climate envoy, John Kerry, who said that the 2021 COP climate conference will be the world's "last best chance"⁵.

This perspective article will explore some of the constraints within which many academic institutions currently operate and argue that these serve to hamper both the evolution of curriculum and the generation of research and scholarship that adequately prepares students to play a part in enabling humanity to live well within planetary boundaries. What are we to make of these demands from academics and scientists that they be permitted to act, rather than simply calling for action on the part of academic institutions? How did the situation arise? Are calls for action being heeded? How might the sector respond and evolve, so that it becomes part of the solution to the CEC?

A SELF-PERPETUATING PROBLEM

Academic institutions around the world are the intellectual homes to many thousands of scientists, scholars and students. They develop and host courses on a range of subjects, from the traditional Arts, Sciences and Humanities to more vocational courses. Qualifications by and large serve as a "ticket" toward a chosen career, some tickets conferring advantages including what has come to be known as the "graduate premium"⁶. An irony of course is that one such example, classical economics, is widely seen as part of the problem (Wiedmann et al., 2020) yet institutions have tended to regard such courses as "jewels in the crown."

League tables are regularly published, providing information on which universities perform best according to set criteria. The THE for example publishes the World University Rankings. Here, the performance indicators are grouped into five areas: Teaching (the learning environment); Research (volume, income and reputation); Citations (research influence); International outlook (staff, students and research); and Industry Income (knowledge transfer). Teaching, research and citations collectively make a 90% contribution to an institution's ranking.

⁴<https://science.sciencemag.org/content/364/6436/139.2.full>

⁵<https://www.bbc.co.uk/news/world-us-canada-55836163>

⁶This is the term used to describe the increase in average wages that university graduates can expect having achieved a degree. These typically include courses in Finance, Engineering and Law, amongst others.

In the UK, exercises such as the Research Excellence Framework (REF) and the more recent Teaching Excellence Framework (TEF) similarly are intended to provide a broad indication of quality of research and teaching. There are however many criticisms of both the REF and the TEF,⁷ not least that these exercises take up an inordinate amount of time and energy. But are they really telling us much about the contributions academic institutions are making toward the problems of how life can prosper on a planet of finite resources? The metrics used are geared toward aspects of the quality of research and teaching, but not their respective contributions to the greater good.

In the case of the CEC, climate scientists have delivered the requisite research yet have been powerless to drive meaningful and proportionate action. Warnings⁸ and calls for action from scientists have been many, and yet a key indicator of planetary health—concentration of atmospheric CO₂—shows that with each new summit and convention, the situation has worsened rather than improved⁹. Academic institutions have certainly delivered in terms of advancing our knowledge of science, but where does the responsibility sit for the implications and outcomes of the research? It certainly does not sit with the climate scientists. It is a fundamental question that must be addressed.

Maxwell (2012) has long argued that we must shift our focus from knowledge enquiry to wisdom enquiry, and this allows for an understanding of the essence of the problem. How do we then move from that understanding to effecting change across a distributed and diverse global sector?

THE SECTOR'S RESPONSE TO THE CEC

In the UK, Bristol University was the first university to declare a climate emergency, back in April 2019. Many other academic institutions around the world subsequently followed. Writing for WonkHE, Facer¹⁰ considered what the sector might then do as a consequence of the declarations of climate emergency. Beyond merely getting their respective houses in order, in terms of setting a carbon budget and developing net zero plans, she argued that the academic sector needs to rethink its mission and consider what it is that higher and further education can offer in a world that is changing fast, and where unpredictability is the norm.

On the 10th July 2019, the Alliance for Sustainability Leadership in Education (EAUC), the United States-based higher education climate action organization Second Nature and UN Environment's Youth and Education Alliance, published an open letter stating that 7,000 higher and further education institutions from six continents were declaring a "climate emergency." The signatory institutions agreed a three-point plan to address the climate crisis:

- Committing to going carbon neutral by 2030 or 2050 at the very latest.

⁷<https://www.timeshighereducation.com/blog/now-good-time-uk-ditch-ref-and-tef>

⁸<https://www.scientistswarning.org/warnings/>

⁹<https://mobile.twitter.com/dwallacewells/status/1331590427980521478/photo/1>

¹⁰<https://wonkhe.com/blogs/declaring-a-climate-emergency-is-an-important-first-step-what-do-we-do-next/>

- Mobilizing more resources for action-oriented climate change research and skills creation.
- Increasing teaching and learning about environmental and sustainability education across curricula, campus and community outreach programmes.

The organizers commented that it was the first time further and higher education establishments have come together to make a collective commitment to address the climate emergency.

As 2021 unfolds, it is fair to say that while growing concerns about the CEC have been heard, the bold and dramatic action required of academic institutions has simply not happened. In November 2019, the Climate Commission for UK Higher and Further Education was established, almost certainly in response to the increasing pressure worldwide that nations and organizations declare a climate emergency. While this was noted by Universities UK,¹¹ a body that curiously has not itself led in this regard, it is unfortunately the **only** item of news that is centered on the climate and ecological emergency that is noted by UUK. UUK hosted an event centered on “The role of universities in tackling the climate emergency” in Feb 2021 ahead of the postponed COP 26, but the brief for the event¹² did not to include a discussion of the future purpose of universities:

“University research has allowed us to understand the threat that climate change poses and is leading the way in offering us solutions through new technology and innovative policy. But **what further role can universities play in addressing this global challenge?** How can we make our campuses carbon neutral and ensure that internationalization goes hand-in-hand with sustainability?”

Some work is underway in terms of “greening” academic campuses, but even there, progress is patchy. For example, UN Environment has produced the Greening Universities Toolkit V.2.0 to inspire universities to develop strategies for green, resource-efficient and low carbon campuses.

“Evidence, however, shows that many universities are struggling with the concept and agenda of university “greening;” achievements to date have been scattered and unsystematic,” the toolkit says. “While some noteworthy exemplars of university sustainability initiatives exist around the world, there is a need to maximize the potential benefits by encouraging their replication in as many universities as possible globally.”¹³

A problem is that there are different views on what it is that academic institutions could and should be doing in response to the current climate and ecological crisis, and in the case of the UK, seemingly little appetite from the sector for a serious discussion of transformative change. The objective of the UN Environment toolkit was stated thus:

“The objective of this Toolkit is to inspire, encourage and support universities to develop and implement their own transformative strategies for establishing green, resource efficient and low carbon campuses.”

This is a stark contrast though with the relentless demands of Fridays for Future and young activists, and now academics themselves, that immediate and proportion action is taken—action that includes academic institutions, and that must go beyond institutions merely achieving carbon neutrality across estates and operations.

GROUNDHOG DAY?

In some regards, criticisms of the failure of academic institutions to help humanity and indeed all life flourish on a finite and increasingly fragile planet are curiously reminiscent of those made of the failure of the international negotiations to adequately address the CEC. There is a sense of *déjà vu* in these very diverse cases, in that problems are identified and acknowledged, yet not adequately addressed.

The Intergovernmental Panel on Climate Change (IPCC) and numerous Conference of the Parties (COP) events hosted by the United Nations Framework Convention on Climate Change (UNFCCC) have demonstrated the gravity of the situation since the first COP on Climate Change took place in Berlin in 1995.

Speaking at COP 1 in Berlin in 1995, Helmut Kohl noted:

“Because of the recent worldwide recession, however, the expected momentum had failed to develop. National self-interest had come to the fore and, in the desire for economic recovery, environmental considerations had often been disregarded and forward-looking projects placed on the back-burner as expensive luxuries, indicating that Rio’s message of sustainable development was not yet accorded sufficient importance by States. Yet it was a dangerous mistake to believe that long-term positive economic development could be achieved at the expense of the environment. Global environmental problems were increasing rapidly and no country alone could overcome the dangers arising from global climate change. What was needed, therefore, was not only joint action by States, but a streamlining and strengthening of international environmental protection machinery within the United Nations¹⁴” (p. 48).

The United Nations Environment Programme (UNEP) has hosted related COP events centered on biological diversity. These have similarly tracked global concerns around loss of biodiversity and environmental degradation since their first event in Nassau in 1994. The President of the 49th session of the General Assembly of the United Nations, stated at that first event:

“... if there was one single area in which international solidarity was vital, it was that of sustainable development, of which the conservation and rational use of biological diversity constituted an essential element. Efforts to combat global warming, the squandering of biological capital or desertification were the task not of a few, but of all, since environmental degradation did not recognize national frontiers or ideological cleavages. Short-term strategies and short-sighted interests must give way to a vision of the world which would translate sustainability into the reality of the collective global experience”¹⁵.

¹¹<https://www.universitiesuk.ac.uk/news/Pages/University-and-college-leaders-launch-12-month-bid-to-find-ways-to-combat-climate-emergency.aspx>

¹²<https://www.universitiesuk.ac.uk/events/Pages/The-role-of-universities-in-tackling-the-climate-emergency.aspx>

¹³<https://wedocs.unep.org/bitstream/handle/20.500.11822/11964/Greening%20University%20Toolkit%20V2.0.pdf?sequence=1&isAllowed=y>

¹⁴<https://unfccc.int/cop4/resource/docs/cop1/07.pdf>

¹⁵<https://www.cbd.int/doc/meetings/cop/cop-01/official/cop-01-17-en.pdf>

Scientists now speak openly and candidly about their frustrations with the failed COP process over decades^{16, 17, 18, 19}. A key point is that neither the science nor the scientists have failed—the science is sound, and scientists have diligently kept to their brief. Similarly, some academics have long expressed disquiet about the trajectory of education. One point is that recurring problems preventing progress have been identified and these speak to pernicious challenges, not only at the science and policy interface, but within academic institutions themselves. Maxwell (2019), puts it thus:

“What has gone wrong is the pursuit of science and technology in a way that is *dissociated from a more fundamental concern with our problems of living, including our global problems, and how best to solve them*. We have failed to develop a kind of academic inquiry centrally and fundamentally concerned to help humanity learn how to resolve conflicts and problems of living in increasingly cooperatively rational ways, science being an important but *subordinate* part of such an academic enterprise” (p. 108).

Maxwell has made these points often, and they are not new. In an address made in 1995, coincidentally in the year of the first COP, and shortly before he died, Ernest Boyer, then president of the Carnegie Foundation for the Advancement of Teaching, said: “What I find most disturbing? is a growing feeling in this country that higher education is, in fact, part of the problem rather than the solution. Going still further, that it’s become a private benefit, not a public good. Increasingly, the campus is being viewed as a place where students get credentialed and faculty get tenured, while the overall work for the academy does not seem particularly relevant to the nation’s most pressing civic, social, economic, and moral problems” (Boyer, 1996, p. 1).

In the case of academic institutions, there has been a collective failure to acknowledge their part in a system that is bringing humanity to the brink of catastrophe, and a failure to lead with the requisite integrity, strength and vision needed to combat the vested interests of corporations consuming the research and employing graduates. Leading climate scientist, Mann (2021) exposes the decades long campaigns of denial, delay and deflection mounted by various actors from the pro-gun lobby to the tobacco industry and now the fossil fuel corporations. The vested interests of big oil and big money are not new, and academia is not immune to them.

BREAKING THE IMPASSE

A vital first step is to recognize that there is a problem—that academic institutions are failing in their over-arching mission to humanity and the planet, and that there exists a huge opportunity for them to play a major role in anticipating and preparing communities both local and global for the changes we will see as

we approach the “safe operating space for humanity” (Rockström et al., 2020).

Deliberative democracy, in which ordinary citizens are carefully briefed on a complex matter and then deliberate ways forward, is a promising approach to addressing deeply entrenched political problems. Dryzek et al. (2019) found that properly implemented, deliberative democracy can circumvent some of the problems that arise in present day democratic politics, such as manipulation and polarization.

Academic institutions may not be as prone to incivility as political institutions, but they are nonetheless typically complex, hierarchical bodies with distinct constituencies and “tribes,” and a wealth of diverse and at times conflicting views and values. Effecting organizational change is notoriously slow and difficult. Surveys of academic staff in the UK at least have revealed at times alarming levels of dissatisfaction with senior management²⁰. Could a more inclusive approach be a way forward in terms of addressing not just pervasive and corrosive feelings of staff being under-valued and over-worked, but also the immense challenges of harnessing the goodwill, creativity and energy that will be needed if academic institutions are to effectively rise to the challenges of the CEC described by Facer (2020)?

THE MORAL AND ETHICAL CASE FOR TRANSFORMATIVE CHANGE

In a tweet, the economic anthropologist Jason Hickel noted²¹:

“It never ceases to amaze me that policymakers assess the relative merits of climate action in terms of GDP, rather than in terms of life.”

In a similar way, many academic institutions are beholden to the same economic forces that drive the CEC. But there are some actions that can and should be taken, particularly as the “Greta Generation” looks to academic institutions in search of courses and careers that anticipate a rapidly changing world in which precarity is the norm.

First, academic institutions must remind themselves that they serve a public good and that they have a responsibility to those they educate and employ. It is for example both immoral and unethical to continue to promote and offer curricula in service of sectors likely to be obsolete within the first half of today’s students’ working lives. The fossil fuel industry is one example in this regard, but career obsolescence is not the key point—the point is that promoting careers in the very sectors that underpin and perpetuate the CEC is unethical. Academic institutions continue to offer courses in the fossil fuel sector, for example, and one could argue that it is misleading and even irresponsible to claim that “With continued worldwide demand for energy, there is no better time

¹⁶<https://www.dandc.eu/en/article/indian-environmentalist-sunita-narain-dont-blame-us-climate-change>

¹⁷<https://abcnews.go.com/Technology/NaturesEdge/climate-change-struggle-note-copenhagens-successful-failure/story?id=9458804>

¹⁸<https://theecologist.org/2019/jan/24/irreverent-musings-cop24>

¹⁹<https://www.bbc.com.uk/news/science-environment-50801493>

²⁰<https://www.timeshighereducation.com/news/overpaid-and-overbearing-uk-university-staff-management>

²¹<https://mobile.twitter.com/jasonhickel/status/1355815525046075393>

to be a Petroleum Engineer”²². Students should be cautioned that such choices are likely to result in curtailed careers, and potentially harmful dissonance later on. There is a duty of care that needs to be exercised so that prospective students make informed choices.

That same duty of care extends to academic and administrative staff too, and much has been reported on the glacial speed at which institutions have grudgingly moved toward divesting from fossil fuels²³. There are many stark illustrations of the failure of university leaders to take responsibility for the knowledge and scholarship they have generated, and it is troubling indeed that some institutions that are home to renowned climate scientists and ecologists have failed to take timely and commensurate action²⁴. Divestments have implications for staff who teach, research and support those areas that will be culled. These issues must be addressed, rather than kicked into the long grass because they entail “difficult decisions.” Introducing more inclusive, deliberative processes could help institutions to initiate and hold much needed conversations about their future role in global societies.

Academics globally are calling for action, willing to play their part in finding solutions and interventions, and increasingly turning to activism (Gardner and Wordley, 2019). Two important areas that could be tackled are (i) curriculum and (ii) study leave and sabbaticals. “Greening” the curriculum will not suffice. Courses centered on a “carbon economy” and on business as usual will simply perpetuate the CEC. They must give way to curriculum that anticipates a different future. Academics have already expressed a willingness to use their contractual study leave to work on solutions-focused endeavors. Making this happen requires executive decisions and mechanisms that recognize and incentivise alternative uses of study leave and sabbatical time.

²²<https://www.abdn.ac.uk/study/undergraduate/degree-programmes/811/H851/petroleum-engineering/>

²³<https://www.theguardian.com/education/2020/oct/01/cambridge-university-divest-fossil-fuels-2030-climate>

²⁴<https://mancunion.com/2020/05/27/university-of-manchester-announce-full-divestment-from-fossil-fuels/>

CONCLUDING COMMENTS

While the coronavirus pandemic has challenged the capability of academic institutions to deliver on their missions, the climate and ecological crisis has exposed some of the flaws and paradoxes at the heart of higher and further education. It has also shown what can be achieved when something is deemed “essential.” Many academic institutions and schools deemed maintaining tuition essential to their survival. Montgomery (2021) notes the enormous efforts that were made to ensure that tuition did not suffer, much of this brought about *via* exceptional processes.

Now it is time to prioritize the CEC above all else and for institutions to recognize that addressing the challenges this poses is essential to their very survival. There is no alternative but to change—new generations of students will demand it. It is a great irony that many academic institutions exist to prepare people for sustainable employment and for life as active citizens in democratic societies, yet employers increasingly lament that graduates are not job-ready²⁵. A more profound irony though is that academic institutions are largely responsible for generating knowledge about the very societal problems that they themselves perpetuate, yet have failed to solve. Nowhere has this been brought more sharply into focus than with the climate and ecological crisis. Transformative change is now essential and academic institutions must embrace this.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

²⁵<https://www.timeshighereducation.com/news/firms-shift-towards-wanting-work-ready-graduate>

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Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Sustainability Governance at Higher Education Institutions: Equipped to Transform?

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Keywords: higher education, sustainable development, governance, transformation, policy

INTRODUCTION

Higher education institutions (HEIs) have various opportunities to engage in and foster sustainable human progress. They can thus play a decisive role in promoting sustainable development (SD) by integrating sustainability as a cross-cutting principle in teaching, research, operations, and knowledge transfer (cf. Sterling, 2013).

In this opinion paper, we reflect on selected literature as well as on specific research we have conducted into sustainability governance at German HEIs. We then provide answers to the following questions (in a German context): Is it essential for HEIs to promote SD? What constitutes optimal sustainability governance at HEIs? And what progress has been made with implementation? We conclude the article with a discussion of current resistance and future prospects for SD at HEIs, in order to stimulate further exchange on the topic.

OPEN ACCESS

Edited by:

Iain Stewart,
University of Plymouth,
United Kingdom

Reviewed by:

Federica Doni,
University of Milano-Bicocca, Italy
Wendy Purcell,
Harvard University, United States

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 11 December 2020

Accepted: 29 March 2021

Published: 26 April 2021

Citation:

Bauer M, Rieckmann M, Niedlich S
and Bormann I (2021) Sustainability
Governance at Higher Education
Institutions: Equipped to Transform?
Front. Sustain. 2:640458.
doi: 10.3389/frsus.2021.640458

IS IT ESSENTIAL FOR HEIS TO PROMOTE SUSTAINABLE DEVELOPMENT?

“Higher education is at the crossroads having to choose between the path of commodification of knowledge creation and learning focusing on optimization and efficiency with the wellbeing of the economy as a key driver or the path of socio-ecological transitions requiring new forms of research and learning as well as alternative capabilities and values that contribute to the well-being of planet and people” (Wals et al., 2016, p. 36).

We hold this to be true and urge higher education institutions to choose the latter course of action. In the face of current sustainability crises, the survival of global society depends on competencies that have so far been of little relevance due to longstanding ignorance of the consequences of our exploitative economic system. The complexity that is inherent in socio-ecological challenges such as climate change requires new forms of learning, thinking, and engagement with the world that are truly transformative and transgressive (Sterling, 2011; Lotz-Sisitka et al., 2015; Wals et al., 2016, p. 28). HEIs are well-placed to explore concepts relating to this issue, disseminate them on a large scale and involve a broad range of disciplines.

To date, however, most HEIs still contribute to the maintenance of a system that is geared toward economic growth and ignores the ecological limits of the planet (Fazey et al., 2020). All too often, students still do not have the opportunity to adequately address global challenges in their studies, or they are only confronted with information about the causes and development of the climate crisis, for instance, in lectures or similar, which does not allow for a transformative learning process (Singer-Brodowski et al., 2019). But global challenges call for them to be empowered to think in a systemic and forward-looking way and to contribute to solving complex social problems

(Orr, 1991; Glasser, 2005; de Haan, 2010; Fadeeva and Mochizuki, 2010; Rieckmann, 2012; Brundiers et al., 2021). In addition to teaching and research, HEIs can provide platforms where co-creation and collaboration between people and institutions from different scientific or societal backgrounds address the increasing complexity of real life problems (Giesenbauer and Müller-Christ, 2020).

It has often been argued that the normativity of sustainability (science) stands in conflict with the traditional positivistic theory of science and the freedom of research. Vogt and Weber (2020) refute this argument by stating that “[s]cientists are involved from the beginning in social change – as soon as they begin to produce ideas and discourses. It is their task to reflect upon this situation” (Vogt and Weber, 2020, p. 17). In doing so, they might become aware of the responsibilities they are entrusted with, being “the voice of the ones without a voice in the arena of power” (Vogt and Weber, 2020). This, in a nutshell, turns the tables and ultimately means science has an ethical obligation to engage constructively with SD or at the least to refrain from promoting unsustainability since “value-free research is neither possible nor desirable” (Vogt and Weber, 2020).

We will now take a closer look at the concepts and structures that can help HEIs to implement SD once their members have embarked on this learning journey together.

WHAT CONSTITUTES SUSTAINABILITY GOVERNANCE AT HEIS?

One major aspect of successful governance for SD at HEIs that many agree upon is the whole institution approach (Sterling, 2004; Ferrer-Balas et al., 2008; Hoover and Harder, 2015; Singer-Brodowski et al., 2019). The development of an approach to the implementation of SD that integrates research, teaching, knowledge transfer, and operations is a complex but worthwhile challenge for HEI governance and can eventually transform entire institutions. We support this concept and would suggest the adoption of an “all-dimensions approach,” namely one that integrates the multiple dimensions of SD and is based on a common understanding between all those developing cross-sectoral measures. This broadens perspectives and opens up opportunities to engage an even greater variety of stakeholders (Bauer et al., 2020).

Another essential factor that is also promoted by a whole institution approach is the HEI’s commitment to engaging, and ability to engage, in a challenging learning process. In a multi-case study involving 11 German HEIs, we identified two components that played a key role in organizations’ approach to learning in the context of SD: the HEIs own perception of their purpose and the assignment of responsibility within HEIs. We found that institutions that viewed themselves as members of society and considered that they had an obligation to participate in shaping it going beyond the obvious tasks of research and teaching usually had a variety of structures in place that enabled regular interaction and cooperation with other stakeholders (Niedlich et al., 2019). This “co-evolutionary rather than linear view of the relationship between education and society” (Sterling, 2004, 67f.) opens up new ways of learning—individually and as an organization, and especially with regard to urgent social issues

such as unsustainability. Ferrer-Balas et al. (2008), furthermore, show that close links between HEIs and society are an important driver of organizational transformation, since they communicate society’s demand for SD more directly to HEIs and therefore intensify the pressure to act.

In contrast, the second component of organizational learning is situated inside the institutions themselves. It has been shown that HEIs take highly divergent approaches to the assignment of responsibility for SD processes (Niedlich et al., 2019). In this regard, it is considered beneficial to have a “structure of responsibility, emphasizing the development of sustainability as a joint development process encompassing all of its stakeholders” (Niedlich et al., 2019, p. 9) rather than a top-down approach. Participation, dialogue and cooperation between stakeholders from different fields and sectors are key (Disterheft et al., 2015; Hoover and Harder, 2015; Leal Filho et al., 2019). This corresponds with a notion of responsible leadership as “being facilitative rather than directive in order to allow everyone, staff and students, to take responsibility to lead, accept risk and find ways to innovate” (Davis and Goedegebuure, 2017, p. 226) and has some similarities with the discourse on distributed leadership (Bolden et al., 2009) and social networks (Purcell et al., 2019). Governance structures such as open Round Tables, transdisciplinary task forces, and Green Offices can be ways to apply this concept. However, it should be noted that voluntary engagement has its limits and that structures such as these depend on reliable funding.

This last remark foreshadows the final section of this paper where we discuss other ways in which HEI governance for SD, as depicted here, can be promoted. But first, we will take a look at Germany, and examine what HEIs have already been able to achieve.

WHAT PROGRESS HAS BEEN MADE WITH IMPLEMENTATION?

In 2006, Adomßent and Michelsen criticized the low number of German HEIs that were committed to SD and attributed this primarily to the “lack of an adequate framework for a consistent and concise German higher education policy that provides universities with financial and legal instruments to commit themselves to sustainable development in reliable ways” (Adomßent and Michelsen, 2006, 88). Only a few years later, Adomßent (2010) was already sounding relatively optimistic with regard to the impact of a number of scientific and social stimuli for increased sustainability on the German HEI landscape. However, progress was generally selective and focused on individual parts of HEIs, with whole-institution approaches being far from common. Lozano et al. (2015) also noted this in their worldwide study on sustainability implementation by 70 HEIs. This still appears to be the case, at least in Germany, as Singer-Brodowski et al. (2019) have shown (Germany is the example we have taken, but the situation is not very different in many other countries, cf. Leal Filho et al., 2019; Fazey et al., 2020). Singer-Brodowski et al. (2019) furthermore detected a ‘Beacon Strategy’ with regard to German HEIs’ ambitions to integrate SD through a whole-institution approach: only a handful of

HEIs have declared themselves SD pioneers, managed to fully institutionalize the concept and thus seemingly outdistanced other HEIs (Helling, 2018; Schmitt and Palm, 2018; Singer-Brodowski et al., 2019; cf. Niedlich et al., 2019). However, the “Beacon Strategy” seems to be working, since the spread of SD-related experiences and knowledge throughout the scientific community also helps to reinforce SD practices—hopefully also beyond the beacons’ own premises.

Finally, signs of this kind of development are evident in the HEIs’ sustainability network, which has been established over the last 4 years as part of a German collaborative project and which now includes stakeholders from over 130 of the approximately 400 HEIs in Germany (see www.hochn.uni-hamburg.de/en.html). Having been part of this project ourselves, we acknowledge the efforts being made. Meanwhile, we can certainly see some HEIs that are already aiming to catch up with those few that have gone before them.

THE CHALLENGES AND POTENTIAL OF A SUSTAINABLE HIGHER EDUCATION SYSTEM

Although an HEIs’ official commitment to SD has been identified by Lozano et al. (2015) as correlating with their implementation of SD, the path certainly entails more obstacles than that. HEIs are complex organizations where change cannot be brought about in the short term. Rather, the process of change is accompanied by complex learning processes on the part of the individuals in the various parts of the organization. Together, these mean that HEIs undergo comprehensive change processes in the course of which established and proven routines, but also goals and processes, are (or can be) questioned and realigned. In the course of this, the interests and rationales of different groups of higher education stakeholders will clash, so that an HEI on the path to sustainability can be said to be learning, and can therefore be seen as a place where education for sustainable development is taking place.

In order for this potential to be developed, some essential external factors must be considered. As of now, the higher education system does not seem ready to support the inter- and transdisciplinary teaching and learning environments that education for sustainability calls for (Singer-Brodowski et al., 2019). This is also true with regard to research, knowledge transfer, and campus operations. Overall, many HEIs see themselves as committed to competing rationales that undermine the requirements necessary for contributing to SD. They are confronted with a multitude of demands and challenges such as internationalization, digitization and marketization (Altbach, 2008; Giesenbauer and Tegeler, 2020). Meanwhile, policymakers have not formulated any recognizable basis for prioritizing tasks or provided any incentives to support such prioritization, despite

the many (non-binding) agreements and declarations relating to SD at HEIs at various levels of governance (Adomßent and Michelsen, 2006; Michelsen, 2016; Singer-Brodowski et al., 2018). Instead, the competition for scientific excellence prevents participating HEIs from engaging in alternative activities. Mono-disciplinary research is often still accorded greater value than innovative citizen science, to name one example, as current funding programs clearly demonstrate. Adjustment to funding mechanisms could address inter alia the often highlighted shortcomings of HEIs with regard to the exchange of knowledge with other stakeholders in society (Zilahy and Huisinigh, 2009; Trencher et al., 2014; Leal Filho et al., 2019), and therefore could also benefit the pursuit of the so-called third mission.

However, prioritization and funding are also issues that, to a certain extent, HEIs can arrange individually according to their own agendas. As set out above, SD implementation requires reasoned conceptions of, and structures for, SD. By making resources permanently available, HEI management can make an important statement and facilitate a far-reaching process of development toward SD. Some HEIs have already been able to set high standards for SD, seizing the opportunity to become beacons for sustainability and thus becoming particularly attractive to students and staff. A small number of beacons is not sufficient, but when the numbers increase, this unique advantage is removed. We need to move past this tipping point toward an HEI landscape where not being sustainable makes an HEI undesirable.

In closing, we would like to stress that HEIs need to undergo a fundamental transformation, and focus on principles of responsibility and sustainability. HEIs should see themselves as laboratories in which students learn to critically examine social conditions, develop ideas for a better future and implement sustainable solutions. In this way, HEIs will make a tangible contribution to the well-being of mankind.

AUTHOR CONTRIBUTIONS

MB and MR: first draft. MB, MR, SN, and IB: revisions and project administration. MR and IB: supervision and funding acquisition. All authors have read and agree to the published version of the manuscript.

FUNDING

This research was funded by the Bundesministerium für Bildung und Forschung, Germany, Grant/Award Number: 13NKE007A.

ACKNOWLEDGMENTS

The authors would like to thank two reviewers for their critical and constructive feedback.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Fostering Academic Interdisciplinarity: Italy's Pioneering Experiment on Sustainability Education in Schools and Universities

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OPEN ACCESS

Edited by:

Iain Stewart,
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Reviewed by:

David Crookall,
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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 20 November 2020

Accepted: 29 March 2021

Published: 28 April 2021

Citation:

Fioramonti L, Giordano C and
Basile FL (2021) Fostering Academic
Interdisciplinarity: Italy's Pioneering
Experiment on Sustainability
Education in Schools and Universities.
Front. Sustain. 2:631610.
doi: 10.3389/frsus.2021.631610

The world needs a systemic transformation from a social, economic and environmental point of view in order to deal with present and future challenges, which are crosscutting in nature. Education and research can become powerful drivers for this radical change, provided they can break free from narrow disciplinary approaches and cultivate the interconnectedness of knowledge. With a view to repurposing teaching and research toward an integrated approach, Italy has introduced a number of reforms, including a mandatory module for all schools and an interdisciplinary course for universities, largely modeled on the interdisciplinary concept of sustainability. Italy was the first country in the world to do so and the news had resonance throughout the globe, indicating a thirst for innovative methods in education and research. This article discusses the approach and the obstacles faced, with the aim of encouraging debate over its structure and contents and potentially replicating its implementation in other parts of the world.

Keywords: interdisciplinarity, transdisciplinarity, integration, education, schools, university, sustainability

INTRODUCTION

The world needs a systemic transformation from a social, economic, and environmental point of view in order to deal with present and future challenges, which are crosscutting in nature. This is clearly indicated by the United Nations, whose *The Future We Want* declaration acknowledges “the need to further mainstream sustainable development at all levels, integrating economic, social and environmental aspects and recognizing their interlinkages, so as to achieve sustainable development in all its dimensions” (UN, 2012). Against this backdrop, education and research can be powerful drivers of a systemic transformation (UNESCO, 2019), especially in so far as they contribute to shift our beliefs, behaviors and approaches, provided we can break free from narrow disciplinary separation and foster the integration of knowledge.

With a view to repurposing teaching and research toward an integrated approach, Italy has introduced a mandatory module for all schools and an interdisciplinary course for universities, largely modeled on the inherent link between interdisciplinarity and sustainability.

In this article, we provide a first tentative analysis of this pioneering approach (the country was the first in the world to make the study of sustainable development mandatory in all schools) and highlight the main approach, policy impacts as well as obstacles. The Covid-19 crisis, which broke out just a few months after the country had introduced these innovative reforms, has significantly delayed the implementation process (schools and universities were shut down for most of 2020 and 2021), thus delaying the timing of the project and the scope of any possible analysis at this stage. We feel, however, that these reflections may be very useful to the current debate on how to repurpose education and research institutions to deal with the 21st century needs and challenges and also to other countries interested in pursuing similar policies.

FOSTERING INTERDISCIPLINARITY IN SCHOOLS AND UNIVERSITIES: A BRIEF REVIEW

Although social and natural processes have always been and are ever more characterized by systemic dynamics in an age of globalization and unprecedented impacts of humans on the biosphere, conventional approaches to education are still largely based on sectoral knowledge, limited cross-fertilization among subjects and a lack of understanding of how different areas of expertise can be integrated to help address societal problems. The concept of interdisciplinarity is therefore key to repurpose education institutions with a view to making them more capable of responding to contemporary pressures and needs (Davies and Devlin, 2010).

But what is interdisciplinarity? According to Boix Mansilla et al. (2000, p. 219), interdisciplinarity is defined as “[t]he capacity to integrate knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement—such as explaining a phenomenon, solving a problem, or creating a product—in ways that would have been impossible or unlikely through single disciplinary means.” A number of scholars believe that interdisciplinarity holds forth great promise in so far as it helps teaching and research connect strands of knowledge with a view to improving our understanding of complex, multifaceted dynamics (Klein, 1990; Hicks and Katz, 1996; Spelt et al., 2009; Jones, 2010).

Interdisciplinarity has grown in popularity in academic debates during the past fifty years (Crookall, 2000), shifting from an intellectual effort to integrate knowledge and freedom of inquiry to becoming the basis for a purposeful approach to problem-solving, as demonstrated by Future Earth, a global network of scientists linking research and innovation through an interdisciplinary focus with a view to promoting sustainability-based solutions (www.futureearth.org). Yet, despite its potential virtues, a truly interdisciplinary agenda has thus far struggled to become mainstream (Ledford, 2015). Even when different disciplines collaborate, they struggle to integrate fully and give birth to new areas of knowledge, a process perhaps better exemplified by the concept of “transdisciplinarity” (Choi and Pak, 2006).

Indeed, there are a number of barriers hindering integration among disciplines, including standardized education assessment models, insufficient time and resources, limited knowledge base and diversity of language and cognitive approaches (Kysilka, 1998; Bradbeer, 1999; Woods, 2007; MacLeod, 2018). School attainment assessment methods are an important tool for education advancement, but it has long been noticed that teachers, whose own evaluation and career expectation often depend on test results, may focus on increasing success rates rather than on facilitating higher-order thinking skills, thus reinforcing disciplinary divisions (Herman, 1992). Moreover, integrated thinking requires time, which is notoriously in short supply in schools and universities, especially if one considers that new syllabi may require approval from the rest of faculty before they can be introduced, which makes the process particularly lengthy and uncertain. In many countries, academic work is often underpaid and devaluated, which discourages innovation and propensity vis-à-vis new areas of work and experimentation. Additional barriers include limited knowledge base, as the same teachers and researchers who should develop interdisciplinary approaches have been educated mostly within the rigid borders of disciplines, thus erecting cognitive “walls” around their academic learning process, resulting in languages that can hardly be translated into one another. As reported by Annan-Diab and Molinari (2017), there is a fundamental problem of teacher training and education, which is still based on traditional approaches and methodologies. All of this requires a radical transformation if we are to develop the teaching skills needed for a new school and university curriculum based on the “interconnectedness” of knowledge.

It is important to recognize that a number of universities—almost exclusively in the Anglo-Saxon world—have made important strides toward interdisciplinarity over the past decade, with the emergence of crosscutting teaching and research areas such as ecological economics, geoethics or sociolinguistics, to name a few examples (Davè et al., 2016a,b). Moreover, a number of donors, including private foundations and the European Union, have launched important research funding programmes to support, if not full-fledged interdisciplinary projects (Gleed and Marchant, 2016), at least multidisciplinary endeavors, that is, research partnerships were different disciplines are involved, although most of them may still operate in parallel tracks (e.g., producing separate outputs). At the same time, despite the growth of issue-based scientific journals and with the limited exception of leading interdisciplinary publications like *Science* and *Nature*, most highly-rated publication outlets jealously defend their disciplinary approach, making it quite hard (if not impossible) for a mainstream journal to welcome submissions by authors with a different background, with unorthodox approaches or focusing on crosscutting topics.

Integrated education and research are not only necessary for scientific progress, but ever more so to deal with the complex problems facing humanity, which—by nature—do not recognize disciplinary or departmental boundaries. In particular, the compound challenges of climate change and sustainability require a completely new way of thinking, including new horizons for interconnected research in a variety of fields,

from energy production to ecological protection, from urban development to societal organization (Bhaskar, 2010; Tejedor et al., 2018; de Bruin and Morgan, 2019). Despite its obvious interdisciplinary nature, education for sustainable development is still often carried out through a specific disciplinary lens: For instance, as reported by the UNESCO report titled “Education for sustainable development: a roadmap” (UNESCO, 2020, p. 9) Education for Sustainable Development has been mostly associated with the teaching of scientific knowledge on environment in 10 Countries.

SUSTAINABILITY EDUCATION: AN INTEGRATED FRAMEWORK AND POLICY APPROACH

Italy is one of those countries in which a rigid separation across disciplines is deeply rooted. Researchers compete in a tight publish-or-perish system based on formally defined “sectors,” which further fragment disciplines into almost 400 relatively obscure areas of expertise: according to the Ministry of University and Research, there are currently 383 scientific disciplinary sectors in Italy (MUR, 2020). These sectors are vital for any academic, as they dictate the scope of their scientific evaluation, teaching responsibilities and career prospects. For instance, research publications falling outside a specific sector may be excluded from the “national scientific habilitation,” which is the assessment process all academics must pass to access tenure-track positions, thus undermining the professional development of researchers, especially in the early stages of their career. Moreover, scientific journals are rigidly divided into “tiers” according to disciplinary preferences, which tends to downgrade articles published in interdisciplinary outlets, irrespective of their Impact Factor.

Against this backdrop, when we headed Italy’s Minister of Education, University and Research in 2018–2019, we introduced a set of policy reforms designed to create new incentives and mechanisms for interdisciplinary collaboration and research. First of all, we discussed with the National University Council, an elected organism representing university staff and students, a fundamental simplification of disciplines aimed at overcoming the bottlenecks of such a multitude of scientific sectors. We also approached the National Agency for the Evaluation of Universities and Research (ANVUR), which is the institution overseeing the assessment of individual researchers as well as universities as a whole, to request a different approach toward the so-called “evaluation of the quality of research” (VQR), with a view to including not only direct teaching and research outputs, but also broader products of the overall academic activity, including policy reports, media contributions, patents, entrepreneurial spin-offs and any activity that benefits the local community and the population at large (a process known in Italy as the “third mission” of universities). Finally, we launched a national online research “repository” where all scientific and practice-based activities by each individual researcher could be tracked and assessed in terms of impact, thus going beyond more conventional parameters such as scholarly citations to

include qualitative dimensions such as the societal effects and policy use of research. All these shifts were designed to help liberate academics from the more traditional evaluation of teaching and research outputs, which generally tends to exclude any activity that does not fall within the remits of a narrow understanding of “academic work” by any given disciplinary sector.

The transformative power of policy incentives and assessment mechanisms can be further strengthened if the targets have been socialized within an education process that upholds interdisciplinarity as an active way of learning. This is why, together with the Sustainable Development Universities Network (RUS), we promoted the introduction of an elective online module for all university students of all disciplines, 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.

In order to take the same principle even further, we then decided to tackle interdisciplinarity at the level of basic education. Schooling has a number of effects on society’s social capital, including potential impacts on collective attitudes, behaviors and lifestyles. A module of civic education was first introduced in Italy in 1958, as a crosscutting theme focusing on rights, responsibilities and social norms, but over time it lost popularity in schools and became a marginal topic, often neglected by teachers themselves (as it did not require a separate grade for students).

With the digital revolution and the adoption of the Agenda 2030 by the United Nations, it has become clear that any approach to the rights and responsibilities in today’s world cannot be confined to learning parts and processes of the national legislation. Local actions affect global dynamics, while global processes reverberate also at the local level. The concept of “glocal” has thus become central to any approach to civic education, especially in the digital age, when the flow of information and the impacts of our actions inevitably transcend boundaries. Against this backdrop, we introduced a new mandatory teaching module on “education to sustainable citizenship,” based on the European Union’s recommendation on key competences for lifelong and cross-discipline learning (Council Recommendation of 22 May 2018 on key competences for lifelong learning, 2018) and using the window of opportunity opened by the crosscutting political support toward a fundamental revision of the traditional civic education approach, which led to the approval of the Act.92 of 20 August 2019 by a large majority in parliament (GU (Serie Generalen195 del 21-08-2019). LEGGE 20 agosto, 2019).

In order to ensure that all components were fully integrated with each other and synergies across the different topics were found, a team of pedagogues, professional educators and sustainable development specialists elaborated a framework divided into six crosscutting “spheres” of learning, mixing social and natural sciences and making it adaptable to the

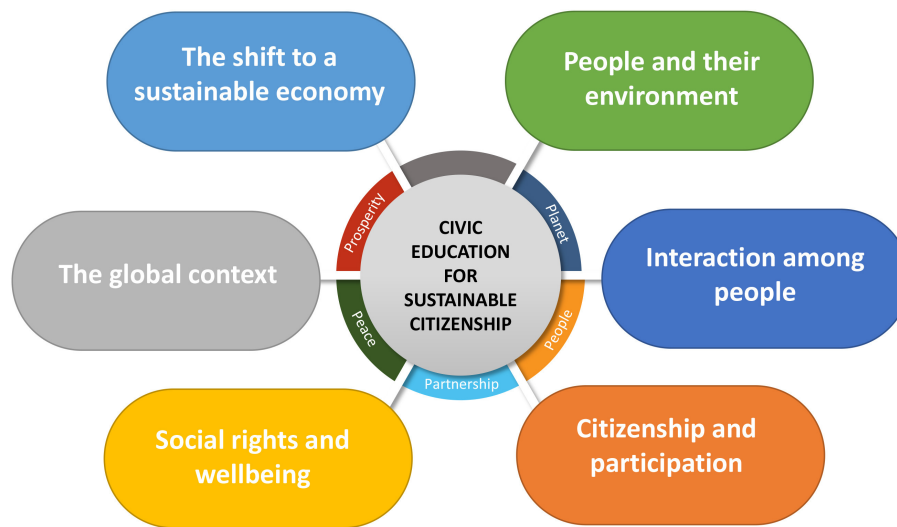


FIGURE 1 | Framework of education for sustainable citizenship.

various grades in terms of complexity and sophistication, from kindergarten to high school (**Figure 1**).

1. People and their environment. The relation with the territories: towns, regions and the use/abuse of natural resources; the role of digital devices in re-defining proximity and exploring the daily life territory.
2. Interaction among people. The relation with “the others,” including the virtual community.
3. Citizenship and participation. The relation with institutions, focusing on rights, active participation and democracy in the digital age, with a view to building action for change and sustainability transformation in the local community.
4. Social rights and wellbeing. The relation with personal and collective needs, including decent work, healthy lifestyles and the implications of the technological revolution.
5. The global context. The relation with the world, focusing on international organizations (e.g., the European Union and the United Nations), including how they manage peace, climate stability, the Internet, international rights and the role of a connected, civil society.
6. The shift to a sustainable society. The relation with social transformation, with a focus on inequalities, consumption choices and production patterns (from the local to the global).

A DISCUSSION OF PUBLIC RECEPTION, IMPLICATIONS AND POLICY OBSTACLES

The general audience as well as the academic community welcomed all changes introduced during our tenure with excitement, indicating a rather widespread need for innovation in the field of education and research. Italy’s decision to make the interdisciplinary study of sustainability mandatory in all schools and elective at the university level was reported by all major international newspapers, from *The New York Times* (2019) to

The Washington Post (2019) and *The Guardian* (2019). It was mentioned by the UN top leadership, agencies like UNESCO and it was given significant prominence at the climate summit COP 25 in Madrid in December 2019. Youth movements like the Fridays for Future and their spokesperson, Greta Thunberg, publicly praised the decision as an example for the whole world.

A number of spin-off initiatives were also carried out autonomously by many schools, which dedicated a special focus to the detrimental impacts of climate change and how collective action can help mitigate the most severe effects while adapting to a different relationship with natural resources. In collaboration with a number of associations, research institutes and private companies, thousands of trees were planted in schoolyards and new collaborative projects were developed with a view to applying “green” technologies to the school environment, for instance, to improve the energy efficiency and health profile of buildings.

During the same period, the RUS network expanded rapidly from 50 universities in 2017 to almost 80 in 2019 (out of less than 100 public and private universities overall), 500 members and several working groups, covering topics such as waste, energy, climate change, food and inclusion and social justice. In 2019, a “pact for sustainability” was signed by all university presidents and facilitated by the Ministry and a national “technopole” for interdisciplinary research on sustainable development was launched.

Despite the positive reception and the widespread excitement, policy implementation was not straightforward nor devoid of complications and bottlenecks. Moreover, the outbreak of the global COVID-19 pandemic has had a detrimental impact on the process, with significant delays and shifting priorities. As schools were closed for most of 2020, the training programmes designed for the teachers involved in the new sustainable citizenship module were postponed. As universities limited their teaching and research activities to the minimum requirements, only a

minority of RUS members (that is, less than 20 universities) has introduced a full-fledged “Lecture 0” thus far.

In addition, a change of leadership at the Ministry, which was split into basic education on the one side and university/research on the other, caused further delays and some degree of disintegration of common initiatives. As a result, the reform of the scientific disciplinary sector is still pending, while the new national research repository is yet to develop from its embryonic stage.

Lack of resources was also a significant problem. The 2019 law on education for sustainable citizenship made it clear that the reform should not have any additional cost for the State and should not increase the existing workload of teachers. As a result, schools could not expand their teaching curriculum and had to carve out one hour per week for the module by reducing other activities. Without a dedicated cohort of specialized teachers, the new module was entrusted to personnel already teaching other subjects, from law and economics to natural sciences and history. To overcome such “gap” in terms of resources and skills, schools were requested to appoint a sustainability coordinator in charge of overseeing the teaching module and the potential spin-off activities and the Italian Alliance for Sustainable Development (Asvis) was brought onboard to provide know-how and act as a reference network for the school community.

CONCLUSION

There is increasing awareness that the challenges of the present and the future require integrated thinking. In this regard, education institutions play a pivotal role as they help shape our understanding of reality and how to act to address problems that transcend disciplinary boundaries, from climate change to public health and technological transformation.

To foster interdisciplinarity (that is, the collaboration of different disciplines) and, ideally, transdisciplinarity (that is, the creation of new areas of knowledge beyond conventional disciplines), we need to change practices and incentives in teaching and research, which are still designed to strengthen disciplinary segmentation. Moreover, we need to develop new tools to help socialize students (and teachers) into patterns of integrated knowledge. It is unlikely that, without policy reforms in terms of cultural shifts, new practices and different incentives, our academic institutions will change on their own and, above all, that they will do so quickly enough to help address current and future challenges.

Against this backdrop, Italy adopted number of reforms in research and teaching. It encouraged interdisciplinary

research by changing assessment procedures, rewarding initiatives that had practical impacts and breaking down rigid disciplinary sectors. Moreover, it introduced new specific teaching modules conceptualized around the interdisciplinary field of “sustainability,” becoming the first country around the world to make the crosscutting study of sustainable development mandatory for all schools nationwide.

These reforms were welcomed by all sectors of society and by the academic community at large, with strong reverberations globally, thus indicating a widespread need for a new approach to education. However, without dedicated resources (in terms of funds, time and personnel), it is uncertain whether the experiment will produce more far-reaching impacts across the entire education curriculum, influencing how we teach and research in all areas. This is indeed its ultimate goal: not simply generate a new field of academic activity but cross-fertilize all scientific subjects, toward a new integrated approach to knowledge.

More research will be needed on this policy experiment when the current Covid-19 crisis will be over, so as to gauge the extent to which the approach has been successfully implemented and the impacts it may have generated on school and university curricula. It will also be crucial to conduct comparative analyses in other countries that may be in the process of adopting similar strategies, while adapting them to different cultural and geographic settings.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

LF is the main author of the article and wrote most sections. CG assisted in the literature review and helped conceptualize the approach. FB was one of the main architects of the approach from an implementation point of view and helped develop the methodology. All authors contributed to the article and approved the submitted version.

ACKNOWLEDGMENTS

We thank a number of colleagues for support at the Ministry of Education, University and Research and for their comments to this article. In particular Nicoletta Cocco, Fulvio Esposito and Matteo Pietropaoli.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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If It Is Life We Want: A Prayer for the Future (of the) University

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OPEN ACCESS

Edited by:

Stephen Sterling,
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Point, United States
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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 01 February 2021

Accepted: 07 April 2021

Published: 30 April 2021

Citation:

Moser SC and Fazey I (2021) If It Is
Life We Want: A Prayer for the Future
(of the) University.
Front. Sustain. 2:662657.
doi: 10.3389/frsus.2021.662657

Universities are one potentially important place – albeit not the only one – to initiate the next generation into becoming the adult humans needed to navigate the difficult future of the Anthropocene. The University of the future will fail this mission, if it only prepared young people in the technical expertise required to manage accelerating climate crises and the breakdown of Earth's life support and interlocking human systems. The depth and extent of transformation that awaits society requires people skilled in coping emotionally and in effectively engaging the plethora of challenges ahead with agility, creativity, resolve, vision, and integrity. It requires universities themselves to transform into institutions of human development that cease to participate, pardon and propagate patterns of exploitation and, instead, become singularly dedicated to restoring and regenerating the conditions for life. This paper articulates a vision of a radically different future “University.” Building on others' calls for transformation-supporting education, we frame universities' role in the larger arc of inner and outer human and societal development. We spell out some of the implications and needs such a shift would entail. The paper is written in the spirit of the future University that we envision: not just from our analytical thinking brain, but drawing also on our imaginative/intuitive, emotional, and sensing/embodyed ways of knowing. As such, it breaks with conventional academic writing and opens up wider possibilities for and commitment to life-affirming and restorative action.

Keywords: climate crisis, sustainability, Anthropocene, higher education, transformation, emancipation, initiation, human development

PRAYER AS INTRODUCTION

*“Prayer is the absolute relation of the human heart to itself, to its own nature. ...
Prayer is ... a dialogue of man with himself, with his heart.”*
(Feuerbach, 1893, p. 123)

Future, Earth, Life –
You, promise of our days.
You, ground of our existence.
You, source of our being.

We come to you broken.
 Maybe not broken, merely unfinished¹.
 And yet, with broken hearts:
 We nearly broke you.

Today we come with our heads down, not with weapons of analysis, not with litanies of defenses, not with litanies of past achievements and arguments of why we deserve another chance, not even promises of how we will redeem ourselves. Today we come in prayer. We come to speak to our higher selves. We come to seek a higher education.

We know, we have disregarded you, Future; we have destroyed so much of you, Earth; we have dismissed you, Life – even as we depended, and still depend – on you. We have robbed you, overheated you, mined and undermined you. We have done so in plain sight and full knowing, even as you – generously – gave us another day, another year; even as you spoiled us with riches, with beauty; even as you granted us shelter, water, food, companionship beyond our wildest dreams.

We deluded ourselves in thinking we were superior and independent, not embedded and elemental. We misunderstood our powers – thinking ourselves omnipotent and invincible, rather than formidable enough to make ourselves vulnerable to existential risk. We have made ourselves smart, but not yet wise; we do not yet know nor live up to our true name.

We have taught our young but not prepared them for the world we have created. We have educated them for a tomorrow that may never come, rather than ready them for the tomorrow that awaits. This, we now realize, leaves us all in danger, endangered.

Thus, we come to this precipice, hardly admitting that we ourselves created our own crises, barely recognizing them as the necessary end of the road, of our institutions, of our thinking, of the house of cards we ourselves have built. We come with all our broken promises, our failed prowess, humbly now, realizing how bereft we are, how much in need of change.

Here – Future, Earth, Life – we offer our brokenness, our hearts, our unfinished selves. We come to you to learn what we must learn.

For it is life we want. Another day. A role and task on Earth worthy of our name.

May it be so.

A UNIVERSITY UNFIT FOR THE ANTHROPOCENE

The Complicit University

Higher education can be – and has been – critically examined and, indeed, sharply criticized, for its contributions to unsustainability and for its possible role in a transition to sustainability. This critique has come from within and without. Some have pointed fingers at its financial entanglements with extractive, polluting, and exploitative industries that make it

complicit with unsustainable, neoliberal forces rather than an instrument of good (Lave et al., 2010; Berman, 2014; Burke and Nik, 2014)². Related to that, many have bemoaned its own carbon and ecological footprint (Mayo, 2019; Yañez et al., 2020). Others have focused on its outdated and hierarchical governance and slow responsiveness to an increasingly urgent sustainability crisis (Moon Christopher et al., 2018; O’Riordan et al., 2020). This has led to (self-)critical looks at institutional barriers to doing relevant research (Leal Filho et al., 2018) and to questions about pedagogy and whether or not it is preparing the next generation adequately in the knowledge, skills, and competencies required (e.g., Brundiers et al., 2021). Given all these factors, a growing chorus of voices has questioned academia’s capability to provide intellectual leadership at all for the sustainability transition. An entire field has emerged – sustainability science – aimed at maintaining the usefulness of science to solving real-world problems (e.g., Polk, 2014; Mooney, 2016; Clark and Harley, 2020; Rocha et al., 2020; Kliskey et al., 2021).

The Reforming University

Higher education has not remained untouched and unchanged by these critiques, but has self-examined and launched many efforts to rectify and reform problematic aspects of its inner workings and external impact (e.g., Corcoran and Wals, 2004). Many have contributed to the reflection on the future of higher education (formalized through organizations such as AASHE³, fields like “transformative education and learning⁴,” international research projects [e.g., INTREPID (Bina et al., 2019); Global Educational Futures (Luksha et al., 2018)], and global efforts through UNESCO⁵. Many universities and professional organizations have made serious efforts at lowering their own contributions to emissions, waste, and environmental toxins through initiatives such as Second Nature⁶ and the UN-lead Green University Networks⁷. Similarly, many have reviewed, changed, and refreshed curricula, and promoted more engaging forms of pedagogy (a more learning- and learner-centered approach) (de la Harpe and Thomas, 2009; Barth, 2016; Gaard et al., 2017; Pietrzak et al., 2018; Bina and Pereira, 2020; Bonini, 2020; Stanford University Design School, 2021).

These efforts have led to attempts of defining competencies needed for sustainability (e.g., Fadel et al., 2015; UNESCO, 2017; Rieckmann, 2018; Guimarães et al., 2019). Recognizing the importance of sustainability, various institutions of higher learning have reorganized and coalesced its departments and intellectual contributions into sustainability-focused institutes, initiatives, and centers (for selected examples, see McMillin and

¹Gorman, A. (2021). *The Hill We Climb*. Poem read at the inauguration of President J.R. Biden, 46th President of the United States of America, January 20, 2021. <https://news.harvard.edu/gazette/story/2021/01/amanda-gormans-inauguration-poem-the-hill-we-climb/> [accessed January 29, 2021].

²See also the fossil fuel divestment campaigns at colleges and universities: <https://campaigns.gofossilfree.org/efforts/fossil-fuel-divestment-colleges-universities> [accessed 1-29-21].

³See: <https://www.aashe.org/> [accessed 1-29-21].

⁴See, for example, journals such as <https://journals.sagepub.com/home/jtd>, <https://jotl.uco.edu/index.php/jotl/about>, and <https://www.emerald.com/insight/publication/issn/1467-6370>.

⁵See: <https://en.unesco.org/themes/education-sustainable-development> [accessed 1-29-21].

⁶See: <https://secondnature.org/> [accessed 1-29-21].

⁷See: <https://www.unenvironment.org/explore-topics/education-environment/wh-y-does-education-and-environment-matter/green-university> [accessed 1-29-21].

Dyball, 2009). Some also created fairer access and opportunities to minorities and people of lesser privilege (e.g., Klein, 2009; Walsh et al., 2020). Less successfully, albeit while advancing change slowly in the right direction, some universities and research institutions have supported their faculty, staff, and students in working toward greater transdisciplinary engagement with the world of practice and policy (Palma and Pedrozo, 2019; Fazey et al., 2020; Fazey et al., this issue).

The Non-conformist University

And still, for some these changes have not gone far enough. Nearly 50 years after the very first Rio conference, and through successive decadal summits and IPCC cycles of assessments, academia's verbal commitment to sustainability has been found to be widespread. Yet, the implementation of commensurate changes has at best been irregular and inconsistent, leading some to conclude that higher education is still more part of the problem than of the solution (e.g., Tilbury, 2011). The warning cries of society's unsustainable behavior and inadequate policy response have only grown louder. For example, in January 2021, 17 ecologists issued one of these, in what is the equivalent of scientists shouting:

"The scale of the threats to the biosphere and all its lifeforms—including humanity—is in fact so great that it is difficult to grasp for even well-informed experts. ... this dire situation places an extraordinary responsibility on scientists to speak out candidly and accurately when engaging with government, business, and the public. We especially draw attention to the lack of appreciation of the enormous challenges to creating a sustainable future. The added stresses to human health, wealth, and well-being will perversely diminish our political capacity to mitigate the erosion of ecosystem services on which society depends." (Bradshaw et al., 2021, p. 1)

While it is clearly not only academia's responsibility to address this breathtaking shortfall in leadership and action, academia does have a prominent role in preparing the current and next generation of leaders who must take up that mantle. Not surprisingly, there remains a persistent critique – from within and without – of the neoliberal commitments of universities in the (re)production of knowledge, of reductionist ways of thinking, and production of conformist consumers (e.g., Olssen and Peters, 2005; Saunders, 2010; Olssen, 2016; Busch, 2017; Connell, 2019). Sharp critiques have thus been leveraged against the complicit outcomes of teaching and research, followed by growing calls for subversive and transgressive learning (e.g., Lotz-Sisitka et al., 2015; Macintyre et al., 2018; Selby and Kagawa, 2018). Despite a long-standing acknowledgment of the need to give students more agency in their own education, few universities have gone far beyond giving lip service to this ideal (e.g., Astin, 1999/1984; Manning et al., 2013)⁸. Many continue to argue that the impact of sustainability education and research does not go far enough, has too little impact, likely because it does not address the most consequential leverage points, i.e., the

deepest drivers of societal behavior, namely its worldviews, belief systems, paradigms, and values (e.g., Burns, 2012; O'Brien, 2013, 2016; O'Brien et al., 2013; O'Brien and Selboe, 2015; Bai et al., 2016; Abson et al., 2017; Albrecht, 2020).

This has led some to shift the emphasis in education, as noted by Burns (2018):

"The field of sustainability education has been largely focused on learning that promotes sustainable change, both individual and systemic, seeking solutions for our destructive and divisive societies that are ecologically resilient, socially just, and economically viable and localized. As this field has developed, educators have also recognized the need for the integration of learning that can more deeply transform our unsustainable ways of being and knowing" (p. 277).

Clearly, critics have called out the limits of instrumentalist approaches to education and instead pushed educators to better account for the inner dimension of learning and growth in transformative (sustainability) education (de Witt et al., 2014; Horlings, 2015; de Witt, 2016; Woiwode, 2016, 2020; Burns, 2018; Parodi and Tamm, 2018; Scharmer, 2018; Wamsler and Brink, 2018; Wamsler et al., 2018; Brendel and Cornett-Murtada, 2019; Grenni et al., 2020; Ives et al., 2020; Pisters et al., 2020). Across the board, these much-needed voices call for more engaged, empowering, and creative pedagogies, and the uptake of skills and practices among learners required to grasp and deal with the "dire situation" humanity faces. Typical recommendations include the uptake of practices that foster mindfulness, reflexivity, self-awareness, a redirection from individualistic and materialist values toward cooperative and common-good values, as well as an active grappling with the emotional experience of living through the climate and ecocidal crisis of our time (e.g., Pihkala, 2020; Sherman, 2021).

CONCEIVING THE UNIVERSITY OF THE FUTURE

The Necessary Reframing of a University's Purpose

Stepping back from these specific critiques and responses of the modern(ist) University, we would argue, the incremental reforms and even more radical changes proposed are critical and necessary, but do not yet go far enough to match the challenges before us. While pushing for structural and behavioral changes to lessen universities' negative ecological impact, they maintain, even as they extend, the notion of universities as centers of scientific exploration and excellence and (secondarily) as places of human *education*. This does not go far enough. While we see the "non-conformist" efforts described above as most promising in their value commitments and aim at the kind of empowerment and emancipation needed, we wish to propose a more radical reframing of the necessary ambition.

For this purpose, we draw on depth psychology and work on initiation, particularly the work of eco-depth psychologist and

⁸A bright example is the student-led office, called Student Organizations, Media, and Culture and Arts or SOMECA, at the University of California-Santa Cruz; see: <http://studentswithagency.ucsc.edu/> [accessed 1/30/21].

wilderness-based soul initiation guide, Bill Plotkin⁹, and other kin contributors to personal and cultural transformation, albeit relying on different models of the maturation process (e.g., van Gennep, 2004/1960; Berry, 2015/1988, 1990; Mahdi et al., 1998; Henderson, 2005; Weller, 2015; Shaw, 2016; Hollis, 2020).

Universities are one potentially important place – albeit not the only one – to *initiate* the next generation into becoming the adult humans needed to navigate the difficult future of the Anthropocene (Berzonsky and Moser, 2017). The depth and extent of transformation that awaits society and that is needed to arrive – in time – at a sustainable, not human-dominated Earth requires developmentally mature, and in fact, initiated adults (Plotkin, 2008, 2021).

The University of the future is likely to fail this mission, if it “only” prepares young people in the kinds of knowledge and technical expertise required to manage accelerating climate crises and the breakdown of Earth’s life support and interlocking human systems (Maxwell, 2007; Fazey et al., 2020). It will likewise fall short, if it builds some of the psychological and social skills and competencies needed but does not recognize and place them within an understanding of the developmental needs of individuals and societies on their paths coming into mature adulthood. In this essential process for human maturation, individuals – according to Plotkin – go through a multi-staged process – “the descent to soul, [in which they experience] the dissolution of current identity; the encounter with the mythopoetic mysteries of soul; and the metamorphosis of the ego into a cocreator of life-enhancing culture” (Plotkin, 2021). Instead, the University of the future must become a crucial hub for human (psychological) *development*.

The Educational Horizon: Mature, Eco-Centric Humans

The University of the future that we envision must take on – and embody itself – an eco-psychologically transformative mission from which mature, eco-, and soul-centric humans emerge, ready to commit to enacting their deepest purpose not just in their own lives or in society but in the larger Earth community (Plotkin, 2021). This will change the University from being primarily a place of technical, vocational, and intellectual advancement to a place – in the first instance – of societal reckoning, of grieving, and actively shedding and dismantling the modernist ways that have brought on the multi-pronged eco-social crisis we now face. As such, it must become a place where psychological adolescents (of all ages) stop conforming to and perpetuating a destructive, individualistic, narcissistic, materialist, competitive, growth-oriented culture. Instead, it must become a safe but demanding space for exploring one’s true place, one’s “ecological niche” or soul (Plotkin, 2021) in the larger Earth community; where people work to find and begin to embody their unique contributions to a socially and ecologically regenerative, restorative culture.

As Astin and Astin (2000) stated,

To cope effectively and creatively with these emerging national and world trends [of social and environmental disruption and decay], future leaders will not only need to possess new knowledge and skills, but will also be called upon to display a high level of emotional and spiritual wisdom and maturity (p. 1).

This call for a “high level of emotional and spiritual wisdom and maturity” points not just to knowledge absorption and skill-building but to a psychological transformation that is necessary to generate the kinds of change agents/leaders that society needs to restore the conditions for survival and thriving, justice, peaceful coexistence, reciprocal care, dignity, and ecological healing (Astin and Astin, 2000, p. 8–16; Plotkin, 2021).

Understanding the psychological “ordeal” involved in healing from the personal and collective traumas we all carry, restoring one’s own wholeness (Plotkin, 2013; Hübl and Avritt, 2020), and readying for and undergoing the arduous search for one’s deepest niche in life (not merely a lucrative career or livelihood), thus points to more than institutional and curricular reform (although they are still required). It points to the need for creating and holding a space for an innate, but in modern societies perilously stifled process, by which humans come to learn of their “gift” to the larger human and Earth community, an offering that is essential for the thriving and continuation of those communities.

While many observers point to some of the skills and characteristics of authentic adults (Astin, 1992; Astin and Astin, 2000; Freire, 2008; Wiek et al., 2011; Roczen et al., 2014; Fadel et al., 2015; UNESCO, 2017; Bruce et al., 2018; Rieckmann, 2018; Levesque and Tichenor Blackstone, 2020; Brundiers et al., 2021; Redman et al., 2021), harboring back to the ideals of liberal and emancipatory education, they do not typically recognize them as the outcome of a crucial psychological transformative process. Consequently, they bemoan and make impassioned pleas against, the pressures of delivering on institutional values and incentives that undermine the achievement of these goals, but they do not recognize the need for creating the psycho-social container for the process of maturation.

Doing so – as guides and mentors – would mean giving space for our own and students’ learning and transformation from who *we are* to what *we all could be*. It would mean facing our demons and fears head on, unlearning as much as we learn. It would mean breaking the chains of social conditioning and “learning others,” and instead developing the capacity to hold spaces for oneself and others to undergo and trust in one’s/their own transformation. It would mean equipping those involved in the midst of such change with appropriate practices and tasks to deepen into their quest, and in the process building dispositions for deeper seeking, reflection, personal change, and motivations for lifelong learning, curiosity in, accepting the hardships of, and thriving amidst change. It would mean building agency on behalf of one’s highest self rather than one’s individualistic desires, while instilling a desire for inward experiencing and outward restoration. And as this involves the depth and breadth of human emotional and spiritual experiences, it would involve building significant skills in “being with” one’s inner world and how it responds and engages with the outer world. It would mean building the psychological stamina for hardship and embracing the inevitable,

⁹For further background on Plotkin’s work, see: <https://www.animas.org/about-us/our-founder/>.

a kind of fearlessness and boldness coupled with awareness and humility in the face of our own frailties and inadequacies.

Skilled guides and mentors would understand the arc of this monumental developmental shift and not impose their own interpretation on the process, but mirror a mentee's journey back to them. It is up to each person to discover what their unique "niche" and "gift" are. Others can only be respectful, curious, and ideally skilled facilitators of a process that leads to an innermost, sacred discovery. From this discovery, individuals will need to build the skills to enact these gifts in service to the larger Earth community, and in this way offer their soul-centered, but other-oriented contribution to the healing of the world (Plotkin, 2021). Accompanying others in the process of reaching true adulthood means helping them develop the requisite capacities to navigate, reflect on, and thus become capable of facilitating and helping yet others in their own personal transformation. In this way, the number of mature adults – with a life-sustaining value orientation and capable of navigating, aiding, and supporting the challenging transformation to sustainability – grows. Such a maturation process would go far beyond simply knowledge acquisition or development of competencies and, instead, would aim at the highest leverage points of system change (paradigm and value shifts) and thus contribute to the deep change toward sustainability required. To create the conditions for such a shift in self-understanding of the University of the future, engagement, deep reckoning, and action is required across all levels including from faculty, students, staff, senior leaders, and those setting the scene and who have influence in education much more widely.

CONCLUSION

In this paper we have reviewed widespread critiques of the modern University and its contribution to human education. We agree with the critiques, but have argued that the reformist and non-conformist critiques don't go far enough. Instead, we suggest that universities themselves must transform into institutions that cease to participate, pardon, and propagate patterns of competitiveness and exploitation and, instead, become singularly dedicated to restoring and regenerating the conditions for life – in all its meanings. This changes them from institutions of human education to spaces for human development.

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Our goal was to put forward a vision of the future University, not to engage – at this point – in questions of implementation. A focus on implementation would need to lay out more fully how current approaches to equipping young people for life would need to change; the roles played by different University actors in supporting the maturation process; and addressing both developmental, institutional, cultural, and funding barriers. For now, in this paper, we set out with proposing a sharp reframing of the purpose of the University, one that is cognizant of the existential threat humanity now faces, and that therefore urgently reorients from contributing to the destructive drivers of society to contributing to the restoration of the conditions for life. As Astin (1992) argued nearly 30 years ago,

"It is time ... to begin concerning ourselves much more directly with the development of values and beliefs that are going to heal our divisions, and which will help to create a society that is less materialistic, fearful, and competitive, and more generous, trusting, and cooperative" (p. 114).

It is far later now, but not too late. If humans are to have a prayer at survival at all, such a radical turn toward saving and restoring the conditions for life is necessary now. Universities must reckon whether it is life they want. Another day. A role and task on Earth worthy of their name.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

SM and IF have been in a long-standing conversation about the need for a radically different vision of the University. Both authors engaged in an embodied practice to vision a more fitting place of higher learning. This led to the underlying ideas for the paper. SM took the lead in drafting the paper and IF offered comments, ideas, and edits. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: SM is the Director of Susanne Moser Research & Consulting, an independent research firm. No commercial interest or gain was involved in writing this article.

The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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A Global MetaUniversity to Lead by Design to a Sustainable Well-Being Future

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OPEN ACCESS

Edited by:

Victoria Hurth,
University of Cambridge,
United Kingdom

Reviewed by:

Barry Carney,
Independent Researcher, Matlock,
United Kingdom

Maria Barreiro-Gen,
University of Gävle, Sweden
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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 15 January 2021

Accepted: 12 April 2021

Published: 07 May 2021

Citation:

Costanza R, Kubiszewski I, Kompas T
and Sutton PC (2021) A Global
MetaUniversity to Lead by Design to a
Sustainable Well-Being Future.
Front. Sustain. 2:653721.
doi: 10.3389/frsus.2021.653721

The COVID19 pandemic has revealed deep, ingrained problems with higher education, but also opportunities for positive transformation. In the post-COVID world, education at all levels has the chance to become: (1) universally available at low cost; (2) focused on developing competencies, (3) empowering fulfilling lives, not merely job training; and (4) engaged with communities to solve real-world problems. Achieving this will require overcoming the mass production model of higher education by utilizing the full potential of the Internet in creative ways balanced with face-to-face solutions-based integrated learning, research, and outreach agenda. Building a global collaborative consortium of universities and other educational institutions can move this agenda forward. We describe how this “MetaUniversity” could be structured and how it would serve to advance this agenda and lead the way to a sustainable well-being future for humanity and the rest of nature.

Keywords: higher education, problem-based learning, pedagogical approaches, online education, community engagement, global collaboration

INTRODUCTION

Education is not a preparation for life; education is life itself.

–John Dewey

We stand at a critical moment in Earth’s history, a time when humanity faces significant challenges, but also significant opportunities to redirect our course toward a more sustainable and desirable future. Universities must play a critical role in this transformation. They educate future leaders and supporting researchers in the quest for deeper understanding and applied solutions, they also serve as models of innovative practices and sustainable systems. Universities have not yet risen to this challenge and many sustainability initiatives have dissolved into fragmented and ineffectual reforms that fail to address the underlying causes of our complex socio-ecological problems.

We also live in a technologically very different world from the one that created traditional universities. We now have the ability to communicate in real-time with almost everyone on the planet. As the COVID19 pandemic has made obvious, interactive video allows meetings, classrooms, workshops, and conferences of almost limitless size with participants from around the world. Although, these come with their own problems, this shows that the accumulated knowledge of the world is no longer stored only on paper in libraries but is available to everyone with an Internet connection (Kubiszewski et al., 2011).

In this context, we need to revisit the primary purposes of higher education (McArthur, 2011). These include:

1. **Mental development:** Critical thinking, but balanced with skills in creativity, synthesis, and communication.
2. **Character development:** Learning about the world and how to live in it, including discovery, research, engagement, civility, etc.
3. **Social development:** Networking, making contacts, and building social capital that will endure throughout life.
4. **Career development:** Credentialing and the preparation for work or the next phase of education.
5. **Intergenerational transfer of knowledge:** Our complex civilization is built on the accomplishments of many human generations. Many of these accomplishments must be understood and applied by some fraction of our current population in order to maintain, sustain, and develop the world. As Herman Daly has said, *“We are always only one failed generational transfer of knowledge away from darkest ignorance.”*
6. **Achieving a sustainable well-being future:** All of the earth’s systems are interdependent, and real solutions to the current challenges must employ holistic, integrated analysis and creative, transdisciplinary education, and solutions. Higher education and academic research play a critical role in achieving sustainable well-being, not only in educating future leaders and producing knowledge but as an active agent in the co-production of real solutions.

Universities have drifted away from a balance of these purposes toward an emphasis on credentialing and career development (Wegner, 2008). Many have come to see themselves as businesses, competing to attract fee-paying students rather than public goods providers interested in building human and social capital. This is partially due to the decreasing financial support from governments. This has made them overly expensive and led many to restrict access to an elite segment of the population. Increasingly “elite” means wealthy, and access to the best universities is increasingly a function of wealth rather than merit or motivation (Durkin, 2019).

Tuition is increasing worldwide. For example, at some U.S. private institutions, it costs around \$200,000 for a 4 year undergraduate University education (World University Rankings, 2020). At the same time, state funding is being drastically cut to most public universities around the world (Sav, 2016). As a result, faculty members are compelled to teach more courses, with more students, and, likely, with less help from teaching assistants. They are also often compelled to raise considerable external funds. This trend may be eroding the overall student experience and the degree of interaction with professors (Umbach, 2007). Professors also have less time to do research and service within the community as more of their time is taken up by teaching, grading, grant applications, and administrative burdens.

At the same time, our evolving system of higher education has been undergoing a paradigm shift since the 1980s. Universities have moved away from unidirectional, instructor-focused teaching to a more distributed, “learning by doing”

student experience (Davis and Botkin, 1998; Reese, 2011). For example, most medical schools in the United States began using problem-based curricula decades ago, resulting in improved student performance (Schmidt et al., 2006). Business schools are beginning a similar shift. This shift toward more interactive, solutions-based courses is crucial, especially if it can be balanced and combined with the possibilities that the Internet has made available internationally. Especially since COVID19, full or partially online courses are becoming routine. Many universities are even providing entire degrees online. However, to fulfill the six purposes of higher education listed above, online education can and must be balanced with equal emphasis on solutions-focused, interactive courses aimed at engaging faculty, students, and stakeholders in the co-production of new knowledge and real world solutions.

The COVID19 pandemic has forced universities to rapidly transition to online learning. This has opened the door to a major rethink and transformation of higher education globally. Rather than competing with each other for students and funding, universities should collaborate in producing and sharing the highest quality online courses, freeing faculty to engage students and stakeholders in the co-production of solutions focused education, research, and applications. We call this proposed global collaboration the “MetaUniversity.”

A CONSORTIUM OF UNIVERSITIES

The proposed MetaUniversity would be a consortium of accredited, member universities providing quality education at lower cost through a balanced integration of: (1) high-quality online courses focusing on basic tools; and (2) real-world, face-to-face, solutions-oriented courses, that require transdisciplinary collaboration and outside the box thinking. This balanced curriculum of both types of courses allows students to integrate analysis, synthesis, and communications skills toward the life-long co-production of creative, real-world solutions.

High-Quality Online Courses

Online learning has become a major trend in higher education (Dykman and Davis, 2008; Allen and Seaman, 2011; Martin, 2012; Deming et al., 2015). These courses range from being completely online to having an additional face-to-face component. The COVID-19 crisis forced education, at all levels, to go online almost overnight (Sun et al., 2020). With some notable exceptions, this experience has shown how ill-equipped many universities were to fully utilize online learning (Garris and Fleck, 2020).

Regardless of the structure, to be done well, these courses require a significantly higher up-front cost compared to traditional, face-to-face courses (McPherson and Bacow, 2015). These costs are not only financial but time-intensive for faculty members. Many universities often attempt to convert most of their offered courses into an online form in a short time, as seen in early 2020 when COVID lockdowns came into effect in many countries. This stretches already tight resources in an attempt to develop high-quality courses and to keep them up-to-date. It creates the problem where courses that are designed to be very

hands-on, and require face-to-face interaction, are forced into an online form for which they are not well-suited. This detracts from the student and faculty experience. Because of these costs and challenges, most universities struggle to provide their students with high-quality online education (Nguyen, 2015).

Although the initial costs of quality online courses are high, once well-developed, they are relatively inexpensive to offer to a large number of students. Updating a course with more current information and reoffering it requires little faculty time and little additional cost for the University. There is also minimal additional cost in offering the course to a broader audience.

The MetaUniversity can be established as a non-degree granting third party that coordinates universities around the world in offering their best quality online-courses, to the rest of the consortium. It can organize students from universities around the world to take credited online courses through any of the consortium University members. Universities can create, and offer, the courses in which they have the greatest expertise, and for which they can produce the highest quality courses. For example, if University A, is known for its outstanding curriculum in Geographic Information Systems (GIS) and creates a high-quality online GIS course, it will be available to students attending any of the other consortium universities. These universities will not have to assume the costs of developing a high-quality course of their own. In return, these other universities will have more resources available to develop high quality courses in subjects they excel in and offer them to University A and other consortium members. This will result in a suite of evolving high-quality courses on the full range of topics available to all consortium members.

Such a sharing of courses will allow universities to offer their students high quality courses, with more diversity, for a significantly lower cost. Faculty around the world will no longer have to duplicate efforts in recreating the same course in thousands of locations. This will allow them to focus their time on offering more courses that require significant creative interactions, either face-to-face or live online. It would free up faculty time, and University money, to provide students with a more interactive, hands on, and compelling education in which they received the opportunity to learn how to solve real-world problems and think critically about the world. The MetaUniversity would allow a better balance between high quality online “tools” courses, and on-the-ground, solutions-focused interactive courses that blur the boundaries between research, education, and outreach.

The MetaUniversity could develop a user-friendly, online platform that facilitates a dynamic, evolving, and improving curriculum over time. Such a platform would enable new faculty and new ideas to be easily integrated, giving courses the opportunity to be enlarged and improved, giving future educators more flexibility and resources and adapting to meet student needs and abilities. Students would also be able to incorporate their feedback into future versions of a course, constantly improving and enhancing it with suggestions of new content and better organization.

The advent of Massively Open Online Courses (MOOCs), the Khan Academy, edX, and other online course initiatives are a

clear move in this direction. Outside the University structure, MOOCs have become very popular over the past few years as part of the open educational resource movement. Massively Open Online Courses are courses structured similarly to traditional University courses, but they often do not offer credit. They are free, and have no prerequisites, but may offer some form of certificate of completion. The first such course was offered in 2011 on the topic of artificial intelligence (AI) and had 160,000 registered students. 23,000¹ completed the 10-week course² Since then, MOOCs have been offered on numerous topics all over the world. The MetaUniversity could build on the experience with MOOCs in a way that improves quality and consistency, while allowing for credentialing and integration into University curricula.

The very successful California master plan for higher education consisted of a hierarchy of community colleges ($n = 116$), state universities ($n = 23$), and universities ($n = 10$)³ This system manifested as a master plan in 1960 (Douglass, 2000). The MetaUniversity could easily mesh with this type of hierarchy by matching its curriculum delivery roughly along the same lines—that is with the full range of community colleges and Universities.

The online courses available through the MetaUniversity can be available at three distinct levels (Kubiszewski et al., 2013).

1. **Independent Learning (Level I):** This is for anyone that would like to obtain the knowledge within the course and does not require University credits or a certificate of completion. This method allows individuals to complete the course asynchronously and for free. However, this option does not provide any faculty interaction or tutorial support but does allow for interaction with others taking the course by this means.
2. **Non-Credit (Level II):** This is for professionals or anyone in the public that would like to receive a certificate of completion but do not require University credits. The certificate will be awarded by the consortium of members as a whole. This option provides some faculty interaction and can be taken asynchronously or on a semester schedule. This option could have a small or nominal course fee, as determined by the MetaUniversity.
3. **University Credit (Level III):** This is for those students or anyone that would like to receive University credits for a course. Course credits are required for anyone who wishes to receive a degree through a specific accredited member University. Courses for these degrees must be taken per the requirements of that University at appropriate fees (recognizing the potential cost savings from online delivery). This option provides full faculty interaction, tutorial support, and accreditation and requires attendance at a member University.

¹<https://www.scientificamerican.com/article/massive-open-online-courses-transform-higher-education-and-science/>

²<https://www.economist.com/the-economist-explains/2013/10/01/will-moocs-kill-university-degrees>

³<https://www.ppic.org/publication/higher-education-in-california-californias-higher-education-system/>

As a means of providing information and knowledge to the broadest audience possible, all content, resources, and results from the MetaUniversity courses will be freely accessible to the public (Level I above). No registration will be required to access content; registration will only be required for taking a course at Level II or III.

Course content can be grouped on various scales to accommodate the different needs of educators, policymakers, students, and the public. These scales will include full syllabi, modules, sub-modules, and independent resources. Such various groupings provide access to individuals looking for very specific assignments, readings, videos, etc., but also individuals looking for an overview, or a comprehensive picture, of a subject area. Students in the Levels II and III categories must demonstrate proficiency after completing the courses (Doroudi, 2020). Developing assessments to measure the knowledge and skills in their content domain is challenging and expensive on the front-end of development (Towns, 2014; Bearman et al., 2017), but techniques are evolving rapidly to improve this, even without human intervention (Kurnia et al., 2001).

Solutions-Focused Courses

Solutions-focused courses allow students to apply the tools and skills that they gained through the online courses to collaboratively solve problems. These will be dynamic, on-the-ground, solutions-oriented courses that may send students and faculty into the community to address urgent, real-world problems, and help identify and implement solutions with broad policy implications. They will address problems at multiple temporal and spatial scales. These courses can involve students and faculty from a broad range of disciplines and those from universities that are part of the MetaUniversity consortia, as well as community stakeholders and decision-makers to collaboratively find whole-system solutions. Because these courses require creativity and interactive communication between the professor, students, and community members, they cannot be taught in large, impersonal online courses. They require small group, in-person interaction. This approach is a form of “co-learning” that blurs the boundaries between research, teaching, and outreach (Heron et al., 2006).

Being involved in such an exercise will provide students the opportunity to use the knowledge they obtained through the online courses in the real-world, but with faculty cooperation, oversight, and facilitation. These courses can provide, if properly designed and conducted, both the faculty and students with an unforgettable educational experience and the opportunity to do on-the-ground, real-world, practical research. They also provide students with the opportunity to learn and practice their communication skills. Students will have to learn to communicate and interact with a broad range of community stakeholders throughout the project and to communicate their results to the appropriate audiences. This may take the form of a peer-reviewed publication, short video, pamphlets, press release, website, or any other media appropriate to the project. Students will receive University credit from the universities they are enrolled in. The main elements of these courses (Kubiszewski et al., 2013) include:

(1) transdisciplinary, solutions-focused learning; (2) community-client interaction; (3) stakeholder participation; (4) blurring of the distinction between faculty and student, research education, and outreach; (5) adaptive management and flexible working groups; and (6) appropriate and practical communication of results.

Learning Outcomes Assessment: Solutions-Based Courses

Successful students in these solutions based courses will have applied their mastery of knowledge and skills in their respective disciplines to transdisciplinary real-world problems. Typically these efforts will be collaborations between faculty, students, and many other potential partners in government, civil society, or the public at large. The MetaUniversity is designed to educate people to achieve a balance of the six purposes of higher education listed above, including to serve the public good and to help build a more sustainable and desirable future. It will help to develop the key competencies needed to achieve these goals (Adomssent et al., 2007; Wiek et al., 2011; Rieckmann, 2012; Lozano et al., 2019).

One objection often heard of collaborative courses is that it is difficult to assign individual grades to group work. But difficult is not impossible as this form of grading has been routinely done (Davies, 2009; Burke, 2011; Maiden and Perry, 2011). For example, instructors can evaluate an individual's contribution to the collaborative assignment, as well as the work of the group as a whole. They can allow group members to evaluate each other's contributions through peer evaluation procedures. The interactive nature of these courses can allow assessments to be an integral part of the collaborative learning process. This will also replicate real-world job situations where individuals are often assessed for, and need to assess, their contributions to group work.

Administrative Structure

The administrative structure of the MetaUniversity can be both lean and inclusive. It can include a core staff to handle details of the network and a distributed decision-making structure involving all the member universities. The decision-making structure can include broad global participation from member universities through a Stewardship Committee and Advisory Board who provide advice on policies, curriculum, and programs.

The Stewardship Committee can be comprised of representatives from each of the member universities. This Committee can communicate regularly about course development and be responsible for approving newly developed courses within their respective universities. The Stewardship Committee can meet bi-annually in-person, and as needed online, to discuss the development of further courses and curriculum, make membership decisions, and overall operations of MetaUniversity.

The Advisory Board can be comprised of education thought-leaders from around the world to provide guidance and ideas on a macro level. The advisory board can meet with the Stewardship Committee to provide advice and guidance when appropriate.

University Approval

Any courses taken at Level III for University credit will first have to be approved by each member University before students from that University are permitted to enroll. For a course to be approved, each instructor will have to submit a detailed syllabus and their CV to the MetaUniversity. Each University and students within each University will be able to browse proposed and approved syllabi, including instructor's CVs on the website. Each course and the instructors will be evaluated by the students and all evaluations will be available openly at the MetaUniversity website.

PRECEDENTS AND POTENTIAL OBSTACLES

Many aspects of such a system have been tested on smaller scales (King and Cerrone Arnold, 2012). At the international scale, the European Union's "Young Universities for the Future of Europe (YUFE)"⁴ is an alliance of ten young research-intensive universities and four non-academic partners located across Europe funded by the Erasmus program. Another precedent is the Bologna Process, a series of ministerial meetings and agreements between European countries to ensure comparability in the standards and quality of higher-education qualifications (Crosier and Parveva, 2013).

However, potential difficulties may arise on larger international and global scales. Managing time zones and overcoming language barriers are just two of the obstacles that need to be addressed. This can partially be resolved through a selection of core basic courses across different languages, but issues of coordination across countries remain.

Recent experience with online education as a result of the COVID pandemic has received mixed results. However, this transition to online-only education was rushed and the results were inconsistent at best. It also made clear that online-only education cannot meet the full list of six purposes for higher education listed above. The MetaUniversity would allow investment in a balance of high quality online courses with in-person solutions-focused courses, which would address this issue.

Certain fundamental aspects of higher education will also need to be addressed (Kubiszewski et al., 2013). One such issue is the property rights assigned to content created by professors, especially for shared online courses (Klein, 2004). Currently, all course content produced by faculty is owned by their home University. For this consortia to work, course content will need to be shared among the universities and may require more flexible copyrights, such as a creative commons license (Liu et al., 2014). This license allows the creator to retain credit for the production of the content but with more allowances for certain types of usage. This content can be produced by faculty members of the collaborative universities, academic societies, or independent scholars. All courses will require approval before being accessible to students and the public.

The transfer of course credits may also need to be rethought. Currently, the process for students to transfer credits is inefficient. Simplifying the exchange of credits between universities may be the first step in enabling the sharing of faculty among the MetaUniversity members in a way that benefits both the students and the universities. One potential way to make this happen is to have the MetaUniversity collaboratively, or the universities themselves, approve courses that their students would take at other universities to gain credits toward their degrees. Tuition fees would be distributed between those universities in a prearranged way.

There are also a host of issues over financial concerns across universities around the world with differing "business models." Many universities are only viable on substantial student revenue. Others have large endowments or sufficient public funding. The MetaUniversity will have to resolve how to appropriately cost and distribute funds from online or in-person courses, that are jointly offered between its members. It also must be stated that even online offerings require considerable local assistance from both faculty and administrators. It seems desirable to have local expert faculty run tutorials and targeted discussion groups to support online offerings, not to mention certification exercises and assessments. This will also have to be properly costed and resourced. There are many other challenges that will be encountered within such a new system. However, through creative cooperation toward a shared goal, such obstacles can be overcome.

A key potential benefit of the MetaUniversity model is significantly lower costs for basic courses, higher quality of content, and more time for faculty to engage in solutions-focused courses. However, local teaching demands for the basic course would still remain. These could be minimized via intelligent online course design and new research into automated grading, but they cannot be eliminated completely.

CONCLUSIONS

The higher education system needs to adjust to a quickly changing world. The traditional role of universities as storehouses of knowledge and the source of delivery of that content is being overshadowed by the massive availability of information on the Internet (Hrubos, 2011). Technical skills quickly become obsolete as technology changes. The University of the future will need to teach students the tools they will need in this quickly changing world, as well as how to think critically and creatively regardless of what job they have or what problem they are asked to solve. Education is key to solving our global problems and creating a sustainable and desirable future. This will require an educational structure that changes our current way of thinking to one that allows us to better focus our global intellectual capital on solving the multitude of problems we now face.

The MetaUniversity we propose can:

- add significant value to the programs within member universities by using resources more effectively, avoiding

⁴<https://yufe.eu/>

unnecessary duplication of basic courses at every University, and reducing overall costs;

- provide students access to “the world’s best” tools and analysis-based courses, regardless of their physical location, while allowing local faculty to focus on interactive, transdisciplinary, in-person, solutions-focused courses that address real-world problems to help create a sustainable and desirable future.
- increase the overall quality and utility of the University educational experience for a wider audience; and
- allow access to world-class University education in developing countries with relatively modest educational infrastructure.

Universities are critical to addressing the massive challenges of transforming our society into one that can create and sustain the well-being of humans and the rest of nature. The old model of

higher education needs to be transformed in order to lead this transformation. A global, collaborative MetaUniversity like we have described is one way for this to happen.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Climate Emergency: UK Universities' Declarations and Their Role in Responding to Climate Change

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OPEN ACCESS

Edited by:

Victoria Hurth,
University of Cambridge,
United Kingdom

Reviewed by:

Francesco Caputo,
University of Naples Federico II, Italy
Pekka Juhani Peura,
University of Vaasa, Finland

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 29 January 2021

Accepted: 16 April 2021

Published: 19 May 2021

Citation:

Latter B and Capstick S (2021)
Climate Emergency: UK Universities'
Declarations and Their Role in
Responding to Climate Change.
Front. Sustain. 2:660596.
doi: 10.3389/frsus.2021.660596

On April 17, 2019, the University of Bristol became the first university in the United Kingdom (UK) to declare a climate emergency. Against a backdrop of high visibility and public concern about climate change, as well as climate emergency declarations from other sectors, another 36 UK universities followed suit over the next year. This paper explores what these climate emergency declarations show about how UK universities are responding to climate change and wider sustainability concerns, as well as how they view and present themselves in relation to this. Critical Discourse Analysis of the declarations allowed for in-depth scrutiny of the purpose and wider social context of the documents, demonstrating that they function as promotional statements, as presenting a collective voice, and showing a commitment from the universities to action. We argue that while these provide the potential for advancing sustainability within the sector, the tendency to use declarations as publicity and promotional material does detract from new commitments and action. The research contributes to the discussion around the role of universities as institutions with a responsibility both to act on climate change and to shape the broader societal response to it. It also provides insights as to how future research can evaluate universities in relation to their commitments and strategies, and provides suggestions to help ensure they live up to the promises and intentions that they have publicly made.

Keywords: climate emergency, climate emergency declaration, universities, higher education, climate change, sustainability

INTRODUCTION

Climate mitigation and progress on sustainability requires action across society, although some sectors have greater power—and obligation—to make an impact than others. With the autonomy (Collini, 2012) and expertise (Boulton and Lucas, 2008) to push for change, universities are in a privileged position. These institutions are uniquely situated to lead the way in responding to the climate and ecological emergency as they are multidisciplinary and collaborative, part of the local and national economy, able to think longer term, and provide a fertile space for discussion and debate (Katehi, 2012). This substantial potential to push for change is furthermore allied with universities' core functions of research and education (Harayama and Carraz, 2012; Bauer et al., 2018). The Higher Education sector represents a substantial share of economies worldwide (Calderon, 2018) and the UK reflects this wider trend, with 2.38 million students and almost 440,000 staff in UK Higher Education institutions in 2018–19 (Universities UK, n.d.).

Universities have made progress in addressing sustainability through measures such as sourcing renewable energy for their operations (Milligan, 2019), researching routes towards more sustainable societies (White, 2013) and considering global citizenship in education (Fiselier et al., 2017). Nevertheless, in terms of tackling their own carbon emissions, the scale and nature of change needed is substantial. Previously, the Higher Education Funding Council for England (HEFCE),¹ set a target of 43% reduction in carbon emissions by 2020 against a 2005 baseline (HEFCE, 2010). However, Amber et al. (2020, p. 514) found this would be missed “by a huge margin” and that new policies and mechanisms are needed urgently to deal with this issue. Of the UK universities ranked in the People and Planet University League (2019a)—a student-led initiative that rates institutions on a range of indicators—only a third were on course to achieve their 2020 emissions targets (People and Planet, 2019b).

The action needed by universities goes beyond reducing emissions; as Sterling (2013) argues, sustainability must become part of their purpose, rather than it being tackled as an “add-on.” In a similar manner, Facer (2020) stresses that more profound change is needed in how universities operate, including through reconfiguring their operations and refocusing educational missions, in ways that help promote wider society’s move away from unsustainable practises. This has not yet occurred to the extent needed to position sustainability concerns at the heart of the ethos and institutional purposes of Higher Education; Ralph and Stubbs (2014) suggest that universities have in many cases been behind government and industry in taking action, and Facer (2020) likewise argues that universities’ civic role in relation to industry and communities needs reinvigorating (Facer, 2020). Leal Filho’s et al. (2017) global study of universities found that the main barriers to sustainable development are institutional limits to their ability to enact rapid change, as well as sustainability issues not being prioritised, and the lack of dedicated structures to put solutions into practise. More far-reaching change will present challenges to universities, not least in reconciling their aim to be sustainable on the one hand, and international in their outlook and collaborations on the other (Glover et al., 2017). Ultimately, fully addressing sustainability and climate change raises questions about how universities operate and what purpose they serve. This includes whether they are prepared to advocate for substantial social, economic and cultural change for emissions reduction and sustainability, or see this as beyond the remit of “disinterested” scholarly work (Capstick et al., 2014).

One indication that the centrality of sustainability and climate concerns may be rising up the agenda of universities, has been the practise of declaring a “climate emergency.” Since the University of Bristol became the first UK university to declare a climate emergency on April 17, 2019, 36 others followed suit within a year, of a total of 161 UK universities (Amber et al., 2020). These declarations occurred at a time of unprecedented publicity and visibility of the climate crisis, with the UK public more worried about climate change than has been previously recorded

(Capstick et al., 2019); despite even the impact of COVID-19, public concern has remained high (Whitmarsh, 2020). University students are also more worried about climate change than has been previously recorded (NUS, 2019).

Drawing attention to climate change in terms of an emergency suggests a recognition that fast and substantial action is needed. However, closer attention to these declarations is necessary, to understand how universities are responding to climate change both operationally and in a wider social context, how they are positioning themselves and their role in response to the climate emergency, and how these public-facing statements may differ between universities. The declarations made across UK universities have not previously been systematically analysed. This study aims to contribute to an understanding of how UK universities are addressing climate change. Scrutiny of what universities are saying and doing will contribute to an understanding of how change is taking place, and provides a basis for holding the sector to account for action on the climate crisis. While the present study focuses primarily on universities’ climate emergency declarations, we also consider climate change to be a valuable focal point for exploring sustainability in a wider sense.

METHODS

In order to systematically analyse the declarations, documents were collated from universities who declared a climate emergency between April 17, 2019 and April 16, 2020. This year-long period was deemed a suitable time period from the date of the first declaration, not least as the initially rapid rate of declarations began to slow into early 2020: whereas 14 universities declared during the first 3 months from mid-April 2019, only six did so in the final 3 months to mid-April 2020. Some universities made declarations as standalone announcements whereas others declared by signing the Global Universities and Colleges Climate Letter (hereafter referred to as the Climate Letter), a public online document organised by the Environmental Association for Universities and Colleges (EAUC), the climate action non-profit Second Nature, and the UN Environment Programme’s Youth and Education Alliance (UN Environment, 2019); this declaration included the wording “we collectively declare a Climate Emergency” (SDG Accord, n.d.). Although 37 universities declared a climate emergency during this time, only 26 documents are included in this research: the Climate Letter and 25 standalone declarations. The universities are from across Great Britain and are distributed across the Times Higher Education (2020) rankings, with institutions in both the top and bottom ten (for further detail see **Supplementary Material**).

Standalone declarations were defined as documents where the main purpose was to declare a climate emergency, or which had a dedicated section within them doing so. One document per university was analysed. Documents which simply referred to the declaration or made mention of a climate emergency but whose main aim was not to make a declaration were not included. Declaring universities were identified either through the Climate Letter, a list of university sustainability commitments on the EAUC website or through news articles

¹Now replaced by UK Research and Innovation (UKRI) and Office for Students.

TABLE 1 | UK university climate emergency declarations.

University	Date	Standalone declaration
University of Bristol	April 17, 2019	Yes
Newcastle University	April 18, 2019	Yes
University of Glasgow	May 2, 2019	Yes
Keele University	May 3, 2019	Yes
University of Lincoln	May 16, 2019	Yes
University of Exeter	May 20, 2019	Yes
University of East Anglia	June 5, 2019	Yes
UWE Bristol	June 13, 2019	Yes
Falmouth University	June 20, 2019	Yes
Bangor University	June 21, 2019	Yes
University of Manchester	July 2, 2019	Yes
King's College London	July 2, 2019	No
Glasgow Caledonian University	July 5, 2019	No
University of Plymouth	July 10, 2019	Yes
University of Worcester	July 16, 2019	No
University of Sussex	August 1, 2019	Yes
Canterbury Christ Church University	August 8, 2019	Yes
Goldsmiths	August 12, 2019	Yes
University of Edinburgh	September 2, 2019	No
University of Warwick	September 20, 2019	Yes
University of Winchester	September 20, 2019	Yes
Anglia Ruskin University	September 20, 2019	No
Birmingham City University	September 20, 2019	Yes
University of Cambridge	October 1, 2019	No
University of Portsmouth	October 1, 2019	No
Swansea University	October 15, 2019	No
UCL	October 17, 2019	No
Royal Agricultural University	October 31, 2019	No
Plymouth Marjon University	November 15, 2019	No
Aberystwyth University	November 25, 2019	Yes
Cardiff University	November 29, 2019	Yes
University of Brighton	January 17, 2020	Yes
Brunel University London	January 24, 2020	Yes
Liverpool John Moores University	February 7, 2020	Yes
Buckinghamshire New University	February 14, 2020	No
Bath Spa University	February 27, 2020	Yes
University of Nottingham	March 2, 2020	Yes

on the climateemergency.uk website. Further universities were identified via search engines using the terms “university” and variants of “climate emergency declaration.” Declarations were then obtained directly from university websites. The full list of universities that made a climate declaration during the 1-year time period are shown in **Table 1**.

The research applied a Critical Discourse Analysis (CDA) method to analyse the declarations. This was used in order to reveal both what is conveyed in text and the way this is done, and additionally as it allows us to situate documents in the broader contexts in which they were created to provide a wider frame of reference. CDA is concerned with how language is used as a means of exercising different types of power

(Fairclough et al., 2011). As Blackledge (2012, p. 617) puts this, “language is not powerful on its own, but gains power through the use powerful people make of it.” The analysis follows a three-step process outlined by Oswick (2013) which addresses:

1. The text dimension
2. The discursive practise dimension
3. The social practise dimension

Documents were read several times before commencing the analysis to ensure familiarity with the content. For step one, the text dimension, the documents were coded inductively over several iterations to identify recurrent topics and areas of emphasis. The analysis then proceeded to identify broader, over-arching themes. Having identified three main themes, the analysis proceeded to step two, the discursive practise dimension. This considered the author, audience, stakeholders, and where and when the documents were published. These sensitising questions are recommended by Oswick (2013) to look beyond the content and provide insights into the wider context in which documents are produced and consumed. The third step, the social practise dimension, considered power and the broader institutional and societal landscape. This complements the first two steps by considering factors relevant to universities: for example, concerning reputation, their core business, and civic responsibility. This drew on insights from the literature to understand how the declarations interact with wider landscape in which universities function and how the declarations demonstrate power.

The Critical Discourse Analysis (CDA) used in this study is grounded in a critical theory approach. Critical theory consists of four main elements: an ontology that states that social reality is constructed; an emphasis on power and ideology; internal and external connections and contexts; and reflection and suggestions for change (Prasad and Caproni, 1997). The epistemological position for the present research is therefore that it sees truth or meaning as “constructed” – that is, assembled through the use of language and other symbols. CDA views text in documents as being particularly important, as the language used within them creates and mediates social action (Lee, 2013), for example by shaping institutional narratives or priorities. A critical theory approach can be used to understand the nature and operation of organisations (Symon and Cassell, 2013); in the case of the present research, the elements outlined above are used to understand the climate emergency declarations of universities in order to scrutinise how they are responding to climate change. Further detail about CDA and the analytic approach is provided in the **Supplementary Material**.

RESULTS

Aside from carbon neutral targets, the Climate Letter provides no information about the individual signatories. Therefore, the results mainly draw from the standalone declarations.

The analysis identifies three overarching themes. We highlight how these function as promotional statements, as demonstrating a collective voice, and as showing a commitment to action. See

TABLE 2 | Distribution of universities across each theme.

Theme	Number of universities
Declarations as promotional statements	22
Declarations as a collective voice	26
Declarations as a commitment	18

Table 2 for a summary of the distribution of universities across each theme.

Declarations as Promotional Statements

The declarations function, firstly, as promotional statements about the universities' achievements on climate change and broader related issues. Many of the universities highlighted work that they have previously done, that was ongoing or that would be taking place in future.

Examples of promotional statements identified within declarations include the following:

"Keele University launched its new Institute for Sustainable Futures last year." (Keele University, 2019).

"For many years, the University has been deeply committed to social, environmental and financial sustainability at a strategic and operational level." (Canterbury Christ Church University, 2019).

"Between 2009 and 2018 we produced 9,209 publications relating to Sustainable Development Goal 13: Climate Action." (University of Manchester, 2019).

As can be seen from the statements above, despite the declarations ostensibly being concerned with the climate emergency, there was a clear sense in which they sought to draw attention to the reputation and good name of declaring institutions.

The university's role in research and education was frequently mentioned, and focused typically on the content of curricula and type of research carried out (e.g., conservation), as opposed to research or educational practises (such as internationalism or long-haul travel). Staff and student practises, awareness and engagement were mentioned but to a lesser extent; the main focus across the declarations was on operations, research and education. Although there is a clear focus on climate change, 14 of the universities referred specifically to animals and/or nature, with four declaring an ecological, biodiversity or environment *and* climate emergency. This suggests that these universities sought to publicly acknowledge and give weight to these related issues.

A clear indicator of the promotional function of declarations, was their use to show leadership in climate change and sustainability through awards and rankings, subject expertise and being the "best" or "first" at something. There were explicit mentions of leadership, both current and aspirational, for the university as a whole as well as researchers and students, as illustrated by the following statements:

"Lauren McDougall, President of the Students' Representative Council (SRC), commented: 'Students at the University of Glasgow feel passionately about the issue of climate change and want their institution to play a lead role in tackling it.'" (University of Glasgow, 2019).

"We have some of the best teams anywhere in the world working on climate change and the environment." (University of Exeter, 2019a).

"This builds on the university's long-standing commitment to sustainability which has...seen it receive a first-class award every year since 2012 from the People & Planet University Green League" (University of Brighton, 2020).

This emphasis on leadership is designed to showcase universities' proficiency and the recognition that they have received for their efforts. Such leadership was often framed in an international context, reflecting the priorities of the university sector to be successful globally, not only for research and education but also for sustainability issues.

The placing of the publication of declarations, as well as their content, also shows them to have a strong promotional aspect. The majority of declaration announcements were published as public-facing news articles on universities' websites. This indicates the intended audience was not only staff and students, but also aimed at wider stakeholders and the general public. Many of the declarations were mentioned in local and national press, enabling a wider public reach and promotional function for universities (e.g., Falmouth Packet, 2019; Walker, 2019).

The timing of the declaration announcements also points towards their promotional function. Following the University of Bristol's initial declaration, a concentrated series of declarations were made, particularly in the first 6 months. Some universities made their declarations on specific days where more publicity was likely: four declared on September 20, 2019, the start of a week of international climate change strikes, and one declared on World Environment Day 2019. These declarations were made at a time when climate change and the climate emergency were very much in the public eye, suggesting an ideal time for universities to demonstrate their achievements in this area.

Declarations as a Collective Voice

The declarations are used to demonstrate both internal and external togetherness: that the universities are part of a bigger whole and that there is attention to this topic across the sector. Many universities stated that they were joining with others in the UK and around the world in declaring a climate emergency. As with the expressions of leadership, there was an international focus by many universities. Framing the declarations in this way gives a collective voice to the universities, even though many of the declarations were made separately and there is a clear element of competition shown by their emphasis on leadership. As so many of the declarations were announced during a short period of time and others by way of the Climate Letter, this also gives them a collective voice. Examples of this feature are illustrated by the following statements:

"Aberystwyth University has joined organisations around the world in declaring a climate emergency." (Aberystwyth University, 2019).

"We all need to work together to nurture a habitable planet for future generations." (Climate Letter; SDG Accord, n.d.).

"The University of Plymouth has declared a climate emergency, joining an international movement." (University of Plymouth, 2019).

The universities appear keen to demonstrate that others have already declared a climate emergency, even the University of Bristol (2019), which was the first university in the UK to do so. By framing their announcements in this way, the universities give more legitimacy to their declarations through showing they are part of a wider initiative.

Staff and students are mentioned in almost all of the declarations and are positioned as key collaborators in relation to climate change and sustainability. There are also specific mentions of the Student Unions supporting the universities' actions, working with them or jointly declaring a climate emergency.

"Bath Spa University and its Students' Union have joined forces to declare a climate emergency." (Bath Spa University, 2020).

"Professor Juliet Osborne, Director of the Environment and Sustainability Institute, will be chairing a working group bringing together staff and students." (University of Exeter, 2019a).

"A comprehensive action plan will be drawn up in consultation with staff and student unions." (Goldsmiths, 2019).

Staff and students are often positioned as active and independent stakeholders as well - raising awareness, showing concern, pushing for action and providing ideas, though students are positioned in this way to a greater extent; for example as in the University of Sussex's (2019) declaration: "in declaring a climate emergency, our students and supporters will hold us to account for our own actions." External stakeholders are also mentioned, but to a lesser extent and depth than internal stakeholders. This suggests that although the declarations are public, they focus on demonstrating the importance of their internal stakeholders who are likely to be most attentive to the declarations.

Declarations as a Commitment

The declarations function as a way to demonstrate the universities' commitment to tackling climate change in tangible ways such as policies, targets and committees, as well as talking broadly about action and commitment. Many of the universities referred to the severity and urgency of climate change, with their commitments used as a way of demonstrating that they understand this, as in the phrasing used by Liverpool John Moores University (2020): "We are deeply committed to playing our part at this critical time."

While much of the wording of the declarations is promotional, as described above, many nevertheless include action-oriented statements. Six universities explicitly addressed the need to go beyond words and

take action (Cardiff University, 2019; Falmouth University, 2019; Goldsmiths, 2019; University of Exeter, 2019a; University of Sussex, 2019; University of Warwick, 2019), for example:

"We must...work together to help move us on from making this declaration to a comprehensive plan of action." (Cardiff University, 2019).

Commitment was also demonstrated through more tangible outcomes or objectives. Most universities mentioned specific targets or goals, mainly for becoming carbon neutral or reaching net zero; this is also referred to in the Climate Letter, signed by 20 of the universities. For example, Keele University (2019) "announced an ambitious climate emergency target to be carbon neutral by 2030." In some cases, universities also stated their intentions to incorporate sustainability more deeply into the university's practises and some referred to sustainability being at the "heart" of the university (University of Manchester, 2019; University of Plymouth, 2019; University of Winchester, 2019). The notion of more transformative change to the universities' modes of operation and ethos was only occasionally touched upon, however, as in the following example:

"Through this declaration, Birmingham City University commits to putting in place a programme that will deliver a transformed university." (Birmingham City University, 2019).

Both current and future internal committees, groups and boards were mentioned, though to a lesser extent than targets and documents. In many cases, Vice Chancellors' statements are used to convey the commitment at senior level to the declaration. All of these tangible outcomes and practises demonstrate ways in which the universities' actions are made legitimate and can be scrutinised in future.

DISCUSSION

Since late 2018 there has been a sustained and high level of publicity around climate change in the UK, including through media coverage of the IPCC's (2018) 1.5°C special report, Sir David Attenborough's television programme "Climate Change – The Facts" (BBC, 2019), as well as widely-reported school strikes and large-scale protests. The heightened visibility of climate change has been unprecedented and unexpected. As well as contributing to, and reflecting, a substantial increase in public concern (Capstick et al., 2019), it has paved the way for increased pressure on and by civil society, including universities. Although it is difficult to know the exact mechanisms driving each university's declaration, it is clear that this wider social context, as well as the growing interest in climate emergency declarations, has been influential.

In their declarations, the universities address the main barriers to sustainable development identified by Leal Filho et al. (2017) to varying degrees, in terms of reflecting their institutional priorities

and structures. By way of a public declaration and the language used to describe climate change and sustainability, they clearly give a heightened importance to tackling it. By framing it as an emergency they suggest that rapid action needs to be taken, and some have announced dedicated structures to do so. This demonstrates that universities do, on the face of it, appear to be firmly committed to action and to be pursuing this towards addressing sustainability.

The emphasis on research and education in the declarations, as well as frequent mention of their international focus, demonstrates that universities are, to some extent, linking climate change to their core roles and interests. This reflects Chapleo et al.'s (2011) findings about how universities brand themselves on their websites. However, while the declarations typically suggest that universities want to be seen as leaders, none go as far as to suggest *re-purposing* universities, with only a small number mentioning sustainability being at their heart, or other indicative language of more transformative change. In light of this, there remains a risk that climate change and sustainability are seen as “add-ons” or peripheral to their core business; in this, they would appear to conform to Huisman and Mampaey's (2018, p. 437) argument that universities are more comfortable with “legitimised action” and are unwilling to stand out on more fundamental questions that could be asked of the Higher Education sector in a time of climate emergency.

Even with respect to achieving emissions reductions from operations, setting targets does not necessarily mean they will be achieved – as is indicated by progress to date in the form of HEFCE (2010) and People and Planet (2019b) data for universities. It is nevertheless encouraging that many declarations also mentioned more concrete action and plans beyond target-setting. One promising example in this vein, is that by the University of Exeter (2019b), which published an Environment and Climate Emergency Working Group White Paper 6 months after their announcement, explicitly stating that this came about as a result of their declaration.

Although these declarations tell us about the image that the universities are trying to portray, the present research is limited in that it cannot show the internal workings of the universities either in the lead up to making the declarations nor what action they have taken after doing so – in this sense the analysis carried out here should be seen primarily as a snapshot of universities' public-facing intentions and perspectives at a critical juncture in society's response to the climate emergency. This has implications for future research that could identify which actions universities have taken following their declarations, such as whether they use their collective voice on this issue and achieve the emissions reductions to which they have committed. This will demonstrate whether momentum has been maintained – particularly given the shocks to the sector experienced from COVID-19.

CONCLUSION

This research sought to identify what UK universities' climate emergency declarations show about how they are addressing climate change. Our analysis found some revealing contrasts in how universities position themselves. There is a competitiveness in how the declarations are used as promotional statements, yet

there is also a clear interest in showing that individual universities are part of a greater whole. From their emphasis on a collective voice, the declarations suggest that universities are seeking to emphasise that the climate emergency is a shared problem. The difference between how the universities declared may also indicate a variability in their interest in publicity. While the Climate Letter, signed by many declaring universities, contains clear commitments and recognition of the climate emergency, for those universities that only signed that pre-written letter this arguably indicates less ambition and expectation of scrutiny than a standalone announcement.

It remains to be seen what impact the climate emergency declarations will have, over and above any action that universities were already taking on climate change. Universities should be commended for their public commitment to take climate change seriously, but as Falmouth University (2019) states, these declarations “must be more than warm words” if universities are to be taken seriously. There remains an important difference between the specific commitments in the declarations, and arguments for more far-reaching reorientation of purpose and practise of the sector. Staff and students are frequently mentioned within universities' declarations, and it is likely—indeed essential—that universities will be held to account by these groups for the level of action they pursue following their declarations. The declaration of a climate emergency is only a starting point, but provides a firm basis for demanding institutions live up to the promises and aspirations they have put forward.

DATA AVAILABILITY STATEMENT

The original contributions generated for the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

BL developed the research, ideas and methodology and carried out the analysis. SC supervised the research, helped shape the analysis, and revised the article. BL led in writing the article with input from SC. All authors approved the submitted version.

FUNDING

The open access fee for this article was paid for by the Economic and Social Research Council (ESRC): grant reference ES/S012257/1.

ACKNOWLEDGMENTS

The authors thank Dr. Christina Demski and Dr. Sarah Mander as co-supervisors of the research.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsus.2021.660596/full#supplementary-material>

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Can Universities Help “Build Back Better” in Education? The Socially Embedded University Responds to the Covid-19 Pandemic

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OPEN ACCESS

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 02 December 2020

Accepted: 12 April 2021

Published: 20 May 2021

Citation:

Reimers FM (2021) Can Universities
Help “Build Back Better” in
Education? The Socially Embedded
University Responds to the Covid-19
Pandemic. *Front. Sustain.* 2:636769.
doi: 10.3389/frsus.2021.636769

The high impact disruptions in the external environment caused by the Covid-19 pandemic revealed the socially embedded character of many universities around the world. University collaborations with schools during the pandemic suggest that they are institutions open to their external environment, capable of learning from and with their environment, and capable of influencing their external environment, helping to address significant social challenges. Drawing on a non-probabilistic survey administered to a convenience sample of 101 universities in 21 countries, I examine how they built partnerships with schools to sustain educational opportunity during the pandemic. The results are informative of the evolving nature of higher education and its mission. They illustrate the responsiveness of universities to societal needs. The findings show that universities are socially connected to their surrounding context, and that they see themselves as engines of social innovation at a time of great unexpected need. The study found the majority of universities to be engaged with schools supporting education during the pandemic. They see such engagement as part of their mission and strategy, even though they perceive it as challenging. Most of such engagements do not have a formalized “theory of action,” but are evolving as the crisis created by the pandemic itself evolved. While such engagement during the pandemic builds on pre-existing engagements with schools, the response during the pandemic provided an opportunity to integrate different efforts across various units. The majority of the universities in the study had a school of education, and about half have a program of pre-service teacher education and few of the collaborations established during the pandemic were new, most were based on pre-existing collaborations. In two thirds of the cases the collaborations with schools during the pandemic were initiated by University leaders. Most of the collaborations consist of developing alternative delivery channels and supporting teachers in developing new skills to teach remotely.

Keywords: COVID-19, higher education sustainability, higher education outreach, sustainable development goals, university school collaborations, higher education innovation, socially embedded university, education disruption

A MAJOR GLOBAL DISRUPTION AND THE NEED TO “BUILD BACK BETTER”

The effects of the 2020 Covid-19 pandemic could make the world less inclusive, less stable, and less sustainable during the coming years (World Economic Forum, 2021). These effects include those on people's lives and health, including mental health, as well as the economic consequences of infection or death to those directly affected and to their dependents. Indirect effects include jobs and income loss, mobility restrictions, disruptions to schooling, and severe limitations to other forms of association and interaction. A considerable burden for governments will be the financial toll created by funding the costs of the public health response to the pandemic, as well as the costs of the economic relief to individuals and businesses which some governments provided to mitigate the impact of the disruption to work and business (World Bank, 2021).

The scale of these disruptions caused by the pandemic is unprecedented, likely to cause a global economic recession not seen since the Great Depression (Reinhart and Reinhart, 2020). A United Nations report explains that the Pandemic has exposed and augmented pre-existing vulnerabilities, and that recovering from its impact requires not just restoring the conditions which existed prior to the pandemic, but “building back better,” pursuing the global development agenda, as articulated in the UN Sustainable Development Goals (United Nations, 2020: p. 1).

“Recovery is an opportunity to address the climate crisis, inequality of all kinds and gaps in our social protection systems. Instead of going back to unsustainable systems and approaches, we need to transition to renewable energy, green infrastructure, sustainable food systems, social inclusion, gender equality, and stronger social safety nets, universal health coverage, better preparedness for health emergencies and multi-hazard risks.” (United Nations, 2020: p. 8).

However, “building back better” will be especially challenging because the foreseeable financial austerity and because it involves collective action problems, not well-addressed by market forces or by the current democratic politics in contexts of low trust and intense polarization. Addressing climate change, for instance, is likely to require a number of coordinated changes in government, private industries and individual behavior, changes that have so far proven elusive (IPCC, 2018).

Universities may be well-positioned to contribute to facilitating the collective action necessary to “build back better” given their scale, capacity and the multifaceted nature of their operations, including their capacity to study complex topics and to translate such knowledge into ideas for policies or societal reform, technologies and other services. Furthermore, engaging in the task of building back better would help universities align their core missions of research, teaching and outreach in synergistic ways that would underscore their value to society.

Articulating the social relevance of universities is particularly important as such relevance is increasingly challenged in many countries. In the United States, for example, the percentage of the adult population that thinks colleges and universities have a positive effect on the way things go in the country decreased from 60% in 2012 to 50% in 2019, whereas the percentage who thinks

colleges and universities have a negative effect increased from 26 to 38% during the same period (Parker, 2020).

METHODS

Relying on a survey to senior administrators and faculty in 101 universities, administered in June of 2020, this article examines Universities' role in building back better, as they engaged with schools and school systems during the Pandemic. The online survey was distributed with the assistance of organizations that convene universities including the Latin American Scholarship Program of American Universities at Harvard University, the Qatar Foundation for Education, Science and Community Development, colleagues from 25 universities around the world collaborating in a cross-national study of the engagement of universities with schools during the pandemic and other collaborators of the author.

The design of the study is not probabilistic, but an intentional survey on a convenience sample of respondents in 21 different countries, in public and private universities adequate to the goal of characterizing responses for the institutions in question, but inadequate to estimate whether those are representative of the population of over 28,000 universities around the world. Nonetheless, this study on a sample of convenience allows an exploration into the responses of these universities during the pandemic in assisting educational institutions. The survey was developed specifically for this study, drawing on insights from the discussions that were part of the cross-national study mentioned earlier, drafts of the survey received feedback from those colleagues collaborating on that study. The survey is included in **Appendix A**.

A total of 101 faculty and administrators responded to the survey, half of them from public and half from private institutions, from 21 different countries, as shown in **Table 1**.

IMPACT OF THE PANDEMIC ON EDUCATIONAL OPPORTUNITY

In person learning was disrupted as schools and universities adopted physical distancing measures. On March 3rd, UNESCO reported that school closures in thirteen countries had interrupted the education of 290 million students around the world (United Nations Education Science and Culture Organization, 2020). By the end of March 2020, three weeks after the World Health Organization had declared the outbreak, national school closures had impacted 1,581,173,934 learners. All remaining learners, out of a total of 1,712,374,616, had been impacted by localized school closures (United Nations Education Science and Culture Organization, 2020). By the end of July 2020, only a very small number of schools and universities had reopened. Soon after, most schools and universities around the world suspended in person instruction, many of them adopting alternative modalities of education delivery, including using online learning, relying on radio, television, mobile applications and printed materials.

TABLE 1 | Universities that responded to the survey by type and country.

Private universities			Public universities		
Country	Frequency	Percentage	Country	Frequency	Percentage
Argentina	1	2	Argentina	1	2
Bolivia	1	2	Brazil	1	2
Botswana	1	2	Canada	1	2
Chile	6	12	Chile	2	4
Colombia	11	22	Colombia	6	12
Ecuador	3	6	Ecuador	6	12
Guatemala	1	2	Spain	4	8
Honduras	2	4	Honduras	1	2
Lebanon	1	2	Italy	3	6
Mexico	15	30	Mexico	18	35
Paraguay	1	2	Nigeria	1	2
Peru	3	6	Portugal	2	4
Dominican republic	3	6	Dominican Republic	2	4
Turkey	1	2	United States	3	6
Total	50	100	Total	51	100

Educational institutions, from pre-schools to universities, used a variety of means to sustain some form of educational continuity amidst the challenging conditions caused by the distancing requirements. For most institutions this involved very rapid design and implementation of alternative means of delivery, and continuous adaptation based on rapid learning about the effectiveness of the approaches deployed.

In effect, schools and universities responded to the disruption caused by the pandemic in a massive global exercise in innovation to sustain educational opportunity through alternative delivery channels. These efforts quickly revealed that not all students had the same access to technology and other supportive conditions that would allow them to learn online, for many institutions the first and most obvious approach to sustaining opportunity. Other students lacked the self-study skills to effectively learn online and to learn more independently than they were accustomed to. These innovative efforts revealed also skill gaps among teachers to teach remotely (Reimers and Schleicher, 2020).

In order to expand the institutional capacity to meet the unprecedented education crisis created by the pandemic a number of education authorities invited collaboration from universities. The secretary of education of São Paulo, Brazil, for instance developed a partnership with the State University of Juiz de Fora, to build a formative monitoring system that would help teachers and school leaders assess student engagement and learning as they learned remotely. Similarly, Colombia's Minister of Education, built on a pre-existing partnership with a University to support online learning, to create a robust multimedia platform to support remote instruction. The Chilean government invited the two main universities in the country – the Universidad de Chile and the Pontificia Universidad Católica de Chile—to join in a social roundtable that would advise and assist the government on a number of areas of pandemic response, including education.

Just as it was reasonable for school and system leaders to ask universities for help in sustaining education during the Pandemic, some universities also engaged in such a task on their own as part of their mission to contribute to the development of the communities of which they are a part, through research, education and extension.

RESULTS

Even though universities see engagement with schools as challenging, most pursue it and see it as part of their mission. Two in five respondents indicated that elementary and secondary schools are not particularly receptive to collaborating with universities, while a third of the respondents disagreed with that idea.

Most respondents see engagement with pre-collegiate education a part of their mission. When asked whether they agreed with this statement: “This University does not see engagement with elementary and secondary schools as part of its mission” only 20% of the respondents expressed total or partial agreement, with 50% expressing total disagreement and 14% expressing some disagreement. Consistent with this, sixty nine percent of the respondents report that there is a tradition in the University of partnering with primary and secondary schools for research or extension.

Fifty nine percent of the universities offer a program of pre-service education of teachers, and 74% of them have a department or school of education.

Sixty four percent of the respondents report that after the Covid-19 pandemic broke out University leaders or faculty engaged in conversations with institutions involved in elementary and secondary education to explore whether they would welcome or require support from universities to continue to educate during the Pandemic and sixty one percent indicate that the University is engaged with elementary and secondary schools during the Covid-19 Pandemic to support those schools in continuing to teach during the Pandemic.

The type of school with which universities have developed partnerships to support instruction during the Pandemic are presented in **Table 2**. Most University school partnerships involve schools which are part of the same “system” as the University, or schools with which universities had partnerships predating the pandemic. Less frequent are partnerships with schools with which no prior relationships existed, as well as supporting local, state or national level education authorities.

Most of these collaborations were initiated by the University, or jointly by the University and the schools. Very few of them were initiated by the schools themselves or by governments.

The efforts during the pandemic were an opportunity to integrate pre-existing collaborations across units in the University and schools, according to 60% of the respondents. Half of the respondents see the collaborations between schools and the University as opportunities to help students in the University gain valuable skills. More than half of the respondents see the collaborations with schools as opportunities to foster collaboration across various departments in the University.

TABLE 2 | If the University has been engaged with elementary and secondary schools during the COVID-19 Pandemic, which type of schools did this include? (more than one response is possible per University).

	Frequencies		
	Total dataset	Private universities	Public universities
a. Schools which are part of the University or of the same "system." These schools and the University are under the same governance. (1)	36	19	0.17
b. Elementary and/or secondary schools with which it had robust prior partnerships but that are not part of the same "system." (2)	47	26	21
c. Elementary and/or secondary schools with which it had no significant prior relationships. (3)	21	13	8
d. Local governments to support them in the development and implementation of strategies for elementary and secondary schools during the Pandemic. (4)	24	15	9
e. state governments to support them in the development and implementation of strategies for elementary and secondary schools during the Pandemic (5)	22	13	9
f. National governments to support them in the development and implementation of strategies for elementary and secondary schools during the Pandemic (6)	16	13	3
g. Other intermediary organizations –networks of schools, organizations that provide support to schools, foundations—to support them in the development and implementation of strategies to educate during the Pandemic. (7)	26	16	10
No answer	20	7	13

The collaborations focused primarily on designing products or making available resources and training teachers or staff in order to would support educational continuity during the pandemic as shown in **Table 3**.

Over half of the respondents report that there were many challenges in establishing these collaborations with schools. While the decision to initiate the collaborations involved principally senior University leadership (presidents and deans) and faculty, the implementation of the collaboration involves a broader range of constituents, including faculty, staff and students. The initiative involves, to a similar extent, the office of the president and provost, the office of outreach and extension, the school of education and other departments or faculties. In most cases these efforts are funded by the University. The primary motivation to undertake the collaboration was to be of service to society (66% of the cases). In the great majority of cases this collaboration is aligned with the University's strategic plan.

TABLE 3 | What was the focus of the collaborations of the University with primary and secondary schools included (more than one responsible is possible per University).

	Frequencies		
	Total dataset	Private universities	Public universities
a. Designing solutions and products that would support learning and teaching during the Pandemic. (1)	49	27	22
b. Translating research so that it could be used by schools, or others in support of schools so they could continue to teach during the Pandemic. (2)	21	8	13
c. Conducting research directly relevant to those schools as they continued to teach during the Pandemic (3)	13	6	7
d. Transferring practices to schools that allowed them to continue teaching during the Pandemic –for instance sharing lessons learned in teaching online. (4)	47	30	17
e. Making available educational, technological, and logistical resources that would support the teaching efforts of schools. (5)	37	21	16
f. Training elementary and secondary schools, teachers, staff and/or principals. (6)	48	29	19
g. Other, specify (7)	15	6	9
No answer	20	6	14

TABLE 4 | Is there a strategy, or a "theory of action" or "logical framework" guiding these collaborations of the University with elementary and secondary schools?

	Frequencies		
	Total dataset	Private universities	Public universities
These are efforts without an integrated University wide "theory of action" or "logical framework"	30	15	15
There is an emerging "theory of action," evolving as we embark on these efforts.	25	15	10
There is a clear "theory of action" or strategy guiding these efforts	30	15	15
No answer	16	5	11
Total	101	50	51

When asked if there is a clear strategy or theory of action guiding these collaborations, the responses are equally divided between those where there is a clear strategy (about a third of the cases), those where there is an emerging strategy, and those where there is no strategy at all as shown in **Table 4**.

In most cases (60%) the collaborations were designed as rapid prototypes which are being improved on the basis of experience. In a similar proportion of cases there is a monitoring system

TABLE 5 | Have these efforts been evaluated in any way? (more than one response per University is possible).

	Frequencies		
	Total Dataset	Private Universities	Public Universities
a. We have collected evidence that has been used to manage and improve those collaborations. (1)	56	30	26
b. We have conducted formative evaluations of those collaborations? (2)	22	13	9
c. We have evaluated the impact of those collaborations? (3)	15	10	5
d. These collaborations are the basis of applied or academic research carried out by academics at the University? (4)	20	9	11
	21	8	13

that allows continuous improvement. While there are monitoring and formative evaluations in three fourth of the cases, impact evaluations or academic research based on those collaborations are less frequent, as seen in **Table 5**.

DISCUSSION

For the universities included in our study, the high impact disruptions in the external environment caused by the Pandemic provided an opportunity to contribute to society assisting schools and school systems in finding ways to sustain education during the crisis. That this was done in this disruptive context speaks to the nature of the University as an entrepreneurial, socially embedded learning organization. The engagement of universities in the redesign of learning and teaching systems in response to the socially distanced context created by the pandemic fits squarely within the contemporary interest on more effective and more open learning systems in universities, and outside them (Scott, 2020).

The strategy guiding these efforts is incipient, as only a third of the respondents indicated that these collaborations were guided by a clear theory of action, while an additional third of respondents indicates that such theory of action is “emerging.”

These results suggest that universities are learning organizations that take outreach to society as an important aspect to their mission. As such, they are also open systems, in interaction with their environment with the capacity to discover changes that can influence them and with the capacity to change in response to those changes in the external environment (Von Bertalanffy, 1938; Argyris and Schon, 1978; Birnbaum, 1988; Senge, 1990; O'Connor and McDermott, 1997; Senior and Swailes, 2010).

The collaborations with schools that Universities developed to sustain educational opportunity further suggest that they not only have the capacity to adjust to changes in the external environment, but to create alternative futures. Through their functions in teaching, research and extension, universities can very much imagine and build a future. They are indeed capable

of “building back better.” While this study examined a narrow domain –school education—in which to examine such role for the University, there are multiple other areas in which similar forms of social engagement are possible, from addressing climate change or public health, to social inequality or poverty alleviation, to democratic governance or urban renewal.

Might this engagement of universities collaborating with schools to sustain learning during a time of crisis anticipate a greater emphasis in its social role and value? High impact events of this sort in the past have influenced how universities interpreted, and re-created, their mission. For instance, the second global wave of democratization after World War II and the third wave beginning in the mid-1970's (Huntington, 1993) led to universities embracing the goal of expanding access with unprecedented vigor. It is too early to tell whether the engagements of universities with schools during a time of crisis described in this paper foreshadow a reinterpretation of the purpose of the University, but the findings suggest that universities are indeed socially embedded institutions.

A century ago, the idea that research in universities was carried out by researchers working in the isolation of the ivory tower, was replaced by the argument that research was the product of researchers interacting with society, the related argument of the “Triple Helix” explained research as the result of close collaboration between universities, industry and government (Engwall, 2020: p. 5). The concept of the “Triple Helix” is the foundation of the idea of the “entrepreneurial University,” the University which serves as an engine of societal improvement, and the findings in this study are congruent with that view of the University.

This entrepreneurial, socially embedded University, is the idealized model of the American University which contemporary discourse on “world class” universities propagates as desirable, a University with porous borders with society, and open to social change and its impact (Ramirez, 2020: p. 131).

University engagement has become so prominent that it is now considered a key component of national or state policymaking, a tool of institutional profiling, and an indicator of performance as part of the broader accountability and system steering agendas (Goddard et al., 2016).

This engagement of universities with pre-collegiate institutions to support education during the global pandemic addresses the democratic imperative which some authors argue is part of the important mission in our times:

“Put most simply, the urgent task before us to reinforce, and maybe reforge, the links between higher education and democracy which, perhaps too complacently, was taken for granted in the twentieth century in the age of mass higher education, now drawing to the close. The twenty-first century University needs to be an open institution—spatially, by opening up closed-off, policed corporate-like academic precincts; scientifically and academically, by embracing open knowledge systems and welcoming new (and challenging) knowledge traditions (and rejecting the exclusionary and hierarchical tendencies of performance and ranking regimes— and, maybe, the seductive discourses of “excellent” and “world-class”); and socially, by meeting the needs of everyone, not just of enlarged elites.” (Scott, 2020: p. 111).

As the responses of the universities examined in this study show, there is much that such opening of the University to society can contribute at a time of great need, and in doing so help answer the increasing questions about its social value.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR'S NOTE

The survey on which the data in this article are reported was conducted as part of that larger study of university-school collaborations and all contributors to that project provided helpful feedback to a draft of the survey and assisted in distributing it. The analysis of the data presented in this article, and the responsibility for the interpretation of the data on which this article is based are my own.

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AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

ACKNOWLEDGMENTS

I gratefully acknowledge the collaboration with Francisco Marmolejo and with colleagues in 20 universities in a study of university-school collaborations during the pandemic. The findings from that larger project are presented in Reimers and Marmolejo (in press).

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsus.2021.636769/full#supplementary-material>

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From Publications to Public Actions: The Role of Universities in Facilitating Academic Advocacy and Activism in the Climate and Ecological Emergency

OPEN ACCESS

Edited by:

Victoria Hurth,
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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 10 March 2021

Accepted: 07 May 2021

Published: 31 May 2021

Citation:

Gardner CJ, Thierry A, Rowlandson W
and Steinberger JK (2021) From
Publications to Public Actions: The
Role of Universities in Facilitating
Academic Advocacy and Activism in
the Climate and Ecological
Emergency. *Front. Sustain.* 2:679019.
doi: 10.3389/frsus.2021.679019

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Thousands of universities have made climate emergency declarations; however the higher education sector is not rising to the collective challenge with the urgency commensurate with scientific warnings. Universities are promoting an increased focus on sustainability through their research, teaching and their own institutional footprints. However, we suggest that such initiatives will be insufficient to catalyse the required transformations in our societies and economies because of (i) the time lags inherent in education and research pathways to impact, and (ii) their failure to address either real-world political processes or the forces invested in maintaining the status quo. We therefore suggest that academics should move from publications to public actions and engage in advocacy and activism to affect urgent and transformational change. We discuss the barriers to engagement in advocacy that academics face, and propose a number of actions that universities should adopt to help overcome them. These include explicitly recognising advocacy as part of the work mandate of academic staff by altering work allocation models, facilitating engaged research sabbaticals, altering hiring and promotion policies, and providing training to enhance the effectiveness of engagement. In addition, universities must defend the right of academics to engage in protest and push back against emerging threats to academic freedom. Such actions would strengthen a rich tradition of academic protest and enhance the contribution of universities to the public good in areas well beyond sustainability, for example race and social justice (Black Lives Matter, decolonising education) and public health.

Keywords: climate change, direct action, higher education, non-violent civil disobedience, protest, public engagement, public goods, sustainability

INTRODUCTION: EMERGENCY ON PLANET EARTH

Planetary heating threatens the collapse of human civilisation and ecosystems worldwide (Trisos et al., 2020; Richards et al., 2021), a situation so severe that over 11,000 scientists have declared “clearly and unequivocally” that the Earth faces a climate emergency (Ripple et al., 2020). Alongside the climate crisis, the destruction of nature is causing an equally severe ecological emergency that threatens the extinction of a million species and undermines the conditions for human life (Diaz et al., 2019; IPBES, 2019). We thus face a twin Climate and Ecological Emergency (CEE). An emergency is an urgent situation requiring immediate action, yet, despite thousands of Higher Education (HE) institutions around the world having issued their own “climate emergency declaration” [UNEP (United Nations Environment Programme), 2019] and the widespread recognition that universities play a key role in contributing to the public good, the HE sector is not rising to the collective challenge with the urgency commensurate with the warnings—despite the fact that these warnings emanate largely from academics working in HE—and is largely continuing with business as usual. For example, many universities continue to invest in or receive funding from fossil fuel corporations (e.g., Gayle, 2021), while academic fields such as economics may ignore the CEE almost entirely (Oswald and Stern, 2019). So poor has been the collective response of the HE sector to the CEE that universities have been accused of failing—and even betraying—humanity (Green, 2021; Maxwell, 2021).

As institutions of education and research, universities have the potential to be “pivotal change agents” in catalysing transitions towards sustainability (Giesenbauer and Müller-Christ, 2020), and over 200 universities have signed the SDG Accord, the HE sector’s “collective response” to the UN Sustainable Development Goals (SDG Accord, 2021). The sector’s efforts towards sustainability have focused primarily on three areas: (1) promoting solutions-focused research (Schneidewind et al., 2016; Vogt and Weber, 2020), (2) institutionalising “education for sustainable development” (Grund and Brock, 2020; Kopnina, 2020), and (3) reducing their own institutional footprints (e.g., Fissi et al., 2021). Universities can also contribute to the sustainability transition in a fourth way, through engaging with the public and other audiences outside the sector (McCowan, 2020), although such efforts are less well-documented in the literature. All such initiatives are important and demonstrate the HE sector’s vital role in contributing to the public good; however, these efforts alone will be insufficient to trigger the transformative changes required at the necessary speed. It takes time for students to reach positions of societal influence and for research to influence policy, so education and research pathways are poorly adapted to an emergency context. Moreover, these approaches are ill suited to the scale of the problem (Facer, 2020), which requires “transformative change, namely a fundamental, system-wide reorganisation across technological, economic, and social factors” (Diaz et al., 2019). While education and research can facilitate and inform the required transformation, they are insufficient to catalyse it because they do not necessarily address

either the processes that most powerfully influence political and policy change, or the forces that are so heavily invested in preventing the required transformation.

FROM PUBLICATIONS TO PUBLIC ACTIONS

Although an explicit theory of change is lacking, academia appears to operate under the assumption that if academics generate information, then society’s leaders will use that information to make wise decisions that promote the public good (see e.g., Rosen, 2019). However, it is naïve to assume that policy and political decision-making are informed solely by evidence, because government decision-makers are additionally (and indeed primarily) influenced by special interests seeking to maintain the status quo and prevent policy-change, in particular corporate lobbyists (Brulle, 2016; Wetzels, 2020). For example, in 2020 the oil and gas sector spent over \$136 million in political contributions and \$110 million on lobbying in just one country, the United States (OpenSecrets.org, 2021). Governments are also influenced by public opinion; however, special interests also seek to forestall popular demand for sustainability transitions through the funding of climate change counter-movement organisations to manipulate public opinion by casting doubt on the realities of climate science or the urgency of transformative action (Lamb et al., 2020; Brulle et al., 2021).

There have therefore been growing calls for academics (Frid and Quarmby, 2012; Gardner and Wordley, 2019; Green, 2020) and universities (McCowan, 2020) to step beyond their traditional roles and influence policy more actively through advocacy and activism. We amplify these calls, because we believe that with knowledge comes responsibility. Just as the general public are urged by security agencies to sound the alarm if they become aware of a danger, so scientists have a duty to speak out—and take appropriate action—in a time of planetary emergency. As renowned climatologist Michael Mann states “it would be an abrogation of our responsibility to society if we remained quiet in the face of such a grave threat” (Mann, 2014). Academics also benefit from both a trusted position within society and a platform for sharing their views, both of which can be seen to confer even greater responsibility to act in accordance with their knowledge of the CEE. Advocacy can be defined as publicly adopting a position and working to promote it, for example through lobbying, campaigning and engaging and organising the public; activism is a subset of advocacy that uses more direct forms of action to influence policy, such as protest and non-violent civil disobedience. While advocacy largely works within the system and depends on the “proper channels” of influence, activism tends to operate outside it; however, we note that there is in fact no consensus in academia on what the “proper channels” consist of, and that the theory of change for connecting research to action should itself be a topic of open research and experimentation.

One powerful mechanism to rapidly influence policy is non-violent civil disobedience, which has been a driver of major 20th century changes including universal suffrage, independence from empire, and civil rights for people of colour. In recent

years, and particularly since 2018, a number of popular climate and environmental civil disobedience movements have sprung up around the world, including the Greta Thunberg-inspired School Strikes/Fridays for Future, Extinction Rebellion, and national movements such as Sunrise Movement (USA) and Ende Gelände (Germany). While it is difficult to attribute causality, these movements have doubtless helped stimulate a step change in public discourse over climate, including unprecedented media coverage and public concern (Gardner and Wordley, 2019; Thackeray et al., 2020). This is also translating into political rhetoric and action; the European Parliament and at least 38 countries have declared a climate emergency (Harvey, 2020), and to date nine countries (China, Denmark, France, Hungary, Japan, New Zealand, South Korea, Sweden, and the UK) have enshrined net-zero targets into law (Murray, 2020). Despite this success, or, more cynically, because of it, governments around the world are criminalising protests: these measures have been opposed in an open letter by several hundred academics (Taylor, 2021).

Nevertheless, despite the apparent effectiveness of environmental activist movements in catalysing change, there appears to be only limited engagement with them by academics (Gardner and Wordley, 2019), or engagement only at an abstract, theoretical level. We suggest that such reluctance may stem from three main areas. First, some academics may perceive that they are expected to remain detached and neutral observers, and risk losing scientific credibility (or attracting scorn from their colleagues) by advocating for policy positions (Nelson and Vucetich, 2009; Donner, 2017). As a result, those who do engage in advocacy, and particularly activism, may relegate these activities to their personal lives and thus carry them out as private citizens, rather than explicitly as academics. However, research suggests that participation in advocacy does not affect the public's attitude to research (Motta, 2018) or the perceived credibility, trustworthiness or honesty of scientists (Kotcher et al., 2017; Cologna et al., 2021), though it may slightly worsen negative attitudes towards scientists among political conservatives (Motta, 2018).

Secondly, there are institutional barriers which result in academics not being sufficiently rewarded for such engagement. These include a hypercompetitive academic environment where professional reputations and university hiring and promotion decisions are judged by a narrow focus on high-impact publications rather than other forms of real-world impact (Fochler et al., 2016; Pells, 2019), and the increasing precarity of academic employment (Lempiäinen, 2016), which may leave academics both overstretched and unwilling to engage in activities which do not directly contribute to their career prospects.

Academics may also be actively dissuaded from engaging with such movements, or even sharing their personal reflections on them within their teaching, by government statements (see e.g., Busby, 2020), staff within their institutions, unsympathetic media coverage, and the rising "McCarthyism" of organisations such as Turning Point USA/UK, which hosts websites calling on students to report lecturers for "political bias" (Fazackerley, 2020). Some academics may also be put off from engaging in activism by the perceived lack of opportunities with which they

feel comfortable. For example, many may not be willing to place themselves in positions where they risk arrest. However, non-violent civil disobedience involves a spectrum of approaches and may employ an array of tactics that do not require law breaking, such as projecting scientific papers in public places, the withdrawal of cooperation or labour, performance art, and walk-outs: academics should therefore seek opportunities to participate in ways that are appropriate for their personal circumstances. Moreover, academics that are unwilling or unable to engage in frontline activism may nevertheless offer practical support (as well as public endorsement) to those who do.

FACILITATING ENGAGEMENT, ADVOCACY, AND ACTIVISM

Given the urgency of the CEE, we suggest that universities must expand their conception of how they contribute to the public good, and explicitly recognise engagement with advocacy as part of the work mandate of their academic staff. The limited existing research suggests that such a position would be supported by both academics and the public (Cologna et al., 2021). To encourage this, universities should broaden work allocation models to allow at least 10% of time for advocacy and engagement with policy processes, including public engagement and education, and working with campaigning organisations and elected officials. Promoting engaged research sabbaticals would allow such activities to be ramped up in the run-up to key political events, such as the conference of the parties to the UN Framework Convention on Climate Change or UN Convention on Biological Diversity, allowing academics to devote their energies at key times when the opportunity for impact is maximised. In addition, the criteria used in promotion decision-making should be further diversified to include specific criteria related to advocacy and engagement, including advancing scientific evidence for policy-making, communicating science for advocacy, and engaging with community groups and activist organisations. By incorporating advocacy into the work mandates of their academic staff, universities would explicitly reject the notion that political engagement should only be carried out in academics' spare time, as private citizens. Moreover, it would help overcome any stigma that activist academics may face from colleagues. However, this alone will not be sufficient, so universities should take an active role in combatting and mitigating such stigma, as they have done to break down discrimination based on race, gender and sexuality.

Given the emergency context, academics should also be supported to redirect their work on campus to assist the social movements addressing the CEE. For example, academics could be facilitated to conduct action research on how to publicise, grow or maintain protest groups, as well as help them identify strategically important targets or refine their theories of change. Likewise, universities can restructure their formal curricula to ensure that teaching for all students covers topics relating to analysis of the role of protest as part of democratic engagement. Ideally, we would begin to see project based learning focussed on activism. As the US National Task Force on Civic Learning

and Democratic Engagement found, “by teaching students to address real-world issues in concert with others, some colleges are helping students move from civic knowledge to civic action, thus better preparing them to serve their communities and the nation as informed, active citizens when they graduate” (NTFCLDE (The National Task Force on Civic Learning and Democratic Engagement), 2012). Educational establishments which best promote this have a clear sense of mission, promote activism as a form of civic engagement in both informal and formal curricula, facilitate networking between students with overlapping interests, and hire staff with experience of and a commitment to activism and who can help socialise students to become familiar with forms of activism in their community (Kezar and Maxey, 2014). Hodson (2014) notes that students are best served by learning both *through* action and *from* action and argues for a three phase apprenticeship approach of modelling (teacher demonstration), guided practice (teacher assisted), and application (independent student action). Such an approach of action-based learning has great potential for renewing our democracies though boosting social agency and civil awareness amongst students (Biddix, 2014).

To enhance the capacity of academics to be effective advocates, universities can create structures to provide specific training. For example, the Interdisciplinary Centre for Sustainability at Université de Lausanne aims to foster collaborations and build links between the university and society at large, by providing academics opportunities to engage with politicians and civil servants, and build links between the university and civil society organisations. The Climate and Development Lab at Brown University engages students in real-life climate policy-making, writing influential briefs and meeting with politicians (Ciplet et al., 2013). More training could include community engagement, advocacy, ethics, scientific integrity, media communication, as well as historical, international and local examples of civil disobedience and its role in achieving social progress, as a way to raise awareness of the historical legitimacy of such tactics as part of scholarly life.

While the facilitation of advocacy aligns well with many universities’ goals of achieving greater impact and community engagement, the question of academic involvement in non-violent civil disobedience is more complex because it is unusual for public bodies to be seen to encourage law-breaking. Nevertheless, universities can provide their staff with the security to engage in civil disobedience by explicitly guaranteeing that they will not discriminate against staff with a criminal record for non-violent protest. For example, a clause guaranteeing this right could be inserted into employment contracts, as part and parcel of academic freedom. Beyond the employers themselves, labour unions such as the University and College Union in the UK have an important role in both defending the rights of members to engage in civil disobedience, and providing them with the security to feel able to do so. Moreover, such a defence of academic freedom must not be limited to guaranteeing the rights of staff from an institutional point of view. The leaders of higher education institutions must also actively and vocally fight attempts to stifle academic freedom by governments, the press, and organisations such as Turning Point USA/UK. This appears to be a growing concern around the world; for example, the

governments of the UK, China, France, Hungary, Russia, Turkey and many other countries have sought to limit the freedom of both academics and their institutions through a range of repressive policies (Roberts Lyer and Susa, 2019).

Lastly, universities can strengthen the ties between academics and civil society organisations and grassroots movements by permitting the use of their facilities, free of charge, for mobilising and community building activities (Marginson, 2011). Many towns and cities lack public spaces suitable for talks, screenings and training, yet universities possess these in abundance and they often lie under-used outside office hours. The erosion of access to public space on campuses is a consequence of the corporatisation of the HE sector, but permitting the use of facilities by groups in which staff and students participate is a simple way both to contribute to change and generate goodwill within their local communities.

Nevertheless, while universities have an important role in facilitating greater engagement and advocacy by the whole academic community, their willingness to do so may be limited by the increasing corporatisation and marketization of higher education institutions. In effect, these institutions may have too much “skin in the game” to actively promote forms of engagement that call into question the neoliberal agenda they increasingly are having to comply with. In an environment that is increasingly intellectually conformist, monocultural and bounded within disciplinary silos, it is the margins that provide the most fertile ground for ideas and actions that seek to disrupt the status quo, and it may be unrealistic to expect that change will be driven solely by the centre. Therefore, engaged academics must also push the boundaries from the margins and pressure their employers to implement the types of policies we have suggested. While we recognise that some of the suggestions are rather incremental and managerial, and therefore themselves unsuited to an emergency context, we offer them as a starting point for further discussion and anticipate that the roles of academics and universities will continue to evolve through experimentation and public debate as the planetary emergency deepens.

CONCLUSIONS

This essay draws from and builds on a rich and growing literature on the role of researchers in a world increasingly in crisis. Although the position of researcher has traditionally been viewed as limited to the neutral, impartial, and detached generator of knowledge (Power, 2019), a range of approaches have been developed that see the researcher play an active role in the use or implementation of the knowledge they generate to promote its translation into public goods. These include action research (Lewin, 1946), engaged scholarship (Van de Ven, 2007), transition management (Rotmans et al., 2001), transdisciplinary process-oriented research (Bulten et al., 2021), and transformative science (Schneidewind et al., 2016). While these approaches reject the notion of the researcher as an impartial generator of knowledge, they are limited to the behaviour of researchers while engaged in their professional research activities, and say little about their behaviour as citizens and academics outside the research context. Academic activism,

in contrast, extends beyond our role as researchers; it applies to our public lives as academics regardless of whether or not we are currently engaged in research, and irrespective of our disciplinary specialism. If engaged scholarship and similar approaches are about the production of knowledge, academic activism is about acting appropriately on it in an emergency context.

We suggest that the traditional academic roles of research and teaching are not sufficient to drive transformative change in a time of rapidly accelerating global crises, so those with the greatest knowledge and understanding of these crises have a moral obligation to provide leadership, and engage in advocacy and activism. Given this, universities must reconsider their role in society and adapt their operational models to explicitly recognise engagement in policy and political processes as part of the work mandate of their staff, and adopt mechanisms to facilitate and reward it. Such academic activism is part of a rich tradition; for example, academics such as Albert Einstein, E.P. Thompson, Barry Commoner, Carl Sagan, Catharine MacKinnon, Noam Chomsky, and Cornel West are or were renowned advocates for a range of causes, while Sagan, Chomsky, and West (along with others such as former NASA scientist James Hansen) have been arrested in the course of their activism. There is therefore historical precedent for such actions, but they require greater support from universities if they are to become more acceptable and mainstream among academics. Nor are such actions limited to environmental and climate issues, as 2020 has seen the rise of academic advocacy and activism related to the Black Lives Matter movement and longstanding calls to decolonise university curricula, as well as in response to the UK government's handling of the COVID-19 pandemic (i.e., the creation of the Independent

SAGE group of scientists to provide independent scientific advice). Beyond the rapidly changing biophysical realities of the planet, society must address a pressing range of social issues including soaring inequality, continuing discrimination against women, people of colour and non-binary people, and the rise of far-right political movements. These worrying trends increasingly threaten to undermine the public good to which universities seek to contribute, highlighting a critical need for the HE sector to rapidly adapt its operations and reconsider its theories of change. While academia and activism may be perceived by some as uneasy bedfellows, emergency times call for emergency actions.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

CG conceived the paper. CG, AT, WR, and JS wrote the paper. All authors approved the final version.

ACKNOWLEDGMENTS

We thank Claire Wordley for discussions which guided the initial development of this paper. The title is respectfully borrowed from Arlettaz et al. (2010).

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer SC declared a past co-authorship with one of the authors, JS, to the handling editor.

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Co-producing a Community University Knowledge Strategy

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OPEN ACCESS

Edited by:

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National Co-ordinating Centre for
Public Engagement, United Kingdom

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 31 January 2021

Accepted: 21 May 2021

Published: 18 June 2021

Citation:

Bell S, Lee R, Fitzpatrick D and
Mahtani S (2021) Co-producing a
Community University Knowledge
Strategy. *Front. Sustain.* 2:661572.
doi: 10.3389/frsus.2021.661572

This community case study describes the process of developing a strategy for community-university engagement, as an example of co-production, and presents the strategy and early outcomes of the work. Based in London, the strategy and the process of co-production are of international relevance in supporting more productive relationships between universities and their cities, as a foundation for repurposing universities for sustainable human progress. The case study is presented in the context of literature related to community engagement with universities and co-production, an area of growing concern as universities seek to strengthen relationships and contribution to sustainable human progress in their home cities. London is one of the world's great university cities, with more than 40 higher education institutions contributing ground-breaking research and educating students from across the globe. London is also home to vibrant local communities, with a strong tradition of grassroots action, community organization and citizen participation. Community groups and universities have a strong history of working together, often without formal recognition or resources. The Community university Knowledge Strategy for London, known as Collaborate!, was a collaboration between universities and grassroots community groups in London, co-convened by Just Space and University College London (UCL). A series of workshops, guided by two steering committees of community and university members, explored principles for working together, cultural and institutional barriers, decolonization, industrial strategies, community spaces and case studies of good practice. The final conference outlined the basis for a London-wide strategy to enable better engagement between universities and grassroots community groups. The strategy addresses core principles, curriculum, evaluation and evidence, resources, relationship building, governance and structures to support collaboration. Co-production ensured high levels of trust between participants and commitment to the outcomes. Implementation of the strategy actions requires ongoing resources to support intermediary structures to overcome misalignment between universities as large, hierarchical institutions and community groups as dynamic, informal, social organizations.

Keywords: grassroots action, decolonization, bottom-up approach, urban, citizens

INTRODUCTION

Grassroots community groups are vital elements of social and political responses to sustainability and climate crises (Smith et al., 2017; Tokar and Gilbertson, 2020). Universities, as places of learning and research, also contribute to understanding the nature of the problems of unsustainability, options for solving them and the grounds for good judgement (Maxwell, 2014). In a complex techno-scientific society, where knowledge claims are central to political discourse, universities should be open and accessible to all sectors in good faith. Existing university structures, management and drivers encourage engagement with large institutions and participation in the market, but mitigate against sustained, meaningful collaboration with grassroots communities and movements outside formal modern institutions (Conn, 2011). Universities have struggled to engage with small and micro community groups who constitute 81% of voluntary organizations in the United Kingdom (UK) (NCVO, 2020). Given that much of the energy and action in relation to the climate and extinction emergencies, and social movements such as Black Lives Matter and #MeToo, is to be found in informal, grassroots groups, it is important that universities improve their capacity to build critical, collaborative partnerships beyond large institutional and commercial actors and interests. Repurposing universities to support sustainable human progress requires the development of new structures and processes to enable engagement with a wide range of stakeholders, including grassroots groups and informal, dynamic social movements.

Universities' ability to engage grassroots groups is constrained by their own hierarchical structures and funding and policy models that encourage partnerships based on economic and political strength. Engaging with industry, policy and large third-sector organizations with similarly formalized management structures and systems, whilst non-trivial, is relatively straightforward for universities compared to working with grassroots groups that operate in more fluid, dynamic, non-hierarchical, poorly-resourced contexts (Conn, 2011). For individual university staff, increasing workloads undermine their capacity and motivation to engage with grassroots groups, as such work is often unrecognized by university reward structures and incompatible with management processes.

The Community University Knowledge Strategy for London, or Collaborate!, project, aimed to improve partnerships between universities and grassroots community groups. A collaboration between university and community members, the project co-created strategies, structures, and actions at the city scale, beyond the interests of individual universities or community groups. The project's primary purpose to improve London-wide community-university engagement addressed a need identified by Just Space, a network of grassroots community groups who have more than 13 years' experience working with universities in London in teaching, research, and public engagement. The project engaged more than 100 people in participatory events which contributed to the development of a strategic action document, a draft Charter for Community University Partnerships, a case study report, and a short film (Just Space, 2019; Magar, 2020). This community case study

reviews literature related to university-community partnerships and co-production, describes the local policy and institutional context for Collaborate!, presents the process and outputs, and reflects on its wider relevance.

CONTEXT

The roles of universities have been shaped by their relationship with their stakeholders: from specialist and sheltered enclaves in the medieval ages, they moved to serve emerging nation states, before developing into national and regional institutions serving the growing professions of the industrial society (Watson et al., 2011). Since the 1980s, increasing privatization and marketisation have challenged the role of the university as a potential institution to address social inequality and injustice, and facilitate the circulation of knowledge (Choudry and Vally, 2020). Throughout, the university has performed a distinct and important civic function (Goddard and Vallance, 2014). How this has been shaped or will be shaped by local communities to address current sustainability challenges, is being questioned, both from the perspective of the university as site for community and civic engagement (Watson, 2007; Watson et al., 2011), and considering broader questions of social justice and social responsibility (Choudry and Vally, 2020).

These concerns are of international relevance to higher education institutions who see themselves as having a role in the finding of solutions to tackling some of the world's most serious problems including climate change, poverty, public health and environmental quality. In a UNESCO report from 2009 *Trends in Global Higher Education: Tracking an Academic Revolution* the key drivers affecting universities included the "massification of tertiary systems everywhere, the 'public good' vs. 'private good' debate, the impacts of information communication technology, and the rise of the knowledge economy and globalization" (Watson et al., 2011, p. 24).

Policy

Universities in the United Kingdom (UK) are increasingly encouraged to widen their engagement with external partners and to generate meaningful social and economic impact from their research and teaching. This is evident in several agendas being promoted across the sector, including public engagement (NCPE, 2020), the civic university (Civic University Network, 2020), and government funding mechanisms through the Research, Teaching and Knowledge Exchange Excellence Frameworks. Programs have emerged to address specific disciplines and communities, such as the Common Cause Project focused on partnerships between university researchers and Black, Asian and Minority Ethnic (BAME) communities in the arts and humanities (Common Cause, 2017). These initiatives and policies create a nested hierarchy of drivers for stronger community and public engagement.¹

At the level of the institution, drivers for engaging with the public in general include:

¹From interview with Dr. Gemma Moore, Evaluation Manager, Public Engagement, University College London (UCL), 2019.

- Generation of better quality and more successful research grant applications;
- Expectation of research funders;
- Demonstrating the impact of research, which is assessed in the Research Excellence Framework (REF);
- Expectations of the national Vitae Researcher Development Framework² to improve researcher skills in engagement, influence and research impact.

There next set of drivers, operating at the level of disciplines or departments, include:

- Research and teaching that has had some element of public and community engagement is more likely to be transparent and relevant to society;
- Helping researchers to explore new perspectives and new research angles;
- Public and community engagement experience is increasingly being used as a promotion criteria;
- Moral reasons, like accountability for funding or addressing a social justice agenda through research and teaching.

Finally, there are drivers at the individual staff or student level, some of which will be personal drivers, inspirations, ambitions or values, which may be reflected in the pursuit of public engagement and community partnerships:

- Development of new skills;
- Fun and enjoyable work;
- Opportunities to discover new angles on research or practice.

Community-University Engagement

Previous research on university-community partnerships has focused on the experiences of individual colleges or universities in relation to their civic engagement and social responsibility activities (Watson et al., 2011; Goddard and Vallance, 2014). Collaborate! aimed to develop a city-wide strategy, beyond the level of individual institutions.

A useful framing for how to conceptualize organizational and structural relationships between universities and communities was the theoretical work of one of the project's community steering group members Eileen Conn, who has written about the structural incompatibilities of community engagement (Conn, 2011). Conn (2011) describes a social eco-systemic dance which goes on between two structurally different systems, within which university and community groups operate. At an institutional level, universities operate in a hierarchical system as an incorporated organization, with vertical management systems, contractual employment relations, and resourcing based on recurring annual incomes. Community organizations operate within a horizontal peer-based system, where organizations are often unincorporated, management is based on peer relationships and personal links, employment is voluntary, precarious and informal, and resources are based on unpaid labor, donations, *ad-hoc* grants and in-kind services (Conn, 2011).

These two systems must work with each other and are co-evolving through this process, but are fundamentally incompatible at an organizational level. This creates many mutual misunderstandings, yet it also opens up useful “spaces of possibilities” where these systems can work together and where the horizontal peer forms of local systems and structures can be supported. Parts of the community sector can indeed be vertical hierarchical systems (charities or larger voluntary organizations) whereas smaller communities of interest, identity or place are likely to be more horizontally organized. Within the vertical hierarchical system of the university, scholars, researchers and teachers might be operating quite autonomously (Harney and Moten, 2013), opening up progressive spaces in universities which “are able to connect with community organizations and social movements and accomplish valuable counter-hegemonic work” (Choudry and Vally, 2020, p. 12).

Both university and community systems have internal networks. Universities across London have both formal and informal relations with each other. For example, as signatories to the Civic University Network or the Manifesto for Public Engagement, or as part of institutional networks (for example, the Russell Group or London Higher). Community groups are also networked either through organizations such as Just Space or specific issue-based networks solidarity and collaboration, sustaining horizontal work across different scales (Lipietz et al., 2014). Each system can also embed versions of the other system within itself. For example, efforts to open up more progressive spaces can be seen alongside institutional drivers to widen public engagement, and through practical co-production of knowledge through university-community collaborations.

Collaborative working and co-production have had a long tradition in different disciplines. Ostrom usefully defined co-production as “the process through which inputs used to produce a good or service is contributed by individuals who are not ‘in’ the same organization” (Ostrom, 1996, p. 1073). Indeed, Ersoy (2017) points out in *The impact of co-production: From community engagement to social justice*, that co-production has to a certain extent replaced partnerships and contractualism as the main form of collaboration. However, this needs to be accompanied by an explicit “move towards more democratic involvement which...empowers community-oriented practices” (Ersoy, 2017, p. 3).

This broad trend toward co-production opens opportunities for different forms of knowledge production which are mutually beneficial for both community and university, in the eco-systemic dance between two different structural. These processes however, have to be accompanied by the awareness of differences in power, structures of organization, the wider agendas of decolonization of knowledge institutions, precarity, trust, forms of communication, forms of ownership and diversity of communication tools. The challenge includes finding ways of opening up “spaces of possibility” between the hierarchies of London-based universities in this case, and the dynamic, horizontal structures of

²<https://www.vitae.ac.uk/researchers-professional-development/about-the-vitae-researcher-development-framework>

community groups they currently and potentially could work with.

London

London hosts a diverse university sector, with more than 40 higher education institutions spread across the city (University of London, 2018; London Higher, 2021). London universities vary in size, from small, discipline specific colleges to large multi-disciplinary, multi-campus institutions. Seventeen autonomous university colleges are part of the University of London federation. There are significant differences in the research and teaching profiles, age, origins, income and financial stability, and estates of London universities. London's universities are primarily located close to the center of the city (**Figure 1**). Beyond central London there are notable, well-established universities (such as Queen Mary University of London, University of East London and Brunel University), as well as recent and planned new campuses for central universities who are expanding their estates (such as Kings College London, University College London and Imperial College London). Whilst the university sector faces many common challenges, these may be experienced very differently in different institutions. London universities vary in their relationships with local communities, with some founded explicitly to serve local educational needs while others have focused on international research agendas and students. Each university has a distinct public engagement profile, dependent on institutional priorities, subject strengths and staff interests and capacities.

Figure 1 illustrates the estates owned and used by universities in the Central London area, giving an indication of the concentration of real estate associated with higher education, and the distribution of the major universities in London. The spatial relationship the university has with its surrounding area, whether it is based in the urban center (e.g., University College London, Kings College London, London School of Economics) or in a suburb (e.g., University of East London, Brunel University, Kingston University) carries some important social and economic impacts for the city-region: "For the university, this urban location – even if it is not integral to the institution's identity – forces a relationship with other institutional actors and communities that are also inhabitant in the city" (Goddard and Vallance, 2014, p. 1).

The Just Space network included university members from its inception in 2007. Just Space community members have worked collaboratively with universities on a range of activities for more than a decade, on issues such as urban planning, environmental quality, social and racial equality, housing, and transport (Just Space, 2021). Significant achievements for the network include developing a community-led plan for London and facilitating community responses to the examination in public of the London Plan. University collaboration with community members is guided by the Just Space Research Protocol, which outlines principles and commitments to ensure mutual benefit and minimize harm (Just Space, 2018). Just Space's experience of university collaboration has been largely with "committed academics," many of whom work under precarious employment

conditions with limited institutional support or recognition of the value of their collaboration with grassroots groups.

In 2018 Just Space identified the opportunity to enhance collaboration with universities across London. Just Space member organization Just Map, identified and mapped specific community needs that could be met in through collaboration with universities, highlighted cases of best practice, and convened a workshop with community groups and committed university staff and students. This work clarified the need for better co-ordination of university-community engagement across London, which formed the basis for the Collaborate! project.

THE COLLABORATE! PROJECT

Community University Knowledge Strategy for London (Collaborate!) was a co-designed project funded by the Engineering and Physical Sciences Research Council (EPSRC) Impact Acceleration Account (IAA) at University College London (UCL). The EPSRC IAA is a funding allocation to universities in the UK who are in receipt of EPSRC research grants to facilitate impact from EPSRC funded research. To reflect the collaborative partnership, 50% of the £30,000 awarded was allocated to Just Space to facilitate community involvement in the project, while UCL's role was to engage university partners and manage the administration of the grant. The core project team was Richard Lee from Just Space and Sarah Bell from UCL, with Sona Mahtani employed by Just Space to lead community engagement and strategy, and Daniel Fitzpatrick working as a research associate for UCL.

The project aims were:

- 1) Document and share best practice in community-university partnership for urban research and action in London.
- 2) Develop a strategy and action plan for improved co-ordination and impact of community-university partnerships in London.
- 3) Identify resources required for implementation.
- 4) Launch a business plan for university and stakeholder investment to deliver the strategy.

The project plan included a steering group, a series of public events and working papers, and strategy launch and dissemination.

Steering Groups

The proposal included a steering group composed of equal numbers of community and university members. In the early stages of the project this was adapted to two separate steering groups for each constituency. This was to ensure community members were empowered to direct the project and that university members were aware of the focus on grassroots community partnerships, rather than preconceived institutional framings of community and stakeholder engagement. The separate steering groups developed rapport with the project co-ordination team and colleagues with similar interests. The groups had more free discussion and made open contributions to the project direction as trust was built with the project team and each other. When the steering groups met together they worked

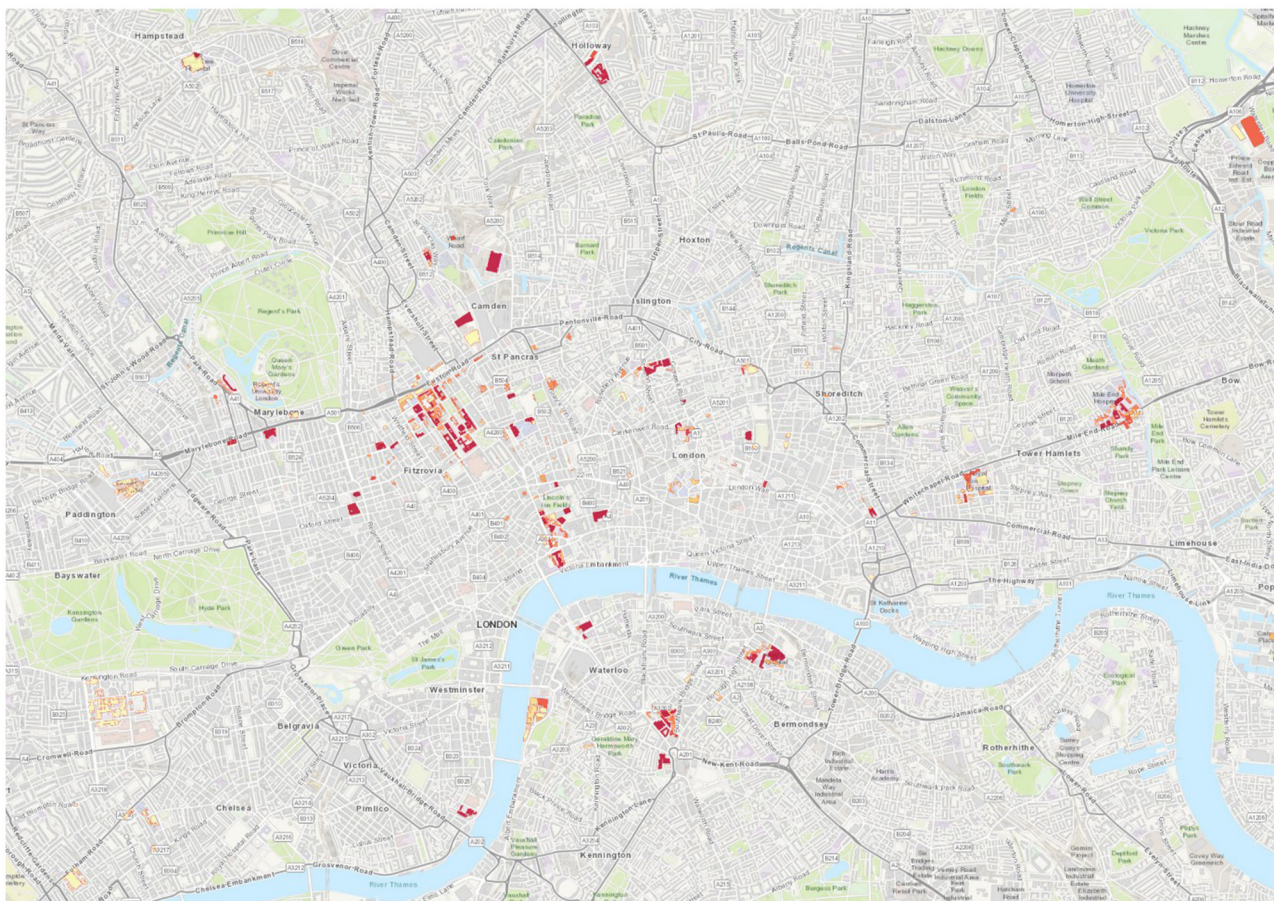


FIGURE 1 | Indication of university estates in Central London (2008).

effectively from a shared understanding of the project and mutual interests, and clearer grounding in their own roles. The separate steering groups evolved to provide support networks within and across each constituency, and have formed the basis for implementation actions beyond the life of the project.

The university steering group included staff from UCL, Kings College London (KCL), Brunel University (Brunel), University of East London (UEL), Queen Mary University of London (QMUL), London Metropolitan University (London Met), University of the Arts London (UAL), Birkbeck University of London (Birkbeck), and the cross-sector representative group, London Higher. Steering group members held different roles within their university, for example, Vice Provost, professional services in London, public and civic engagement, and academic research and teaching. They had different experiences of community partnerships and different levels of power and influence within their own institutions. There were three women and six men on the group, with seven people identifying as white, one as black, and one Asian. Defining the focus of the project as grassroots community groups was an important first step with university steering group members, whose initial

conceptualisations of “community” included wider civil society groups, local government, charities, large non-governmental organizations (NGOs) and the general public.

Community steering group members were recruited by Just Space, and were from community groups who had prior connections to the network and typically had prior experience of working with universities. The organizations were Just Map, Peckham Vision, Newham Union of Tenants, Grand Union Alliance, Community Centered Knowledge, Millbank Creative Works, Wards Corner Community Coalition, Westway 23, Equality and Human Rights Network, and Friends of Queen’s Market. There were six men and five women on the community steering group, with three people identifying as black, two as Asian and five white. The issues of interest to the community groups included local and London-wide planning and development, the creative arts, racial equality, community development, food, disability rights, local economies and housing.

Early meetings of the separate steering groups focused on creating a shared understanding of the project, London communities and universities. This included analysis of

the different motivations and needs of each group, and the complexity within both universities and community organizations. The early meetings provided clarity of the project purpose, and the aspirations and constraints of both universities and communities in building partnerships. Decolonization emerged as an early theme of high priority to community members, and influenced the delivery of the project as well as specific actions and themes in the project outputs (Harney and Moten, 2013; Bhambra et al., 2018). The two separate steering groups came together to plan the public events, and to provide feedback as the project developed, and co-produce the project outputs.

Best Practice Review

A review of best practice consisted of three tasks—a literature and internet search for UK and international case studies of universities engaging communities, a questionnaire for London-based universities on their work with community groups, and identification of community-based case studies of effective relationships with universities. The outcomes of the review informed the steering group discussions, public events and strategy development through internal discussion papers and presentations. The case studies were published in the project booklet, which was disseminated at the project conference (Just Space, 2019). The case studies were:

- KCL's programme to provide free meeting space to community groups.
- "Introduction to Housing Services" course offered for free to Lewisham Homes residents, delivered by London Met.
- Just Map's community mapping projects.
- UCL's Civic Design Continuing Professional Development Course delivered with Granville Community Kitchen and residents of the William Dunbar and William Saville Estates.
- Community leadership training provided by Birkbeck for community group leaders in Newham.
- Wards Corner Community Coalition collaboration with several universities to develop an alternative neighborhood regeneration plan.
- Future of London's Street Markets collaboration between multiple community groups and Leeds University.
- The London Journey and The Food Journey immersive training programmes delivered to university students and others by Community Centered Knowledge.
- The Local Energy Adventure Partnership (LEAP) micro-biodigestion model, which has collaborated with several London universities and demonstrated renewable energy and waste management technology in the Calthorpe Project, Camley Street Nature Park and other community spaces.
- The Engineering Exchange at UCL which supported collaboration between local community groups and engineering and built environment researchers.
- QMUL Legal Advice Center, providing free legal advice to local residents, with students supervised by academics.
- Milbank Creative Works collaboration with UAL to create a social hub supporting innovation, sustainability and creativity in the local community.
- 3D Print the Future of East London, a community arts project based in Loughborough University's campus in east London.

The review revealed examples of productive relationships at a project or programme level, innovative strategies from individual universities, and principles for good practice, but showed no evidence of a city-wide strategy involving multiple universities elsewhere in the world.

Public Events

Two public events were held to explore wider themes, share knowledge and experience, and gather input into the strategy and action plan. A workshop was held in July and a conference in October 2019. The public events are documented in a short film (Magar, 2020).

The public first workshop was held in partnership with Public Voice as part of the Tate Exchange, a series of community-based events hosted at the Tate Modern art museum in Central London. This half-day event at the beginning of the project focused on barriers and opportunities for stronger partnerships, and principles to underpin the strategy. It built on the event held as part of the same series in the previous year organized by Just Space and Just Map, which had formed part of the preliminary work. The workshop began with welcome from the project team and Public Voice host, followed by a presentation on the "The Nature of Community," by Eileen Conn. A first session of small group work divided attendees into university or community sector groups, to identify synergies and barriers to collaboration. Plenary feedback facilitated communication of core issues from university and community perspectives. Small groups of mixed community and university delegates then worked to discuss practicalities of building and maintaining collaboration for mutual benefit. The final session allowed feedback and discussed next steps, including plans for the conference.

The second public event was the Collaborate! conference, held toward the end of the project, at the East London Tabernacle, a community space owned and operated by a church group. The conference booklet, which was available to delegates as they arrived, presented the case studies of existing community collaboration, and formed an important documentation of the project (Just Space, 2019). Following a general introduction to the project and its preliminary outcomes, four of the case studies from the booklet formed the basis of breakout groups where collaborators discussed their work with delegates. During the tea break university staff were available to provide one-on-one advice surgeries to connect community members to relevant academics and programmes. The second series of breakout group addressed themes that had emerged from the steering groups—decolonisation of universities, community economic and industrial strategies, community spaces and the need for a London-wide strategy for community-university collaboration. After the feedback from the workshops a discussion panel from the community and university steering group addressed key themes, before an independent summary from a community-based planner and organizer. The conference ended with an evening meal. Evaluation of the event indicated that it succeeded in achieving its objectives, and that it created an environment

where community and university members contributed on equal terms.

Strategy and Actions

The steering group meetings and public events, together with case studies, research, and analysis, provided the basis for developing a strategic actions document and a charter for community-university partnerships in London. The strategy addresses the purpose and principles of partnerships between universities and grassroots community groups, and outlines actions for implementation through organizational governance and structures, facilitating connections, the curriculum, access to resources and evaluation. The actions are:

- 1) A Charter for Community-University Partnerships in London for universities and community groups, outlining shared principles and commitments.
- 2) Adopt a protocol for ethical community-based research, teaching and public engagement by university staff and students, based on the Just Space research protocol.
- 3) Universities and community groups to share strategic plans with each other, including processes for how they are developed, to consider how community groups can contribute to future strategic planning for universities and how universities can enhance and support effective community strategies.
- 4) Universities to widen and promote opportunities for community representation on committees and boards, including Senate or Council, whilst working to ensure their presence is effective and relevant.
- 5) Community groups to be supported to develop case studies based upon experiences of engagement with universities to decolonize university structures and processes and transform relationships with all affected, particularly with Black, Asian and Minority Ethnic communities.
- 6) Establish London Community - University Collaborate network to build partnerships and develop suitable, and decolonial, systems and structures for the interface between local community groups and anchor universities, located in different parts of the city.
- 7) Expand, promote, support and co-ordinate community brokerage services in London universities, involving community groups in service design and delivery.
- 8) Universities and community groups to explore opportunities for greater, more effective interfaces through co-produced networking and partnership building activities that are adequately resourced.
- 9) Develop a pilot residency program for the collaborative exchange of university staff and community members.
- 10) Publish a prospectus document of strengths of different universities for community groups to know where to access specific expertise in London. This will work alongside ongoing community-led mapping of community groups and their activity and needs, which needs to be constantly updated.
- 11) Engage expertise from diverse community groups to develop learning materials for use across different university-community programs that support wider and deeper community engagement and address issues in London that are challenging and meaningful.
- 12) Establish a platform within London universities to share best practice and materials for decolonizing the curriculum, including co-production of curriculum with organizations and members of colonially exploited communities.
- 13) Establish Action Learning Sets of university staff and community members on issues of mutual interest, such as partnership working, decolonization and curriculum design.
- 14) Universities to provide formal recognition and accreditation of learning from community members who contribute to and participate in community-based projects or teaching, to support lifelong learning and widen access to education. Recognition should also be given to learning from the experiences of community groups, and the access provided to data.
- 15) Free places available to eligible community members on short-courses or summer schools that involve community-based learning or case studies. Community groups can be supported to offer residencies for staff and students on such courses within community spaces.
- 16) Universities to work with grassroots community groups to develop a process for registration of community groups for enhanced access to university resources.
- 17) University libraries to work with registered community groups to provide access to academic journals, books and other resources.
- 18) Universities to provide no cost room hire to registered community groups, share best practice and publicize to appropriate community groups.
- 19) Community groups to work with university libraries and research administration to develop policies and systems that provide open access to academic research publications.
- 20) Research outputs from community collaboration or participation to be disseminated in a format that is appropriate, accessible and agreed by community members (see Just Space research protocol).
- 21) Establish a comprehensive, long term evaluation framework for community-university partnerships.

Charter

A Charter for Community University Partnership was drafted to fulfill Action 1 of the strategy. The purpose of the charter is for universities and communities to commit to core principles as the foundation for undertaking further action. Future signatories of the London Charter for Community University Partnership agree to the following commitments:

- 1) Community-based research, teaching and public engagement are undertaken in accordance with agreed ethical protocols, jointly produced by community groups and universities, that seeks mutual respect, reciprocity and recognition.
- 2) Universities and community groups share strategic plans and governance processes with each other and work together to identify opportunities to strengthen partnership in decision-making and planning.

- 3) Structures for supporting university-community partnerships recognize the different forms of organization of universities and community groups and respond to each other's needs and capacities.
- 4) Communities that experience marginalization, particularly Black, Asian and Minority Ethnic communities, are supported to engage with universities to decolonize university structures, processes and curriculum, and transform relationships with all affected.
- 5) University curriculum development in relevant programs engages expertise from community groups in design and delivery of modules and provides appropriate recognition for community contributions.
- 6) Universities work with community groups to develop systems for sharing resources such as university spaces, libraries and academic publications.
- 7) Evaluation of the impacts of community-university partnerships is undertaken within a comprehensive, long term framework.

Implementation

The project achieved its objectives of developing a strategy and actions for supporting stronger community-university partnerships in London. The strategic actions are not a plan for implementation, as the project has not yet been able to secure ongoing funding or long-term commitment from partners to implement the complete strategy. An initial business model of contributions from subscribing universities has been disrupted by the financial and operational impacts of the Covid-19 pandemic for universities. However, individual actions are being implemented, include university funding of specific, small projects.

The steering committee structure has continued beyond the project to explore opportunities for implementation and future funding, working remotely and meeting online during the pandemic. The community steering committee undertook a detailed review of fundraising options to support a Collaborate! network organization to implement the strategy across London. The university steering committee members identified priority actions that were pursued within their own organizations and developed small working groups across institutions to share best practice in supporting implementation. Implementation within universities has been dependent on the level of influence of the steering committee member and their capacity to commit resources and time. In the short term, priority actions are focused on decolonization (action 5), access to resources (actions 16–19) and establishing action learning sets (action 13).

DISCUSSION

The Collaborate! project succeeded in its aims through a strong commitment to partnership and co-production in practice (Ersoy, 2017). The project was community-led, building on previous unfunded work by Just Space, to address a specific need identified by grassroots community groups in London. Funding for the project was secured through a university funding

scheme, and shared equally between UCL and Just Space, providing autonomy and flexibility in how the project was delivered. Community leadership enabled strong participation from community members in the steering committee and public events. Community resilience and adaptability has enabled progress toward implementation in the changing circumstances of the pandemic, as community groups have greater flexibility and responsiveness than the hierarchical structures of universities (Conn, 2011).

The pandemic has provided both a threat and opportunities for stronger collaboration between universities and community groups. The pandemic and lockdowns have highlighted social and environmental inequalities in London, and the role of universities in the local economy and communities. This provides an opportunity for Collaborate!, as university leaders seek to reposition their institutions to demonstrate their immediate social value. However, resource constraints, increased workloads and highly challenging conditions for communities and universities alike have also led to a focus on “core-business” of teaching and essential research. While community partnerships remain an additional activity for individual staff and university administration, the future development of university actions will be constrained to implementation of high priority strategic actions.

Community leadership in co-producing the strategy and implementing actions was important as a means to avoid unhealthy competitiveness between universities in the same city who are working toward the same objectives. While individual universities have developed strategies to be more “outward looking” this typically refers to non-university partners (Watson et al., 2011; Goddard and Vallance, 2014). Beyond collaboration in research, and higher education policy lobbying, it is uncommon for universities as institutions to work together, despite clear common interests. Each institution develops its own strategy and partnerships, with limited motivation and significant barriers to working with other universities. Community leadership of Collaborate!, in the project and in future delivery, is an important mechanism for maintaining the “space of possibility,” avoiding fragmentation between universities and ensuring a city-wide perspective on the challenges and benefits of community partnerships (Conn, 2011).

Collaborate! steering committee members, both university and community, were invited to join the project because of their expertise and experience, across a range of groups and institutions. They were not “representative” of particular interests, but were able to contribute to the project based on lived and professional experience, and relevant knowledge. Community members are often subject to expectations of “representativeness” in their engagement with universities in a way that industrial or policy partners are not. Industrial advisors or collaborators in university research, teaching and governance are rarely scrutinized based on how well they “represent” their sector of the economy or technical specialty. The “tyranny of representation” applied to community members by contrast

often precludes meaningful engagement of committed, knowledgeable local people with university structures and activities. The success of Collaborate! demonstrates the value of recognizing specific community expertise in strategic partnerships, without expecting individuals to “speak for” complex constituencies.

Co-production of the project outputs was an essential feature of the project, enabling deep collaboration and commitment. However, the implementation of the strategy is constrained by the profile of the participants in the co-production process. The hierarchical structures of the university limit the immediate uptake of the project outcomes, depending on the power and influence of University participants in the process (Conn, 2011; Ersoy, 2017). Community engagement remains lower priority to leadership addressing teaching, research and industry partnerships, particularly under the financial and operational difficulties presented by the pandemic. Senior leaders involved in the process were able to immediately implement priority actions and commit funding, while professional services and academic participants worked to align existing projects and develop stronger support networks. Broader implementation requires ongoing commitment and co-ordination, which community partners are most strongly placed to deliver as a non-hierarchical network than universities who are constrained by hierarchy and competition (Harney and Moten, 2013).

The Collaborate! project is of wider relevance to other cities and communities (Goddard and Vallance, 2014; Ersoy, 2017). Its applicability to other contexts is constrained by its focus on urban and planning issues, as reflective of the core interest of Just Space members and required to demonstrate relevance to the funder. The UK and London context provide specific boundaries for policy and social replicability, but the core principles of co-production and partnership working, in the outcomes as well as the process, will be of relevance to other democratic jurisdictions with active grassroots civil society.

CONCLUSION

Repurposing the universities for sustainable human progress requires expanding the range of stakeholders and partners they engage with and the quality of that engagement (Maxwell, 2014). Effective engagement with grassroots community groups and emerging social movements are particularly important in addressing current and future crises (Ersoy, 2017). However, the hierarchical structures and competitive cultures of universities are fundamentally incompatible with the organizational form of many groups working for sustainable change (Conn, 2011).

The Collaborate! project began with community groups identifying the potential for mutual benefit from a more strategic approach to university partnerships across London. The city scale reflects community interests in knowledge and resources sharing, beyond the expertise and programmes of any specific university. The co-production of the project began with the

initiation and funding, and continued through the development and delivery of outputs, and implementation of agreed actions. A commitment to co-production was evident in the project structures and roles, as well resourcing. The project created a “space of possibility” which drew on both the autonomy and adaptability of community partners, and the formal structures and resources of universities.

Co-production processes and structures supported trust and commitment between participants in the project (Ersoy, 2017). However, implementation has been constrained by the relative power and level of influence of participants, particularly those working in universities. Co-ordination and implementation of university actions is limited by the hierarchy and fragmentation of the sector. For this reason, it is important to move beyond co-production to co-delivery, drawing on the strengths and flexibility of community-based partners to act beyond the boundaries of individual universities. Securing the “spaces of possibility” created by Collaborate! requires continuation of intermediary organizational forms, decentring power and resources from university hierarchies into genuinely collaborative structures (Conn, 2011).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary materials, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

SB is the co-convenor of the project with RL, who provided oversight to the paper. DF led the writing of the Context section of the paper, contributed to the Collaborate, and Discussion sections. SM provided practical delivery of the project, contributed to analysis, outputs, evaluation, and led the writing and production of the best practice case study document, which supports this paper. All authors contributed to the article and approved the submitted version.

FUNDING

This work was funded by the UK Engineering and Physical Sciences Research Council, UCL Impact Acceleration Account 2017–2020.

ACKNOWLEDGMENTS

This case study was made possible by the contributions of members of the steering group, including Victor Adegboyi, Toby Laurent Belson, Robin Brown, Eileen Conn, Nicolas Fonty, Hester Gartrell, Sarah Gifford, Christine Goodall, Shirley Hanazawa, James Jennings, William Leahy, Darryl Newport, Saif Osmani, Wilfried Rimensberger, Shibboleth Shechter, Matthew Scott, Paresh Shah, James Tortoise-Crawford, and Mama D Ujuaje.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Institutional Fragility: Structures of Dominance in American Higher Educational Institutions Inhibiting Sustainable Education

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Keywords: institutional fragility, sustainable education, institutional sustainability, American higher education, transformative learning and change, third order change, sustainable organizational change

It is only when the mind is free from the old that it meets everything anew, and in that there is joy.
-Jiddu Krishnamurti

INTRODUCTION

Higher educational institutions (HEIs) have become a requisite place to educate future change agents towards solving urgent sustainability issues facing society, and HEIs have responded to this imperative. As Vincent et al. (2016) reports, environmental and sustainability baccalaureate degrees grew by 57% between 2008 and 2012, master's degrees by 68 %, and doctoral degrees by 35% (p. 419). While HEIs' response to the demand for sustainability programming is evident, these curriculum and program add-ons primarily support first and second order change. First order change is adding content knowledge about sustainability to the curriculum and second order change is integrating teaching methods or practices to achieve sustainability. While these are very promising, Sterling and Schumacher Society (2001) insists that the whole institution needs to shift to an ethos of participation, appreciation and self-organization better known as *third order change* or transformative sustainability education.

In order to make this necessary shift, we need to perturb the current dominant Western organizational structure that relies on fragmentation, control and manipulation (Sterling and Schumacher Society, 2001). Furthermore, territory, hierarchy, power dynamics, and structural and systemic inequity are some of the terms used to describe unsustainability and yet, these are the dynamics that occur time and time again in U.S. higher education. Congruent with the term, *white fragility* (DiAngelo, 2020), *institutional fragility* can be used to describe the defensive response by institutions when their power is challenged. DiAngelo (2011) explains *white fragility* through Bourdieu's conceptualization of *habitus*—"a set of dispositions that generates practices and perceptions." I draw from this conceptualization in describing *institutional fragility* as a response produced and reproduced by the socially and materially advantaged within the power structure of institutions (p. 58). In other words, fragility, used in this context, means the resistance to looking at and being truthful about the system and groups of people who work within the system who lack the power to change it.

The organizational structure within this current dominant paradigm is contributing to institutional fragility, and I believe is holding higher education back from reaching its full potential and its *response-ability*, in addressing sustainability. Sterling and Schumacher Society (2001) identifies response-ability as a core issue and insists that our cultural educational paradigm needs re-envisioning because it will determine

OPEN ACCESS

Edited by:

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Reviewed by:

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 01 February 2021

Accepted: 20 May 2021

Published: 28 June 2021

Citation:

O'Neil JKP (2021) Institutional
Fragility: Structures of Dominance in
American Higher Educational
Institutions Inhibiting Sustainable
Education. *Front. Sustain.* 2:662527.
doi: 10.3389/frsus.2021.662527

“how far institutions and higher education as a whole are able to respond sufficiently to the wider context of the crisis of unsustainability and the opportunities of sustainability (p. 50). This is a dramatic and transformative shift that will require institutions to re-vision their very structure and the nature of relationships between institutional participants—an epistemological and ontological shift in *being sustainable* (Sterling and Schumacher Society, 2001; O'Neil, 2018). In order to weave “sustainable being” into the fabric of the institution, HEIs’ need to recognize that their responsibility is not only to practice campus greening efforts or teach curriculum in programs about and for sustainability, but they themselves need to function *as* sustainable institutions.

As a higher education careerist of 20 years in sustainability education and a scholar in the area of higher education and transformative change, I draw from my experiences and academic expertise to position this opinion paper. I have served in the capacity of a professor and program director at several institutions and have been involved in HEI governance and consulting in curriculum and program development with the purpose of reorienting curriculum and programs for a sustainable future. Along these lines, and at the time of this publication, I teach a graduate course in *Reorienting Curriculum and Programs for a Sustainable Future* and another course in *Transformative Sustainability Education*, so I am aware of a wide range of challenges that go beyond my personal experiences and are a part of a wide body in sustainability education and organizational change literature.

In sharing my perspective for this opinion article, I draw heavily from my recent experience of designing, developing and leading a graduate program in sustainability education at a public U.S. higher education institution. I realize that all institutions (2, 4-year, graduate, and private) have their own structures to navigate and when I refer to HEIs, I am specifically addressing U.S. 4-year public institutions. Because of my own understanding of third order change and the need for HEIs to function as sustainable institutions, I inaugurated a graduate program with a sustainable education lens in terms of how I administered it and how the program functioned—with faculty, staff and students. I drew from ecological principles in nature to implement a Living Learning System design (O'Neil, 2017, 2018). I also drew from a transformative relational ontology (O'Neil, 2018; Lange et al., 2021) and other sustainability principles to guide my decision-making and actions, such principles as, “...fluidity, integration, multidimensionality, intensity, ethical integrity, caring and synergy” (Sterling, 2004, p. 62). This experience of trying to enact third order change from the inside out brought me into direct contact with the barriers inherent in the current organizational structure of HEIs and convinced me that, without key structural changes, HEIs may have little to offer in terms of bringing about third order change.

I invite the reader to join me in putting aside the commonly applied modernist lens when examining higher education and taking a fresh look at the complexity of sustainability education and how we might revision our future. In doing this, I will look closely at three interconnected major structural and systemic issues contributing to my idea of *institutional fragility*. These areas include *economic structure*, *administrative structure*, and

faculty structure that all lead to one common denominator—power or lack thereof affecting human progress.

Due to the word count publisher restrictions of this opinion paper, the reader may go to the **Supplementary Material** to read my opinion about these three institutional structural issues. Below, I address the issues of these structures by giving offerings to institutional stakeholders. Lastly, I share my concluding thoughts about *institutional fragility*.

SO NOW WHAT? MY OFFERINGS

Through sharing my own experiences leading a sustainability program and drawing from the literature, I have highlighted challenges for sustainability education due to existing economic, administrative and faculty structures. Hurdles created by these systemic arrangements are great and have led many organizational change and sustainability education thought leaders to propose that the entire higher education system needs a systemic overhaul. They advocate for a “higher calling for higher education” embracing a transformative vision for a sustainable future (Sterling and Schumacher Society, 2001; Vincent et al., 2015, 2016; Escrigas, 2016). These issues arise such as in Corcoran (2009) edited book, *Higher Education and the Challenge of Sustainability—problems, promise and practice* and its numerous illustrations and contributions of well-documented experiences of individuals on the front lines of these challenges. So, what am I offering to the reader besides an opinion piece re-stating what we already know?

My first offering is to ask if traditional HEIs are the location for transformative sustainability education or third order change? For anyone still up for the challenge, here are my offerings for HEI stakeholders.

An Offering for Stakeholders Working Within HEIs

Move into the future with open eyes, open mind, and open heart. Embrace the possibilities for transformation that are inherent in educating sustainably, but understand that to do so requires more than offering sustainability curriculum or campus greening. Whether sustainability programs are housed within their own or other disciplinary units/colleges, successfully implementing third order change means rethinking current systems and practices.

- **Embrace the emergent properties** that come from the complexity and holism of sustainability
- **Trust** in all people including those outside of your “insular circle”
- **Be vulnerable** in sharing human flaws and shortcomings
- **Be courageous** in stepping out of the status quo
- **Be transparent** with the rationale behind decision making
- **Be authentic** in who you are even if you fear it falls outside of the dominant cultural norm
- **“Ungroove” yourself** from conformity.

First of all, the administrative structure needs to fully appreciate complexity, embrace holism and take a systemic perspective, “to understand and embrace the advantages of adopting a conceptual framework that privileges such features as integrated wholeness,

dynamic interconnectedness, embeddedness and emergent unpredictabilities" (Bawden and Allenby, 2017, p. 901). An emergent property does not belong to any one part of the system. It is created by accepting the unexpected phenomenon of a collaborative functioning of a system, such as the inclusive interactions within the institutional structures of the system that are allowed to organically create something new, exciting, and unexpected. When that happens, the power shifts, and great work can be accomplished, not out of fear but instead as a shared decision-making process.

In this process, "stakeholder engagement, for inclusion, and for critical reflexive and deliberative discourse remain central to the issues under review" (p. 901). In order to do this authentically and for the betterment of all stakeholders, we need to establish trust. Leaders need to trust in sustainability program leaders who bring a diversity of ideas in how to meet common goals. In turn, that trust will be reciprocated. To trust, Brown (2019) advocates, that it will take courage and to be courageous, leaders must be vulnerable. Vulnerability does not come from power and perceived strength. To be vulnerable, we need to accept that we are human and all have flaws and shortcomings. We also have various strengths. We need to create the conditions to allow one another to expose our vulnerabilities without being judged or leveraging those vulnerabilities against one another.

Next is courage. Courage means showing up and being seen when one is not sure of the intentions of others nor the outcome of sharing one's vulnerabilities. Courage means stepping out of the status quo and advocating for change. It takes courage to be vulnerable. When leaders take the courageous step of being vulnerable, transparency and authenticity in messaging is critical. In other words, they must cut the bureaucracy; be transparent with the rationale behind their decision making. Leaders may be surprised by the overwhelming response these steps will build—they will find diverse allies that *want* to give support, not out of fear but out of true care. Authenticity means letting go of the fear that our ideas will fall outside of the dominant cultural norm and speaking out truths, feeling confident that they will be valued, included and accepted. Not to say that all ideas will be adopted, but that they will authentically be given a fair chance. Authenticity is to be a genuine and real human being.

Lastly, "ungroove" yourself from what Bawden and Allenby (2017) call, self-perpetuating 'epistemic myopia.' "Even more insidious—and blatantly anti-adaptive in its expression—is the submission that in subscribing to what might be termed the "official institutional or governance worldview" invariably results not just in a rejection of other perspectives, but with an outright denial of any alternative" (p. 5). As Krishnamurti (2021) so wisely states,

"Why does your mind conform? Have you ever asked? Are you aware that you are conforming to a pattern? It doesn't matter what that pattern is, whether you have established a pattern for yourself or it has been established for you...a consistent thinker is a thoughtless person, because he conforms to a pattern; he repeats phrases and thinks in a groove."

Ungroove yourself. Good leaders and good educators can create the transformative conditions for *third order change* and

they will find that others are inspired to support and to build into a systemically resilient institution of sustainability.

DISCUSSION: RE-IMAGINING FROM INSTITUTIONAL FRAGILITY TO INSTITUTIONAL SUSTAINABILITY

In fragile higher education institutions, we function in a culture of fear—fear to speak out, fear of truth to power, fear of losing our livelihoods. The fear does not lie only within faculty and lower-level administration; there is a fear within upper administration, too—a fear of losing control, a fear of losing power, a fear of losing money. Sustainability asks us to flatten hierarchical structures, think systemically, collaborate, be authentic, be just, be equitable, be inclusive, build relationships, and enact a collective vision that requires collective decision making. It is challenging and will require a newer way of thinking—a systemic and ecological way of thinking and a relational way of being (O'Neil, 2018; Lange et al., 2021). I was once told by an upper administrative leader, faculty have way more power than they think, the hard part is getting them to care enough to build consensus. Perhaps it is up to faculty to lead these collective visioning efforts for sustainable education for meaningful change to take root, and then it is up to administrators to trust in this (re)visioning. As Escrigas (2016) states in, *A Higher Calling for Higher Education*, we will,

"...require transcending both the paradigm of the "ivory tower" dominant some decades ago and the "market-oriented university" prevalent today. We need a new proactive and innovative conception of the calling of higher education for a Great Transition to a more equitable and sustainable world."

As we saw on January 6th, 2021, U.S. democracy almost collapsed in its very fragility in the U.S. congress. Our democracy may be fragile, but it is very unlikely an entire collapse will occur. DiAngelo (2011) explains that *White Fragility* doesn't always manifest in overt ways but is also expressed as silence and withdrawal in functions. As Bawden and Allenby (2017) explain about worldview transformation, "It is to attack the roots of individual identity, which is fraught: people can live through amazing material deprivation, but strip them of meaning and they are lost, angry, and fearful" (p. 4). Rather than operating out of fear, we need to accept this fragile moment as an entry point for change. The same goes for institutions of higher education. "It is through our worldviews that we adopt particular positions on truth and beauty and justice, on our considerations of what is right what is wrong, fair and unfair, and what is virtuous or otherwise" (Bawden and Allenby, 2017, p. 903). I believe we can learn from the framework of *White fragility* as an intervention for *institutional fragility* with the end result of building a sustainable future. We know where we need to go as a human species, and if HEIs are unwilling or unable to acknowledge their fragility and enact third order change, they should reconsider their role, focus on first and second order change, and look to individuals and organizations outside the institution that may be better equipped to transform or work around structures that impede sustainability.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

ACKNOWLEDGMENTS

I would like to acknowledge Dr. Paula DeHart for her partnership with me in the doctoral program in educational sustainability. Dr. DeHart, a 29-year HEI professor who retired in 2019, was integral in reviewing, editing, and contributing concepts in this manuscript. Many hours were spent on understanding "what

happened" in our HEI experiences, which helped me shaped this paper. I would like to also acknowledge my husband of 23 years, Carl O'Neil. Carl, also an educational practitioner and professor in higher education, has been there through it all-on and off the clock and numerous conversations about "how HEI works...or doesn't work." A new chapter awaits!

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsus.2021.662527/full#supplementary-material>

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Conflict of Interest: JO'N is the Director of The Joy of Sustainability, an independent educational consulting firm.

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The (Un)Sustainability of Higher Education Institutions in Jordan

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Edited by:

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 15 January 2021

Accepted: 24 June 2021

Published: 16 July 2021

Citation:

Hassan SbE, Cordova KE, Rabadi G
and Abu Elhajja W (2021) The
(Un)Sustainability of Higher Education
Institutions in Jordan.
Front. Sustain. 2:653992.
doi: 10.3389/frsus.2021.653992

Higher education in Jordan has been tied closely to the state-building process in the century since the modern Hashemite state's foundation in 1921, with its explicit purpose being to educate and train high volumes of students who are competent and capable to serve as contributors to the state's development. Though this purpose has largely been successful to date, it is becoming increasingly clear that more is needed than simply issuing degrees. In an increasingly globalized world, it is necessary to educate those who can contribute to future research arenas and labor markets over which a single state has limited control. Within this perspective, we detail the evolved societal position that higher education institutions in Jordan occupy and how that position has made such institutions a liability in the nation's continued sustainable development. It is important to emphasize that we do not address here classical sustainability issues, but rather focus on more fundamental and culturally-relevant issues pertaining to the survivability of universities in Jordan upon which more global sustainability views and solutions can be predicated. Specifically, we outline the unsustainability of impersonal, inefficient and ineffective infrastructure, centralization of policies and academic practices, lack of autonomy and/or self-governance, considerable financial dependence on the state, and a general hesitation for higher education institutions to seek boldly societal and economic impact beyond the simple production of graduates. To counter this unsustainability, we propose a three-pronged approach that can help catalyze the re-imagining of Jordan's higher education institutions so that they become maximally effective contributors to the state's future sustainable development. Our proposed approach is based on (i) internally decentralizing higher education institutions to enable greater autonomy and academic freedom, (ii) re-purposing these institutions to become more student-centric, and (iii) embracing diversity and academic community recognition. Finally, it is the intention of this perspective to highlight not only those challenges facing higher education institutions in Jordan, but also to present clearly the necessary and practical steps that institutions themselves may take immediately to ensure their relevance in, and impact on, modern society.

Keywords: higher education, university, developing countries, Jordan, Middle East and North Africa region, state-building, sustainable development

INTRODUCTION

It is a truth almost universally acknowledged that the greatest resource of any nation is its people, and that future prosperity and sustainability lies in unlocking that peoples' innovative capacity to explore, discover and create. This is particularly true for a developing country with scant natural resources such as Jordan. Though the region in which present-day Jordan is located has been at the center of human conversations on innovation and the application of knowledge for thousands of years, the modern state of Jordan has reached a point where critical assessment and reform of its higher education institutions is vital, to ensure that innovation, scientific output, and sustainable solutions spring forth for current and future generations. This fresh, critical look is of the utmost urgency as Jordan, for better or for worse, very immediately and acutely embodies many of the growing global challenges that demand sustainable solutions. The problems Jordan faces today will be all the world's tomorrow, particularly in cross-cutting issues such as water, migration and social responsibility for justice and fairness in the allocation of dwindling resources (Whitman, 2019).

We believe that we are not alone in thinking that one must look back in order to look forward, for it is in the context of searching for that fresh perspective that an economical review of how we arrived at the current state of higher education is necessary. Put simply, higher education in Jordan does not have a long and storied history, but it does have all of the ingredients to create one, not least those ancient traditions of managing scant resources and innovating in harmony with the natural environment, and institutionally supporting the unlocking and education of scientific and artistic talent in the Islamic Golden Age. However, a significant hiatus of stagnation and marginalization has unquestionably obscured past achievements. Thus, the developmental timeline of modern higher education in Jordan may be categorized into four distinct phases (Mazawi, 2005; Buckner, 2011; Adely et al., 2019): (i) Creation of vocational training institutes in the 1950s to prepare students for teaching positions at compulsory school levels; (ii) Establishment of the first 4-year-degree national university, the University of Jordan, in 1961 to meet society's growing demands for further educational opportunities yielding more advanced skillsets; (iii) Expansion of the public university system in the 1980s to continue meeting rising demands by providing educational services to a larger citizenry in diverse geographic areas; and (iv) Proliferation of private and public universities starting in the 1990s to capitalize on a thirst for upward social mobility through education.

The underlying driving force for this modern development was, and continues to be, the state, which has viewed higher education as a tool for training high volumes of students to be competent and capable members of society who serve the state's historically largely centrally-planned economic development. Though not without benefits, this driving strategy does come with consequences. Due to the speed with which expansion and proliferation occurred, most public university campuses in Jordan were poorly planned resulting in impersonal, inefficient, and disconnected buildings that lack any expected sense of

a communal, let alone intellectual, environment to be found. Indeed, this leaves most campuses feeling transactional and, to a certain degree, many have evolved to function as such. Furthermore, because the development of higher education has been so closely tied to the process of state-building, centralization of policies and academic practices have yielded public universities that lack distinct character or, even, specialization. Jordan's government has acknowledged this as a challenge and, as of 2018, has legally recognized both public and private universities as administratively, financially, and academically independent—an action intended to enable universities to evolve organically to meet new market demands. However, at present, these laws exist only on paper with universities having yet to put them into practice. By and large, the same by-laws, policies, educational offerings, curricula, student services, and educational outputs can still be found at each of Jordan's 10 public universities.

To be clear, this is not to blame those universities for inaction. Rather, this reluctance to change is born out of historical hesitation to practice autonomy due to ministerial restrictions on self-governance that have held sway as a result of universities' significant financial dependence on the state. With a total debt of more than \$150 million held by Jordan's public universities (2019) and a yearly increasing budget deficit, it is expected that these universities' financial dependence on the state will continue for the foreseeable future (Jordan Times, 2019). But Jordan's public universities do have a semi-independent outlet to right their economic situation with the hopes of gaining increased autonomy in the future—their boards of trustees. Unfortunately, though, these boards have historically been underutilized and, thus, have failed to admit their responsibility in actively engaging in fundraising efforts. Public universities' primary source of non-state funding comes from tuition fees, which has forced their focus to increasing admission numbers to cover their educational and operational costs. Increased admission of less-qualified students to what are known as “parallel programs” has come at the expense of delivering quality education and has diverted faculty away from research. Although the increasing intake at private universities has reduced the enrollment burden on public universities, it remains clear that the short-term budgetary requirements, or even short-sighted profit goals, of public and private universities have left no incentive to invest in quality of education or innovation. However, there are institutional bright spots, most notably, Princess Sumaya University for Technology (PSUT), that have managed to become financially more sustainable while not sacrificing quality education, as manifested by job placement rates of graduates. PSUT is a non-profit university that has built a solid reputation on offering specialized technology and engineering programs that meet national and regional market demands. Though it has found a way to continuously modernize its educational offerings and has outlined its goal to evolve into a research institution, like other universities in Jordan, PSUT still largely depends on tuition revenues to support its operations. The long-term sustainability of tuition-based models will always be more susceptible to factors beyond an institution's control if they are not supported by other revenue sources such as research and development, innovation, and entrepreneurship. Nevertheless, all of these issues have been

critically reviewed, dissected, and discussed in the literature, with a broad consensus emerging that nothing short of complete systemic transformational change is necessary for Jordan's higher education institutions to maintain their prominent societal position, and therefore, to have a meaningful impact on social and economic development in the coming decades (Badran et al., 2019, 2020; Rabadi, 2020; Shirazi, 2020; Zabalawi et al., 2020).

Although this is the general consensus, both in the literature and anecdotally from Jordanian faculty members and other stakeholders, in practical terms, this transformation may not happen quickly. In a state that faces regular and acute economic, social, and (geo)political development challenges, decision-making is likely to remain reactionary and myopic, while those who champion systemic transformational change will inevitably be overwhelmed by political exigencies that may not countenance the transformational change that, to many observers appears both essential and straightforward.

For the sake of simplicity, it is important to point out that a critical mass of decision-makers in Jordan has yet to recognize that the reality and requirements of education are no longer confined by state borders as was the case when first being developed in the early decades of the centralized state-building process—and this is where the barrier to activation for change is at its strongest. Can we create sufficient awareness and appreciation of the fact that the role of higher education institutions has evolved to become producers of competent and capable graduates whose advanced skills are transferrable beyond any one particular society or state? Perhaps wider acknowledgment of this could be the first step in launching a fifth phase of higher education development in Jordan. In support of this, can we explore concrete, practical initiatives that individual higher education institutions in Jordan can implement immediately that would yield maximum impact for sustainable progress, both in terms of human development and the support of a culture of sustainable economic and social development, without overly upsetting the existing higher education system that is so reluctant to change? Although a workable framework for answering these questions does not yet exist in Jordan, our short answer to each would be “yes.” As detailed below, we propose several approaches supported by specific ideas and activities that universities could immediately start exploring without having to seek approval or permission from the relevant educational authorities. It is our belief that the following three-pronged approach can help catalyze the re-imagining of Jordan's higher education institutions so that they become maximally effective contributors to the state's sustainable development and retain their established competitiveness on the regional and international levels. To be clear, we recognize that this approach is not necessarily ground-breaking in its novelty, but if properly followed, its impact would be felt across the country in meaningful ways. Accordingly, our proposed approach is as follows:

(i) Internal decentralization to enable greater autonomy and academic freedom:

It has become clear that, in Jordan, centralization at the national level begets greater centralization at the individual university level. This is wasting potential and obstructing the achievement of sustainable progress. Hierarchical modes of administration are outdated, slow, and ineffective. In practice, university presidents retain central authority with consecutively lower branches of administration (i.e., vice presidents, deans, and department heads) carrying out the duties assigned by those above them. In order to realize effective, dynamic institutions, decentralization of this authority across academic units should be of the highest priority. This makes intuitive sense, because in reality, those academic units are filled with topical experts who are the most capable on campus for planning and responding to the shifting tides of their respective disciplines. Indeed, is any university president truly capable of understanding the complexities of the differing needs that arise from all of the schools, departments, and programs that fall under their institution's educational banner? In a similar vein, the time spent by high-level administrators on lower-level tasks limits their availability to pursue larger and more impactful initiatives for the institution they serve. The role of the president, with support from other high-level administrators, should be to focus on setting the vision of the institution at large, establishing a collective strategic plan to realize that vision, and then guiding, governing, and implementing that plan by consensus with the deans and department heads (Batarseh, 2014). Finally, universities must reach out and practically engage with their boards of trustees as any serious attempts to realize a decentralized, efficient administrative framework will require taking and implementing bold decisions such as decentralizing budgets, managing human resources, imposing quality assurance programs and responsibilities, more targeted scholar and staff recruitment, as well as providing faculty and middle management greater freedom in decision-making. Afterall, responsibility with no authority is meaningless.

(ii) Re-purpose higher education institutions to be student-centric:

When looking to re-purpose higher education institutions in Jordan to meet the societal demands of the future, it is important to begin by re-assessing the educational contract that exists between student and institution. Does the university effectively create a conducive environment for student learning and human growth? Do effective student services exist? Can a vision to make the institution an exemplar of sustainability, with students as its budding champions, seek to have a lasting impact on processes and practices in wider society?

Though the answers to these questions can be complex and nuanced, there is a lot that can be achieved from a high-level perspective. As a result of rapid growth and expansion, campus planning and university architecture in Jordan have resulted in largely impersonal environments and buildings that are not environmentally sustainable. But it does not have to remain this way. Universities can easily identify buildings and facilities that have become obsolete in order to re-allocate them for sustainable use by students (Winks et al., 2020). All university campuses in

Jordan are ripe for outfitting with renewable sources of energy. Several universities, most notably Jordan University of Science and Technology, Hashemite University and the University of Petra, already power their campuses from solar panels resulting in close to zero energy bills (Qdais et al., 2019). In the digital age, libraries for example no longer require stacks of book shelves. It would be in the students' interests to repurpose such capacity into learning commons—spaces that offer high-tech collaborative work rooms, individual study areas, electronic equipment, and other free-to-use information technology. The impact of such a strategy may be taken for granted in other parts of the world, but in Jordan this has yet to be done.

It is also important to emphasize that students' needs extend beyond educational services. The university should be experienced by students as a community and mechanisms should be created to facilitate the growth of meaningful connections with peers as a vital support to personal growth (Beckers et al., 2016). Universities can enable this through the explicit creation of "student hubs" that operate with significantly extended hours. The "student hub" is a facility that provides large open spaces for students to engage with each other, offers diverse dining options, and supplies additional high-tech collaborative workspaces. Everything from job recruitment and a campus bookstore, to social and professional club activities can be held in this space. Indeed, most universities already have a starting point for realizing this "student hub"—the central cafeteria—which naturally invites and facilitates the congregation of the student body.

Aside from creating a physical infrastructure that is student-centered and community-focused, universities should also re-assess the extracurricular services they provide to their student body to maximize academic success. For example, some private universities in Jordan have already established mentorship and guidance programs for incoming undergraduates. These should be celebrated, championed, and strengthened with further financial and administrative support, and expanded to public universities. A career management office that advises students on their professional career before and after graduation, and connects the universities with employers, can have a tremendous impact on the employability, placement and clarity of decision-making of graduates. Furthermore, the creation of new educational approaches that do not require ministerial approval should be explored. These include service-learning modules and/or service-learning course credits, paying greater attention to, investing in and deploying more virtual learning courses and resources. Additionally, formalizing internship programs during intersessions gives graduates richer experiences and better chances of employment. A good example is German Jordanian University, which requires every undergraduate student to spend one semester abroad at one of Germany's higher education institutions and a second semester interning with industry. It is true that governmental restrictions will always be present, but with a bit of creative thinking and institutional will-power, higher education institutions in Jordan can make a substantial impact on their student body by re-balancing the dynamic with new activities that are student-centric.

(iii) Embrace diversity and academic community recognition:

Diversity yields novel, independent ways of thinking and ignites creative collaboration. As with any system of higher education in the world, Jordan's would benefit from a greater diversity of talent—diversity with respect to nationality, race, gender and background (bint El Hassan, 2020). This must happen from the top down. University presidents and high-level administrators in Jordan have been predominantly educated in the United States and Europe. It is interesting that although they have witnessed how autonomy, decentralization and academic freedom in higher education can lead to innovation, their lenses narrow after returning to Jordan and spending the majority of their professional life within that system. It is therefore highly probable that diversifying leadership via the recruitment of foreign or diaspora administrators and scientists from abroad marks an essential step toward effecting change and infusing higher education institutions in Jordan with new ideas and practices. This concept also extends to faculty members and the student body. Aside from bringing different experiences and ways of thinking to the table, diversifying faculty members will yield a presence on campuses that can disrupt conventional ways of pursuing education in Jordan. These faculty members will yield new educational philosophies, provide students with access to values and thought processes that are perhaps different, and expand the standard worldview of their students. Diversification of the faculty population should also be broadened to include the creation of senior lecturer and/or adjunct faculty positions for those accomplished industry leaders that are keen on engaging the youth. Although conservative academia in Jordan may reject the notion that non-tenure track faculty has a place in the university classroom, they must recognize that many subjects (e.g., entrepreneurship, business management, data science) are often best taught by the practitioner rather than the academic. It is also true that utilizing senior lecturers and/or adjunct faculty from industry to teach semester-long courses provides real-life experience and value to students. However, if recruiting and hiring foreign, diaspora, or industry-derived adjunct faculty proves too expensive or bureaucratically challenging, then universities may also create a robust visiting scholar program. Such a program already exists in an elementary form in Jordan through a sabbatical system, but real brain-gain and diversification of talent on campuses will only happen if the visiting scholar program expands its reach beyond national or regional borders to include scholars from the Far East, Africa, and Latin America.

The final ingredient to consider when re-purposing universities in Jordan is a recognition of the wider university community. Good work far too often goes unseen and unrewarded in the existing incentive systems. In fact, these incentive systems are often viewed and indeed function as an exercise of rights rather than recognition and, thus, need to be re-purposed so that they operate on a merit basis and convey a higher degree of selectivity, independence and prestige. For example, scholarships for students could be transformed into a tiered system with those most-deserving from a merit perspective receiving a "named" scholarship, which inevitably instills a sense

of prestige. Similarly, named professorship programs could be created for those faculty that excel in research and/or teaching. Upon appointment to a named professorship, faculty members may receive a fixed increase in salary, reprieve from teaching, and small seed funding for further research or teaching activities.

To attract the international community, endowed chair positions may also be created. Although these positions typically require a sustainable source of additional funding, it is certain that any investment would prove worthwhile for any university with foresight. Such positions attract renowned scholars who view these positions as academically prestigious and who also appreciate the advantages of the liberty that is provided to them to pursue research programs using the in-kind support and moderate funding that comes with such positions. Endowed chair programs can also be supported by international organizations with an interest in elevating the research capacity of countries like Jordan. This is not just wishful thinking, in fact, the British Academy and the Royal Scientific Society partnered in 2020 to endow the El Hassan bin Talal Research Chair for Sustainability, Jordan's first research chair in the social sciences and humanities (Royal Scientific Society, 2020).

CONCLUSION

The key resource for sustainable development in any country is human talent: Talent drives innovation; innovation leads to new enterprise creation; and new enterprises can generate high-value employment that yields products, services, solutions, sales, exports, and financial returns. The challenge for Jordan has always been, and will continue to be, how to create the best possible structures to unlock and empower that talent. Higher education has historically been the primary chosen instrument and, in principle, this should be lauded. However, the guardians of this primary instrument for talent cultivation also have a responsibility to continuously adapt to: the shifting needs of the state, the economy and the environment; the desire for the state's

people to flourish in a land of finite resources; and the evolving challenges and demands of the global market. Unfortunately, this is where universities in Jordan have fallen short; their mod operandi are all-to-often outdated and unsustainable, due to factors that are mainly outside of their control. However, it is not all doom and gloom: Universities in Jordan do have the ability to take a fresh look within and to pursue internal activities and initiatives that are both rewarding and easily executed, including, but not limited to, internal decentralization, creation of student-centric environmentally-friendly campuses and activities, and diversification, and recognition and reward for the academic community.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

All authors contributed equally to the conception of the idea and writing of the manuscript.

FUNDING

Financial support was generously provided by the Royal Scientific Society and Princess Sumaya University for Technology.

ACKNOWLEDGMENTS

We are grateful to Prof. Issa Batarseh (University of Central Florida), Mr. Conor de Lion (Royal Scientific Society), and Dr. Mazen Madanat (Royal Scientific Society) for their valuable feedback and discussions.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Impact Culture: Transforming How Universities Tackle Twenty First Century Challenges

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OPEN ACCESS

Edited by:

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United Kingdom

Reviewed by:

Antje Disterheft,
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University of Jaume I, Spain

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 01 February 2021

Accepted: 23 March 2021

Published: 16 July 2021

Citation:

Reed MS and Fazey I (2021) Impact
Culture: Transforming How
Universities Tackle Twenty First
Century Challenges.
Front. Sustain. 2:662296.
doi: 10.3389/frsus.2021.662296

New ways of doing research are needed to tackle the deep interconnected nature of twenty first century challenges, like climate change, obesity, and entrenched social and economic inequalities. While the impact agenda has been shaping research culture, this has largely been driven by economic imperatives, leading to a range of negative unintended consequences. Alternative approaches are needed to engage researchers in the pursuit of global challenges, but little is known about the role of impact in research cultures, how more or less healthy “impact cultures” might be characterized, or the factors that shape these cultures. We therefore develop a definition, conceptual framework, and typology to explain how different types of impact culture develop and how these cultures may be transformed to empower researchers to co-produce research and action that can tackle societal challenges with relevant stakeholders and publics. A new way of thinking about impact culture is needed to support more societally relevant research. We propose that healthy impact cultures are: (i) based on rigorous, ethical, and action-oriented research; (ii) underpinned by the individual and shared purpose, identities, and values of researchers who create meaning together as they generate impact from their work; (iii) facilitate multiple impact sub-cultures to develop among complementary communities of researchers and stakeholders, which are porous and dynamic, enabling these communities to work together where their needs and interests intersect, as they build trust and connection and attend to the role of social norms and power; and (iv) enabled with sufficient capacity, including skills, resources, leadership, strategic, and learning capacity. Based on this framework we identify four types of culture: corporate impact culture; research “and impact” culture; individualistic impact culture; and co-productive impact culture. We conclude by arguing for a bottom-up transformation of research culture, moving away from the top-down strategies and plans of corporate impact cultures, toward change driven by researchers and stakeholders themselves in more co-productive and participatory impact cultures that can address twenty first century challenges.

Keywords: impact culture, research impact, co-production, boundary organizations, participation

INTRODUCTION

The world is facing challenges of unprecedented complexity and uncertainty that are bringing us to the edge of planetary boundaries where ecosystems may collapse, threatening societal well-being and prosperity (Rockström et al., 2009; Steffen et al., 2015; Nash et al., 2017). Working with these challenges, such as keeping global warming to within 1.5°C of pre-industrial levels (Article 2, Paris Agreement, 2015; IPCC, 2018) will require social, institutional, and technological transformations on a scale not previously seen. In this context, universities and research funders are increasingly positioning themselves to produce knowledge to address these issues.

This civic or societal mission is increasingly being codified and operationalized as impact¹, driving the design of research policy and institutional structures and processes that seek to assess “objective” outcomes from research that can be quantified and rewarded. These assessments have led to a narrowing of the types of knowledge and impact that are valued and deemed legitimate (de Lange et al., 2010; Smith et al., 2011; Parker and Van Teijlingen, 2012), leading to gaming behaviors, and an increase in stress and anxiety among researchers who are increasingly held accountable for the public goods arising from their use of public funding (Watermeyer, 2019). Nevertheless, higher education and research institutions and funders are increasingly investing in impact (Oancea, 2019). This has built significant capacity for impact across the sector, including specialist staff, training courses, internal impact grants, sabbaticals, awards, and the creation of boundary organizations (Watermeyer, 2019). As a result, impact is now widely considered to be a key component of an institution’s research culture (Alene et al., 2006; Leeuwis et al., 2018; Moran et al., 2020).

However, limited attention has been paid to the growing importance of impact in research culture, including the values, beliefs, and norms of researchers and how they or their institutions find and articulate meaning and purpose in relation to research impact (Moran et al., 2020; Rickards et al., 2020). We refer to this as “impact culture” and seek to understand how more or less healthy impact cultures might be characterized, and the factors that shape these cultures. To do this, we develop a definition, conceptual framework, and typology to explain how different types of impact culture develop and how these cultures may be transformed to empower researchers to co-produce research and action that can tackle twenty first century challenges with relevant stakeholders and publics.

BACKGROUND

Although there is limited research on impact culture, there is growing literature on research culture and culture change within Higher Education institutions. Some have argued that it is not possible to define a research culture at an institutional

level, given the division of research between differently managed faculties with different research traditions (Deem and Brehony, 2000; Becher and Trowler, 2001). Notwithstanding debate over the appropriate organizational scale at which research cultures develop and persist, the organizational culture literature typically defines research culture as the shared values, beliefs, and norms of an academic community that influence its behaviors and research outputs, and which then define the collective identity of that community and distinguish the strengths and foci of one institution from another (after Hildebrandt et al., 1991; Evans, 2007; Schneider et al., 2013; Shah et al., 2019). Alternatively, many psychologists and sociologists study culture by understanding how people find meaning as individuals (on the basis of their own perceptions), collectively (on the basis of social norms and shared perceptions), and through their relationship with objects (Ashforth and Pratt, 2003; Mohr et al., 2020). Given the important role of values and meaning in these two understandings of research culture, impact may play a crucial role in shaping an institution’s culture, providing both important values and meaning to justify and so underpin the production of research. Indeed, Chubb (2017) showed how researchers from more applied disciplines often felt personally validated and their work legitimized by the increasing recognition afforded to impact in UK and Australian universities.

However, this research also provided evidence that researchers from arts, humanities, and pure science disciplines, whose work was of less immediate or obvious public interest, were concerned that their work was expected to generate impact, and felt that their academic freedom was under threat from the increasing evaluation (and especially metricization) of impact (Bulaitis, 2017; Chubb et al., 2017; Chubb and Reed, 2018). In a recent survey of over 4000 UK researchers by the Wellcome Trust (Moran et al., 2020), three out of the top five words researchers used to describe their research culture were “competitive,” “pressured,” and “metrics.” Research has always been competitive, but now researchers are also competing to gain the trust of stakeholders who might be able to give them impact. To the “publish or perish” mantra, we have added “impact or implode” (Reed, 2021), as universities, governments, and funders demand that researchers prove the value of their research to society. Indeed, 75% of those responding to the Wellcome Trust survey felt their creativity was being stifled by an “impact agenda” that was increasingly driving their research (Moran et al., 2020). Similarly, Chubb and Reed (2018), based on interviews with UK and Australian researchers, heard stories of researchers who had stopped asking the questions they thought were most important, because they were not impactful enough to be funded. It is clear that the impact agenda is generating its own negative impacts on research culture. Ironically, the impact agenda may be compromising the capacity of research institutions to address global challenges.

As such, it is important to understand how the impact agenda is shaping organizational cultures across the sector, and how these cultures may be re-shaped to avoid the conflicts of interest, demotivation of researchers, and other negative unintended consequences that are increasingly associated with impact. In one of the few attempts to characterize the development of impact

¹We define research impact as “demonstrable and/or perceptible benefits to individuals, groups, organizations, and society (including human and non-human entities in the present and future) that are causally linked (necessarily or sufficiently) to research” after (Reed et al., 2020, p. 3).

culture, drawing primarily on Australian experience, Rickards et al. (2020) proposed three generations of impact culture. First-generation impact culture, they argued, focuses on making rigorous research more relevant and accessible, promoting messages from research to a wide audience, and encouraging end users to use it. As a result, first-generation approaches focus primarily on communication, equipping their most senior researchers to work with the mass media or social media to get their message across to as many people as possible. They also tend to focus on tackling visible impact challenges (Fazez et al., 2018), such as the creation of new medical treatments or drugs.

Second-generation impact culture is more two-way, according to Rickards et al. (2020). It shifts the focus to working with partners to ensure research is both relevant and legitimate, and quantifies the value generated for these partners. For example, the “triple helix” model of the university (Leydesdorff, 2012) has been extended to a quintuple helix model in which the activities of universities are conceptualized as intrinsically intertwined with those of business, government, civic society, and the environment (Carayannis et al., 2012). Second-generation approaches focus on improving “research impact literacy” (Bayley and Phipps, 2019) across the institution and equipping researchers at all career stages with the skills they need to understand and meet needs among stakeholders and publics. They are as likely to focus on more conceptual impact challenges as they are to tackle visible challenges (Fazez et al., 2018), for example shifting behaviors or other causes of the symptoms for which others are creating drugs.

Third-generation impact culture seeks to examine, and where necessary question, the assumptions driving the systems that both generate and apply knowledge, asking who generates what knowledge for whom, for what purpose, and why (Rickards et al., 2020). Third-generation impact culture does not assume that universities are even necessary to generate the knowledge or impact that society needs. As a result, third-generation cultures are open to systemic innovations in the way researchers work, creating safe spaces in which researchers and partners can try out new ideas without fear of failure, and providing the support to refine, adapt, and mainstream the best ideas, even if these disrupt the current status quo. They are more likely to focus on systemic and transformative change, moving beyond technological and behavioral change to transform systems and structures (Haberl et al., 2011; Kanger and Schot, 2019; Victor et al., 2019) and underlying beliefs, assumptions, values, and mindsets (O’Brien and Sygna, 2013), including changing the assumptions held by researchers about how change itself happens (Hodgson, 2013, 2019; Connor and Marshall, 2015; O’Brien, 2016). As a result, these cultures are more likely to tackle existential challenges (Fazez et al., 2018), for example, tackling the cultural drivers of unhealthy behavior or trying to transform the medical model that uses drugs to treat symptoms because it is cheaper in the short-term than funding social prescribing programs or “lifestyle medicine” that attempts to tackle the causes of poor health.

The three-generation model explains how impact culture may develop over time or to different degrees, and characterizes some of the activities that are likely to be found in different types of impact culture. However, it has less to say about the drivers of impact culture (including the role of researchers,

stakeholders, and institutional co-ordination in constructing impact culture) or the ways in which universities may need to transform their operating models in response to these drivers, to facilitate more healthy impact cultures that are more likely to tackle twenty first century challenges. It is also not clear if impact cultures necessarily evolve in “stages” from first to second and then third generations, or if culture change processes can “leapfrog” the earlier stages. Impact culture may also not be homogeneous across an institution, and it may be possible for all three generations to co-exist within the same institution as different groups develop their own cultures. For this reason, we sought to develop a conceptual framework that could be used to both evaluate and shape impact culture proactively in response to change without further disempowering researchers through top-down, technocratic approaches, whilst providing an alternative explanation for how impact cultures may evolve and co-exist in research institutions. The next section explains how this was done.

APPROACH

The insights in this paper were based on a narrative literature review and further developed over the course of a year of dialogue and workshops with professional services staff working on impact, senior managers in universities, and researchers from a wide range of disciplines (e.g., biomedical, physical and natural sciences, social sciences, arts and humanities). Narrative literature reviews are more appropriate than systematic reviews where it is not possible to identify specific outcome measures, and the aim is to provide an expert-based synthesis of a broad range of literature (Baumeister and Leary, 1997; Greenhalgh et al., 2018). We integrated literature from a wide range of disciplines and fields, including research impact, cultural sociology, research ethics, public engagement, participation, deliberative democracy, individual values and self-identity, social and cultural values, the psychology of meaning making (in particular the meaning of work), motivation, social learning, social capital, trust, social norms, power, responsible research and innovation, capacity building, leadership, and organizational development.

The literature review led to the development of an initial conceptual framework, which was refined iteratively through 11 training workshops with different universities in the UK, Australia, and Sweden. These workshops were designed to create a safe space for participants to critically evaluate and discuss challenges and successes in their own culture and learn from each other. The proposed framework helped them consider how different elements of impact culture could be built or enhanced in their own contexts, but also allowed for new insights to emerge that helped to further develop the framework. Between the workshops, bi-lateral discussions also took place between the co-authors, and between the lead author with trainees and others working on impact culture internationally, further shaping the work.

As such, the insights in this paper came from a reflexive interplay between different kinds of knowledge, from many different people with different experiences and backgrounds.

This included iterative development from working initially to articulate the authors' implicit knowledge in ways combined with epistemic knowledge (written accounts from other studies), which were then explicitly articulated, tested, and refined through social learning and different forms of interaction, to lead to a new set of insights expressed in this paper. Much of the learning that led to our insights thus emerged through the interplay between the dynamics articulating, connecting, embodying, and empathizing knowledge, as described in seminal work on learning (Nonaka et al., 2000; Wenger-Trayner and Wenger-Trayner, 2020). Thus, while our insights were not derived from traditional academic empirical approaches, they did come from creative processes conducive to advancing conceptual understandings of impact culture and what might be needed to facilitate change to improve it. Further, the insights were explicitly meant to be a combination of what we know now (usually considered to be experience of, or evidence from, the past or the present) with a normative and desired sense of what should be. Such approaches are consistent with calls for the development and application of future methods that enable the enactment of ideas that support change (Fazez et al., 2018, 2020). The outcome has been a refined framework and set of insights that can be applied, tested, and further refined through and across different disciplinary and institutional contexts. This outcome includes a definition, framework, and typology that are rooted in existing literature and shaped by the experience of many who currently work in diverse domains of research and knowledge creation.

IMPACT CULTURE: A CONCEPTUAL FRAMEWORK

The conceptual framework that emerged from the iterative process described in the previous section describes a number of connected domains within which impact cultures may develop and be lived out in research institutions. The framework is bottom-up, starting by understanding how impact interacts with the purpose of individuals and groups as they find meaning in their work, and how this in turn influences their identity and motivation as researchers. As individuals with a shared purpose begin to form groups and create community, different sub-cultures, rooted in very different values, beliefs, and norms, are likely to emerge across an institution. Although these groups may sometimes work at cross purposes, the flourishing of multiple impact cultures underpinned by different purposes and values is an important expression of academic freedom and agency. Such a bottom-up approach may co-exist and interact productively with more top-down, collective approaches to creating impact cultures around institutional visions, missions, and values. However, we argue that participatory change from the bottom up is more likely to achieve meaningful and lasting change in the practices and behaviors of researchers, and so deliver impacts that are consistent with their values, beliefs, and norms, maintaining the motivation of researchers as they address twenty first century challenges.

Rather than expecting all researchers to engage with impact, there is room for pure, basic, and non-applied research,

which has no obvious impact, alongside more applied, action-oriented research designed explicitly to tackle societal challenges, with researchers drawn to impact on their own terms, as opportunities intersect with their interests and values. While extrinsic incentives, in the form of research funding and impact assessments, have increasingly driven engagement with impact around the world (Reed et al., 2020), it has also driven negative unintended consequences, as outlined in the Background section. An approach that seeks to build more on the diverse intrinsic motivations of researchers may be slower to affect behavior change. However, the changes that occur are likely to be deeper, longer lasting, and less likely to lead to the conflicts of interest, mistrust, and demotivation often associated with more extrinsic approaches.

Specifically, the framework includes four interlinked domains: purpose, research, communities, and capacity. Here, we provide a normative description of each component, as we would expect it to contribute toward a "healthy" impact culture that generates impact from research with the fewest possible negative unintended consequences for stakeholders and publics, and for researchers and their institutions/funders. A healthy impact culture:

1. Emerges from clear individual and shared purpose;
2. Generates impacts that are based on rigorous, ethical, and action-oriented research;
3. Forms and is lived out by groups of people as they interact with both academic and non-academic communities; and
4. Builds the capacity needed to facilitate the research, community, and priorities that underpin impact.

Based on this conceptual framework, we define impact culture as *communities of people with complementary purpose who have the capacity to use their research to benefit society*.

While our definition and framework are based on insights from the literature, the interpretation, framing, and integration of this evidence was shaped through an iterative process of individual interviews and discussion in workshops over the course of a year, as described in the previous section. This led to the articulation of the four domains under which our review of the literature is arranged in the rest of this section.

Purpose

Clear purpose is the foundation of a healthy impact culture because culture is in large part about meaning making (Ashforth and Pratt, 2003; Mohr et al., 2020). Meaning is a key component of most academic definitions of purpose, which suggest that purpose is found by finding meaning in past, present, and future life experiences (Ryff, 1989), leading to an intention or goals to achieve something that is meaningful and of consequence (Damon et al., 2003; Kosine et al., 2008). Alternatively, McKnight and Kashdan (2009) suggest that purpose is more of a guiding principle or "self-organizing life aim" that organizes goals and behaviors to generate a sense of meaning. This includes the meaning researchers derive from their work, as it is influenced by values, self-identity, and significant others, how this influences motivation, and how the impact agenda has created goal conflicts

for many researchers that have further influenced the meaning, identity, and motivation they derive from work.

Meaning of Work

There is a rich literature on the meaning of work. From the individual, psychological perspective, this ranges from research on beliefs, values, and attitudes toward work (e.g., Nord et al., 1990; Roberson, 1990; Ros et al., 1999) to the subjective experience and significance of work (e.g., Wrzesniewski et al., 2003; de Boeck et al., 2019). From a more sociological perspective, meaning is constructed through social interaction and reflects social norms and shared value systems that ascribe meaning to certain types of work (e.g., Mead, 1934; Kluckhohn and Strodtbeck, 1961; Geertz, 1973). Ultimately, meaning is sense-making, in terms of how a person makes sense of (or understands) something, or perceives its significance, in a given social or some other context (Ashforth and Pratt, 2003; Wrzesniewski et al., 2003).

The meaning that any individual ascribes to work is strongly influenced by their values and self-identity. For example, the Life Framework of Values (O'Connor and Kenter, 2019) can be adapted to show how researchers live *with*, *from*, *in*, and *as part of* their work. This gives rise to the consideration of instrumental values (the value of what researchers can get from work), relational values (how researchers value their relationships in and with work) and intrinsic values (the value of work without reference to any benefits for the researcher). More simply put, Roberson (1990) classifies value orientations as primarily intrinsic vs. extrinsic, and others have applied Schwartz's (2012) "compass" of 10 basic values to consider how a person's values influence the meaning they derive from work.

In addition to the influence of individual values, meaning making, and hence the development of any work culture, is influenced by co-workers, leaders, communities, and family relationships (Rosso et al., 2010). These relationships may provide cues about how to interpret work experiences and derive meaning through an inter-personal sense-making process in which alternative meanings based on different value orientations may be considered (Salancik and Pfeffer, 1978; Wrzesniewski et al., 2003). Social identity theory suggests an alternative mechanism, based on membership and identification with "in-groups" at work that help people establish a clearer sense of self-identity (often in contrast to "out-groups") and purpose as they contribute to others in their work community (Kahn, 1990; Grant, 2007; Grant et al., 2008). Having a sense of belonging to a group can help people find meaning as they experience a common identity, shared fate, or connection with others (Homans, 1958; White, 1959).

Motivation for Work

Meta-analyses have shown a strong relationship between the perceived meaningfulness of work and intrinsic motivation to do work that a person feels matters (Hackman and Oldham, 1976, 1980; Fried and Ferris, 1987). But what "matters" is deeply personal, and is strongly linked to a person's identity or "self-concept," which Rosenberg (1979, p. 7) defines as "the totality of a [person's] thoughts and feelings that have reference to himself as

an object", which will change over time in response to different experiences and contexts (Ashforth and Mael, 1989). There is evidence that intrinsic motivation for work is strongly influenced by the perceived alignment between work tasks and a person's self-identity (Pinder, 1984; Deci and Ryan, 1985), especially when the person experiences autonomy and competence as they perform the tasks (Deci and Ryan, 2000), and perceives that they are in control of their own decisions (Rosso et al., 2010). The authenticity of aligning work with perceptions of the "true" self is a key mechanism through which people derive meaning from work (Gecas, 1991), enabling them to maintain and affirm their identity and values while working (Shamir, 1991).

This marries with the perceived loss of autonomy and "academic freedom" described by the largely demotivated respondents to the Wellcome Trust survey (Moran et al., 2020). This is important in the academic sphere because researchers often self-identify strongly with their work, gaining significant levels of self-esteem from their psychological identification with their jobs. As a result, many academics see their work as a "calling" in which they work for fulfillment rather than financial award or advancement, as opposed to having a job (in which meaning is derived from material benefits that can be enjoyed away from work) or career (in which meaning is derived from advancing through an occupational structure, and attaining increased status as well as pay) (see Baumeister, 1991 for more on this tripartite model of work orientation). The perception of work as a calling is typically associated with beliefs that "*work contributes to the greater good and makes the world a better place*" (Rosso et al., 2010, p98), for example, the advancement of the discipline or non-academic impact.

The idea of work as a "calling" has theological roots (Luther, 1520; Calvin, 1574), and although most workers are reluctant to discuss it openly, empirical research has shown that many think of their work in spiritual terms (Davidson and Caddell, 1994; Grant et al., 2004; Sullivan, 2006). Here, we define spiritual as a personal search for meaning or purpose (Tanyi, 2002) typically associated with a connection to something other, larger, more significant, and lasting than the self (Dyson et al., 1997), including a higher power, guiding force or energy, or belief system (Hill and Pargament, 2003). Maslow (1971) described this as "transcendence," and Rosso et al. (2010) referred to it as "interconnection," where individuals supersede their ego to connect with an entity greater than themselves or beyond the material world. In this sense, engaging in research and impact both have the potential to contribute to a "*greater good*" (as Rosso et al., 2010 put it) of lasting significance. If cultures are built through the creation of meaning, it seems important to understand how universities can give researchers the autonomy, capacity, and opportunities to make contributions that will provide this deeper sense of purpose in their work. As such, the transformation of universities to become purpose-driven, rather than being driven by the impact agenda, is an opportunity for universities to enable researchers to find their own purpose as much as it is an opportunity to connect with the purpose of the university or the stakeholders it seeks to serve.

This transition, however, has created a goal conflict between research and impact for many researchers. As the Wellcome

Trust survey showed (Moran et al., 2020), many universities' attempts to transition to a more social mission has compromised the perceived autonomy of researchers, with 74% saying that they thought *"creativity was being stifled due to research being driven by an impact agenda."*

Goal Conflicts

A clear sense of purpose leads to the creation of meaningful goals and behaviors that re-enforce and support that purpose (Damon et al., 2003; Kosine et al., 2008; McKnight and Kashdan, 2009). Therefore, pressures that force researchers to prioritize their time in ways that are not in line with their purpose can lead to significant levels of psychological dissonance and demotivation, and may in some cases compromise well-being (Haradkiewicz and Elliot, 1998; Bronk et al., 2009; Burrow et al., 2010). As such, resolving goal conflicts, such as those identified by the Wellcome Trust survey (Moran et al., 2020) between research and impact is a crucial component of enabling researchers to create a healthy impact culture.

Goal hierarchy theory has been widely applied to goal conflicts (Unsworth et al., 2011), and so is pertinent to the dual challenge of producing both research and impact, faced by researchers who are under increasing pressure to both publish and generate impact from their research. The theory helps explain how purpose emerges from an individual's values and self-identity and is expressed through priorities, ultimately influencing which tasks are completed, and which are postponed or discontinued.

At the top of the goal hierarchy are values (referred to in the theory as "self-goals"). Although often implicit and unspoken, a researcher's values ultimately determine the decisions they make as their values create a domino effect through each of the other goals in the hierarchy. These values inform and shape the researcher's identity (or "principle goals" in the theory). Their identity then informs and shapes their purpose and priorities ("project goals" in the theory) because they want their purpose and priorities to be consistent with their self-identity. Their purpose and priorities then dictate the tasks that are prioritized at the bottom of the goal hierarchy. Psychological dissonance arises when a person has to prioritize tasks that are not aligned with their identity and values, leading to demotivation and disengagement from work. As such, someone who has a strong identity as a researcher, informed by values such as the intrinsic value of knowledge and curiosity, is likely to be demotivated when confronted with impact-related tasks. Similarly, research tasks may demotivate someone who sees themselves primarily as an impactful knowledge broker, based on values that drive empathic connection with those facing real-world challenges.

Goal hierarchy theory suggests two approaches to resolving goal conflicts between research and impact. In the first approach, tasks are ranked on the basis of their alignment with the identity and values of the researcher, and this is used as a justification to drop tasks that align poorly, where this is possible. In reality this is often not practical, so task integration seeks to identify tasks that are aligned with core identities and values, that will also enable the achievement of non-aligned tasks. For example, someone whose primary identity is as a curiosity-driven researcher might co-author more applied papers with

stakeholders or draw on impact evaluation data to enhance their applied research, enhancing impact while pursuing research tasks. Alternatively, someone whose primary identity is linked to their impact might extend or complete a stalled paper with some new research that makes the work more relevant to stakeholder needs, or apply for research funding with stakeholders who will benefit if the project is funded.

If culture is created through meaning-making, then it is crucial to understand how engaging with impact can contribute toward or conflict with the identity, values, and purpose of researchers, and their intrinsic motivation. A lack of attention to these deeper issues may explain the demotivation associated with impact in the Wellcome Trust survey (Moran et al., 2020) and negative attitudes held toward the Research Excellence Framework, which assesses the impact of UK research (Weinstein et al., 2021). Indeed, in interviews with researchers in the UK and Australia, where the institutional impact agenda is most advanced (Chubb and Reed, 2017, 2018; Chubb et al., 2017), researchers from less applied disciplines (primarily in the sciences, arts, and humanities) reported feeling judged by their colleagues for doing work that was perceived to be self-indulgent and of little public interest. A university that prioritizes impact may only provide purpose for more applied researchers, whose work is already well-aligned with the impact agenda. To create a more inclusive impact culture, in which all researchers can feel valued and find deeper meaning in their work, it is important to create opportunities for researchers to engage with impact authentically, on their own terms, in ways that are consistent with their unique purpose, identity, and values, and hence build their intrinsic motivation, rather than building yet more extrinsic incentives to push colleagues toward impact.

Research

How we produce research is an intrinsic part of any impact culture that seeks to meet needs and be evidence-based. This includes the ethics and disciplinary-specific notions of rigor that underpin our research and the extent to which research focuses on understanding problems vs. solutions. Although co-production could have fitted under the community theme (in the next section), it is covered here on the basis of literature arguing for Mode 2 research which includes co-production (Nowotny et al., 2003).

Rigorous and Ethical Research

Healthy impact cultures underpin their impacts with rigorous and ethical research. Without relevant safeguards, it is possible for research to have seriously negative impacts, for example as was seen from now discredited research on the link between the MMR vaccine and autism (Wakefield, 1999) or the many highly influential studies from psychology that have failed to be replicated, whose findings are now thought to have arisen from the practice of "data dredging" or "p-hacking," where researchers search large datasets for statistically significant relationships and then retrofit a hypothesis that could explain the finding (Maxwell et al., 2015). The open science movement is now tackling this by creating new norms in many disciplines to pre-publish research

protocols and make data available for others to analyze (Friesike et al., 2015; Vicente-Sáez and Martínez-Fuentes, 2018).

However, it is important to recognize that perceptions of rigor and ethics may vary between researchers and disciplines. Ethical issues may differ between research groups, and even between members of the same group, including many that researchers may be unaware of. For example, female, ethnic minority, vulnerable, or hard-to-reach groups may inadvertently be excluded from social science due to the timing, location, or design of interviews or focus groups (Morgan and Morgan, 1993; Flanagan and Hancock, 2010). There is also growing pressure on researchers to make “policy recommendations” from single studies, whether in response to journal editors and reviewers who want the research to be more widely read (and cited) or funders who want to see impacts from their investment. However, while there is growing recognition that such recommendations should only be made on the basis of evidence synthesis, there are limited incentives from funders or universities to prioritize synthesis work over conducting new original research. More worrying still is evidence that researchers perceive that certain gendered personality traits are better suited to achieving impact, biasing researchers and evaluators toward pursuing ‘hard’ impacts that can be counted, instead of ‘softer’, less quantifiable impacts (Chubb and Derrick, 2020). In response to some of these challenges, there is now rich literature on “responsible research and innovation” (Owen et al., 2012; Von Schomberg, 2013). This community advocates for responsible research that is inclusive (for example, of genders, publics, disadvantaged and hard-to-reach groups), open (pre-publishing research protocols, pre-print papers, and data), and responsive (to the needs of those who might benefit from the research, providing them with opportunities to engage throughout the research cycle).

Action-Oriented Research

The second reason we need to consider the research that underpins our impact culture is the tendency to focus on understanding problems rather than researching solutions. We need to shift our focus from amassing more and more knowledge about the problems the world is facing, to devising and testing solutions that might tackle the underlying drivers of the problems we have studied for so long. Often described as “mode 1” research (Nowotny et al., 2003), the majority of the peer-reviewed literature to date has sought to describe the world as it is, with all its problems, by proposing and testing theories that can be generalized to provide universal knowledge that can be applied across many different contexts.

“Mode 2” research pays more attention to the context in which knowledge is generated and applied, and focuses more on the applicability of knowledge in any given context, than its generalizability between contexts (Nowotny et al., 2003; Caniglia et al., 2021). As researchers connect with the contexts in which they do research, they become able to legitimately connect with the people and contested issues in that context, and it becomes increasingly difficult to act as a detached observer. For example, researchers might seek solutions to visible challenges, such as increasing research funding to early career researchers and groups that are more likely to experience discrimination

(such as women, researchers from ethnic minorities, and those with disabilities or long-term health conditions). However, it is possible to go beyond this to find solutions to the deeper conceptual and existential issues that are driving the problems we can see at the surface. We need to tackle problems within the underlying systems and structures that perpetuate inequality and discrimination. Some of these solutions need to be conceptual, for example how to transform institutional structures, financial models, and modes of governance in our universities and funding bodies. Or we may focus on the values, beliefs, and norms of those who make and follow the rules that govern our institutions. Other solutions need to tackle existential challenges, for example reconceptualizing what universities are for, and who they are meant to serve.

An interesting example of action research with local communities is Staffordshire University’s Creative Communities Unit (CCU), a dedicated public engagement unit which ran from 2002 to 2018 (Gratton, 2020). Their “Get Talking” approach to participatory action research emphasized the use of creative engagement techniques to connect with vulnerable and hard-to-reach groups via “community researchers” who were trained and often paid to work as partners on projects. Community researchers could also enroll on a course to get credit for their work, enabling people who had never engaged in Higher Education before (and probably would never have considered doing so) to gain a qualification. Over time, the Unit built up a large team of community researchers who could work on new projects as they came in. The work was so successful that the CCU started attracting funding from local government and charities to deliver outcomes for the local communities they were serving. Whilst the CCU no longer exists, the Get Talking approach has been adapted for a diverse range of projects. In addition to the contributions of community researchers to the university, there were positive impacts for community members who gained new friends through taking part in events. They established a network that became a lifeline for many when the country then went into lockdown in response to the Coronavirus outbreak.

A similar approach has been taken by a number of projects that have applied to their funders for flexible funding in which there is a pot of money dedicated for use in community projects. Community groups propose projects, and a panel of community members help decide who gets the funding in collaboration with the research team. Impact monitoring might be built into the projects by the researchers, but otherwise there is no formal reporting requirement, enabling community groups to share what they have used the money to do in more creative ways than writing reports. The creativity of the projects that emerge from this sort of approach can be unexpected. For example, the Managing Telecoupled Landscapes project (Zaehring et al., 2019) built in flexible funding for local project partners to generate impact based on evidence arising from the research. For each of the three countries they worked in, Laos, Madagascar, and Myanmar, they had a budget of 50,000 CHF to fund two “implementation actions” per country. In Madagascar they organized a workshop with stakeholders from the vanilla sector and discussed how the revenues generated through vanilla trade could be steered toward more sustainable regional development.

As part of this, they developed a film that integrated the voices of different vanilla stakeholders. At the same time, they implemented an agricultural diversification scheme, training young farmers from different villages to facilitate farmer-to-farmer knowledge exchange and innovation. Building on this, they then were able to attract funding from a private donor, through which other individuals and groups of farmers can now apply for funding for forest-friendly development projects.

More radical than this however are the Ownership, Control, Access, and Possession (OCAP) principles which are used by a range of indigenous populations around the world (including First Nations communities in North America, Métis, and Inuit communities) to ensure research is not exploitative (Schnarch, 2004). In some of these communities, researchers who want to work with local communities have to agree to the OCAP principles before they can work through the organizations representing the community. This means that indigenous communities control data collection processes themselves, and they own, protect, and control how their information is used. They, not the researchers, have the final say in any decision about how and by whom the research data are collected, used, or shared. At the end of your 3 year project, if the community you worked with decide they do not want you to publish your research, they have the power to block publication. This option is important given the extractive nature of many research practices this community had previously been exposed to. In reality, this is rare however, unless the necessary steps of relationship building and trust had not been established, and the research did not respond to their stated needs. While co-production can be described as a way of doing research and delivering impact, it is clearly also about trust and relationship building, and so in the next section, ways of building community with stakeholders is explored in greater depth.

Community

There are three elements of community that may significantly influence impact culture: trust, connection, and the role of social norms and power. Taken together, these represent the “social capital” that an individual, team, or institution has with those they need to work with to generate impact (Bachmann, 2001; Rust et al., 2020).

Trust

Cairney and Wellstead (2020) define trust simply as, “a belief in the reliability of other people, organizations, or processes” as their actions affect the person who is trusting (after Gambetta, 1988). The perceived trustworthiness of researchers depends on their integrity (or honesty), credibility (the feasibility and evidential basis of their claims), and competence (or ability) (Cairney and Wellstead, 2020). The role of cognitive biases should not be underestimated in the formation of these perceptions, as people use heuristic shortcuts, including both evidence-based and potentially prejudicial assessments, to evaluate the trustworthiness of others they do not know, based on prior experience (Kahneman and Tversky, 2013). Trust is necessary for research impact because it enables people to co-operate without the need for contracts, non-disclosure agreements

and, other cumbersome arrangements, reducing complexity and facilitating efficient collaboration. Trust can exist between individuals and between institutions, and to understand trust, it is necessary to look both ways, from the perspective of each party to the relationship (Luhmann, 1979; Zucker, 1986).

Public trust in research was put to the test during the recent COVID crisis. Although it can be difficult to disentangle public trust in research vs. the governments who are implementing scientific advice, it is clear that public trust in the scientific basis for COVID precautions differs significantly around the world. For example, in Saudi Arabia there is evidence of public trust in both government pandemic policy and its scientific basis (Almutairi et al., 2020), while trust has been low in the Democratic Republic of Congo (Whembolua and Tshiswaka, 2020). Kreps and Kriner (2020) found evidence that US researchers who downplayed uncertainty gained public and political support for their recommendations in the short term, but later contradictory studies or reversals in projections reduced trust in research over the longer term. Agley (2020) showed that US public trust in science about COVID was influenced by factors such as religious and political orientation.

This is, of course, the latest in a long line of issues that have tested public trust in research. For example, in a European Commission (1997) survey, 26% of citizens identified environmental organizations when asked whom they trusted most to tell the truth about genetically modified crops, compared to just 6% who named universities (and 1% and 4% who named industry and national public authorities, respectively). The earthquake and tsunami that triggered Japan's 2011 nuclear accident shook Japanese public trust in science, as researchers were viewed as endorsing defensive government narratives on the accident (Arimoto and Sato, 2012). In the UK, controversies surrounding bovine spongiform encephalopathy during the 1990s prompted public criticism of the role of scientific advice in policy-making, leading to the formulation of rules for science-based policy-making by the government (UK Government Office for Science, 2010, 2011). Other guides have been produced by governments around the world in an attempt to strengthen public trust in research, and the role of research evidence in policy-making (e.g., Berlin-Brandenburgische Akademie der Wissenschaften, 2008 in Germany, Commission of the European Communities, 2002, and Government of Japan, 2011).

To retain and build public trust in research(ers), Wilson et al. (2017) suggested 10 strategies: be transparent; develop protocols and procedures; build credibility; be proactive; put the public first; collaborate with stakeholders; be consistent; educate stakeholders and the public; build your reputation; and keep your promises. Similarly, McAllister (1995) argues that interpersonal trust depends on perceiving someone as competent, reciprocal, fair, reliable, responsible, and dependable. It is possible to trust a researcher or institution on one issue for which they are deemed competent but not on other issues, where they do not have the same track record. However, by following guidelines such as those proposed by Wilson et al. (2017), it may be possible for researchers and their institutions to systematically build trust with publics and key stakeholders over time.

Trust is an important precondition for many impacts because we know that people are more likely to act on evidence they receive via trusted individuals and networks (Carolan, 2006; de Vries et al., 2015; Taylor and Van Grieken, 2015). This effect is more pronounced when there is risk or uncertainty (O'Brien, 2001), complexity (Luhmann, 1979), or credibility issues (Ingram et al., 2016) associated with the evidence or the actions being proposed. Knowledge is exchanged more frequently and freely among networks of people who trust each other, while the presence of just one person in the network who is perceived to be untrustworthy can instantly shut down group communication (Lyon, 2000; Levin and Cross, 2004; Stobard, 2004). Indeed, de Vente et al. (2016) showed that having senior decision-makers in the room (in this case policy-makers) was more likely to deliver decisions that were implemented on the ground, but discussion, learning, and trust building were much more significant when these people were not in the room.

The temporal dynamics of trust are worth noting. Trust typically forms slowly over many small steps, and so the first step toward building trust with someone is to engage with them, and give each other low-risk opportunities to give and take, and see what happens (Rust et al., 2020). It is this reciprocity that builds trust over time. Once a trusting relationship has been established, we continue to perform acts of trust and trustworthiness in the day-to-day give and take of our relationship (de Vries et al., 2015). When trust is broken, it often happens in an instant, and can take far longer to rebuild than it took to build in the first place (Lewicki et al., 1998; Lewicki and Tomlinson, 2003).

Connection

Despite the clear link between reciprocity and trust building, the majority of researchers invest little time in reciprocal relationships beyond their disciplinary networks. This remains one of the most powerful ways researchers can build trusting, impactful relationships beyond the academy. Using stakeholder analysis (Reed et al., 2009; Kendall and Reed, in preparation), it is possible to identify individuals, groups, and organizations that might benefit from engaging with research, and starting with these connections, small beneficial acts can initiate the process of reciprocity that builds trust over time. Many supposedly “serendipitous” impacts arise from this process of “being in the right place at the right time” as researchers build their non-academic networks, and become more visible and accessible to those looking for help. Such networking activities can build three types of connection, which can each play a different role in promoting impact (Pretty and Ward, 2001; Pretty, 2003; Rust et al., 2020):

1. Researchers build “bonding” connections when they invest in relationships with people who are similar to them, typically sharing similar interests and attitudes. While this might typically refer to institutional and disciplinary networks, it is possible to create bonding capital within diverse communities of interest;
2. Researchers can take on the role of “bridging” connections if they are able to build trusting relationships with key individuals in very different networks who would not normally

interact with each other, e.g., Neumann (2021) and Reed et al. (2020) showed how researchers played particularly important bridging roles between members of the research, business, charity, and policy communities in UK and German peatland governance bodies.

3. “Linking” or “bracing” connectors create connections between different hierarchical levels within a network, for example between policy-makers and farmers, or connecting postdocs with senior managers so they can make their views heard, e.g., Reed et al. (2018) showed how ClimateXChange and the IUCN UK Peatland Programme played a role as the boundary organizations in Scotland that connected decision-makers in the policy community with the voice of practitioners as well as researchers.

Social Norms and Power

These connections are in turn influenced by social norms, which establish expectations within a community or network around modes of interaction and behavior. Norms around reciprocity have been shown to be important for collaborative work and can help rapidly build trust, increasing the likelihood that members of a community will offer help to each other, in the knowledge that others will provide help if and when they need it (Ashby et al., 1998; Gómez-Limón et al., 2014). However, more negative norms can exist, for example a highly critical group norm may stifle innovation among members who are worried that the group will be quick to judge their actions (Rust et al., 2020).

Norms are often shaped (or imposed) by the most powerful members of a group, who may be invested in protecting the status quo that has given them power (Gelderblom, 2018). Those with power in a group may determine who is included or excluded from a group or its activities, in turn influencing the extent to which others in the group can connect or build trust (Lyon, 2000). Groups with strong power imbalances can make it hard for members to trust each other because trusting someone often means exposing vulnerabilities, which may be exploited to further entrench power dynamics (Bourdieu, 1986; Blackshaw and Long, 2005). Such exploitation of power may lead to imbalances in the level of resources, opportunities and information that different members of the group are given, further perpetuating the imbalance of power. Where power is used to control information, knowledge exchange can be used to disempower others, restricting who has access to the most valuable knowledge within an “inner circle” (Foucault, 1980; Brugnach and Ingram, 2012). However, it may also be used to empower others, where processes are developed to ensure transparent access to information and decision-making processes for all members of a group (Fazey et al., 2013). Instead of abusing their position of power, it is of course possible for leaders to sanction abuses of power and organize groups in ways that flatten power dynamics arising from existing hierarchies and other privileges.

A healthy impact culture is underpinned by social norms that seek to actively empower the voiceless and marginalized, and enable active participation from across all members of the groups and networks researchers participate in. This requires deliberate work and effort to understand the causes of marginalization and

how these root causes might be addressed, in order to empower active engagement, rather than just doing better outreach (Bell and Reed, 2021). It also involves looking hard at the reasons why research and researchers are so inaccessible to most stakeholders, beyond just addressing issues of open access to research findings. Researchers themselves may be as hard to reach as some of the stakeholders classified as “hard to reach.”

This process may in some cases be bruising, and as a result many researchers focus on those who are easier to reach, partly as a protective strategy and partly because the time invested in more receptive audiences are likely to yield more impact. It is important to recognize the vulnerability of researchers who may have had psychologically damaging interactions with stakeholders in the past or who do not have the time or desire to prioritize impact. Others in teams or departments might then prioritize impact without putting undue pressure on all researchers to be equally active in their engagement with stakeholders.

As such, building a community with stakeholders may be seen as a collective endeavor across an institution, rather than each researcher having to obtain (or protect) their own networks. While some researchers will be rightly protective of certain important relationships, it is possible for the collective social capital of a group of researchers to enable the kinds of coproduction discussed earlier in this paper.

Capacity

There needs to be sufficient capacity to build each of the three pillars of a healthy impact culture described in the previous sections, including: skills, resources, leadership, strategic, and learning capacity.

Skills

A number of skills may be needed to realize impact. Most universities now have in-house impact training, run by a combination of local and external experts, and some also provide coaching alongside a more personalized, longer-term portfolio of skills development tailored to the needs and interests of the researcher. Where possible, a more tailored and personalized approach can enable researchers to develop skills that match their priorities and enhance their motivation for impact. Training in responsible research and innovation and strong induction processes are essential to ensure all researchers have the same basic understanding of rigor and ethics to underpin their work (see the section Research). Given the importance of building non-academic social capital (see the section on Community), training in influencing strategies, workshop facilitation, stakeholder analysis, and communications are core skills for researchers who want to generate impact from their work. Training in impact planning tools, such as logic models (Rush and Ogborne, 1991; Julian, 1997; see Reed et al., 2018 for an example of a research impact logic model) and Theory of Change (Quinn, 1988), impact monitoring and evaluation methods (e.g., Jancey et al., 2020; Louder et al., 2021; Reed et al., 2021a), and an understanding of the various settings within which impact may be generated, for example skills and strategies for working with policy vs. industry, is also important (e.g., Reed et al., 2018).

Training may also focus directly on impact culture, for example integrating insights and tools from across the three components described in the previous sections, or training in the cultivation of compassion (see Poorkavoos, 2016 for examples of a diagnostic questionnaire and training courses).

Funding

Training requires funding, and internal funding for impact staff and initiatives is an important part of the capacity that is needed to facilitate a healthy impact culture. For example, Peart and Jowett (2017) described how they used an institution-wide impact assessment to justify investment in the generation and evidencing of impact in the lead up to the UK's 2021 Research Excellence Framework, transforming their impact team from 1.5 to 10 full time equivalents in the space of 2 years. An alternative approach is to seek external funding, for example for large strategic investments as a university or collectively with other universities around specific challenges or sectors to create boundary organizations (see the section on Connection).

Another approach is to allow researchers to bid for internal impact funds to support their impact. However, there is a danger that applications and awards may be biased toward certain groups of people (e.g., men over women) or types of impact (Chubb and Derrick, 2020). For example, “hard” impacts with high potential for significance and reach may be prioritized over “soft” (Chubb and Derrick, 2020) or “unsung” impacts that may be important but are harder to measure, are significant but not far-reaching, benefit the “wrong people” at the “wrong” time or place (according to impact assessment criteria), or are based on research that is contested, confidential, or does not meet eligibility criteria for impact assessment (Reed, 2019).

As a result, it may be worth considering how such funds can be prioritized in a transparent way to fund impacts that are particularly important or in need of help, allocating funding to those who need it most, rather than those who shout loudest. Some universities hold back impact funds specifically for early career researchers to ensure that this group gets some of the funding for impact, even if the impacts they are pursuing might take longer to yield measurable benefits than more mature impacts that senior staff have been building for years.

Learning Capacity

Learning capacity is sometimes overlooked in institutional capacity building for impact. Monitoring and evaluation of impacts are important to facilitate learning from mistakes as well as providing evidence to support case studies of impacts that have been successfully achieved (Louder et al., 2021; Reed et al., 2021a). Universities are increasingly investing in impact tracking systems, whether as add-ons to existing research management systems or more sophisticated systems developed specifically for tracking impact, like Vertigo Ventures' Impact Tracker and ResearchFish (Fedorciow and Bayley, 2014; Hill, 2016; McKenna, 2021). However, academic engagement is limited unless it is mandated by funders, even with the most sophisticated and user-friendly of the systems currently available.

It can also be valuable to engage with stakeholders in the design and implementation of monitoring and evaluation to

ensure the outcomes evaluated actually meet their needs. If impact can only ever be defined in relation to the people and contexts you seek to benefit (Reed, 2021), then the only legitimate way to evaluate impact is through the eyes of the beneficiaries. In addition to encouraging researchers to monitor impacts as they arise, it may also be useful to create safe spaces in which researchers can learn from each other, including learning from mistakes, for example via seminars' series and workshops (Wenger-Trayner and Wenger-Trayner, 2020).

Strategic Capacity

Strategic capacity for impact may take the form of an impact plan (e.g., via a logic model or Theory of Change) for individual research projects (see above), but more extensive strategies are typically needed at institutional scales. Broadly speaking, there are two types of institutional impact strategies (Reed et al., 2021b). First, "achieving impact" strategies had a strong emphasis on partnerships and engagement, but were more likely to target specific beneficiaries with structured implementation plans, enable the organization to operate as a boundary organization to co-produce research and impact, support and facilitate best practice at the scale of individual research projects or teams, and recognize impact with less reliance on extrinsic incentives. Second, "enabling impact" strategies tended to be developed by universities and research institutes to build impact capacity and culture across an institution, faculty or center. They also had a strong focus on partnerships and engagement, often including a focus on industry or local communities, and they invested in dedicated impact teams and academic impact roles supported by extrinsic incentives including promotion criteria.

Leadership Capacity

Finally, effective leadership is needed to build a healthy impact culture. While this is traditionally considered in terms of senior management roles, the literature on evolutionary organizations (Duening, 1997) and socio-technical systems (Geels, 2004) suggests that a more bottom-up approach to leadership can yield greater innovation and impact if safe spaces can be created with sufficient intellectual freedom and authority for colleagues to lead with new ideas. Rather than waiting for change to happen from the top-down, colleagues are empowered to lead their own change by being given the ability to experiment and then evaluate and share what they find with others. The approach is evolutionary in the sense that it enables "survival of the fittest" ideas, with weaker ideas being discontinued or adapted and refined in successive iterations. Good ideas and practices that take root in a safe, protected "niche" then have the potential to take root elsewhere in the organization or sector as others see the benefits and adopt the approach for themselves (Geels, 2004). As Rohr (2011) put it, "the best criticism of the bad is the practice of the better."

Synthesis

While each of the four components reviewed in this section—purpose, research, community, and capacity—are important in their own right, any individual component alone will not create a healthy impact culture. For example, many research institutions

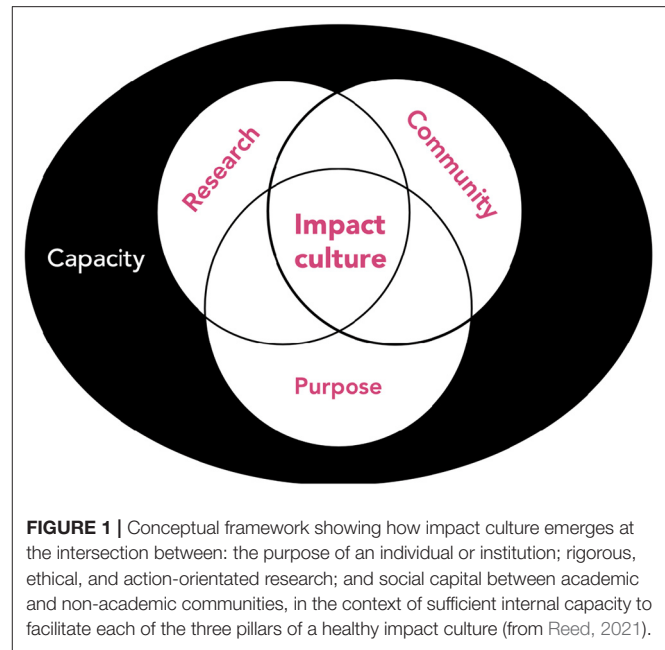


FIGURE 1 | Conceptual framework showing how impact culture emerges at the intersection between: the purpose of an individual or institution; rigorous, ethical, and action-orientated research; and social capital between academic and non-academic communities, in the context of sufficient internal capacity to facilitate each of the three pillars of a healthy impact culture (from Reed, 2021).

prioritize the kind of research we have suggested is needed to underpin a healthy impact culture. While this might feed into a strong sense of purpose for many researchers and for the institution, it is likely that opportunities for impact will be missed and negative unintended consequences may arise without the necessary capacity for generating impact and without building social capital with stakeholder communities, while paying attention to social norms and power.

Instead, our framework shows that a healthy impact culture emerges at the intersection between research, community, and purpose, enabled by sufficient capacity (Figure 1). The overlapping circles in the Venn diagram visualize how purpose shapes choices about which research questions are asked, how research is conducted, and to what end, whether to further understand the problem or research potential solutions. Equally, the rigor, ethics, and (typically) unpredictable outcomes of research will have a significant bearing on the purposes that can be achieved by any researcher. Second, the purpose of research can significantly shape relationships with peers and stakeholders, either underpinning or undermining trust and connection, for example depending on whether the purpose is theoretical or applied, problem- or solution-oriented, or competitive or collaborative. Equally, interactions with peers and stakeholders can significantly shape the purpose of researchers, as they are influenced, inspired, or challenged through these collisions. Third, engaging with peers and stakeholders can significantly enhance the quality and relevance of research and enable research to deliver more meaningful impacts. Equally, collaborating with diverse peers and co-producing impact with stakeholders can deliver original insights that also meet felt needs and priorities.

DISCUSSION: WHAT NEEDS TO HAPPEN?

Moving to a healthy impact culture requires two things. Crucially, responsibility for each lies with both researchers as individuals and the institutions that employ them:

1. Researchers must each do the inner work of tackling the barriers that prevent them from being more authentic and pursuing their purpose. In turn, universities need to create the space, academic freedom, and capacity to enable researchers to pursue priorities linked to this purpose; and
2. Universities need to reinvent themselves as boundary organizations that connect researchers across disciplines (not just within their own institution), and systematically connect researchers, publics, and stakeholders around key challenges. In turn, researchers need to open their minds to the opportunities that this creates, finding ways of engaging with these opportunities that connect with their own identity, values, and purpose.

This needs to happen at three quite different scales. First, there is the individual scale, where researchers find new ways of seeing themselves and their contribution to the world which emerge as researchers own their own intrinsic motives, identities, and values, and express their purpose through their research, and the role they play in their communities.

Second, when these individuals come together in groups, emergent properties arise at the group level, which go beyond the sum of the individual contributions to the group. When groups of increasingly authentic colleagues connect around shared purpose, it becomes possible to explore new ways of working and to achieve research and impact goals together that would not have been possible otherwise. Rather than homogenizing action around a single university mission statement or set of values, different groups can legitimately pull in different directions. A university that prizes academic freedom cannot build its operations on the model of an army squadron or a business where everyone has to conform to a single mission or set of corporate values. We must not only allow but encourage diversity, enabling multiple sub-cultures to develop and flourish in parallel, at different speeds and with very different outcomes.

Third, when a university empowers individuals and groups to build their own sub-cultures, adapted to their unique circumstances, there are emergent properties at the scale of the university itself, which can no longer be pigeonholed as one thing or another, that is for “them” or “us.” It spins out companies and builds the local economy, and at the same time, it critiques the capitalist model and exposes and tears down structures that exploit the vulnerable. One research group might engage in activism to defeat the objectives of organizations that other researchers are trying to help. Rather than seeing this as self-defeating however, it is possible to see this as innately healthy if we see impact as both “*perceptible and/or demonstrable benefits... that are causally linked to research*” (Reed et al., 2021a, p. 3). As we went on to explain, “*impact is in the eye of the beholder; a benefit perceived by one group at one time and place may be perceived as harmful or damaging by another group at the same or another time or place*” (Reed et al., 2021a, p. 2). It is not

for us, but for those we seek to help, to judge if what we have done is “impact.”

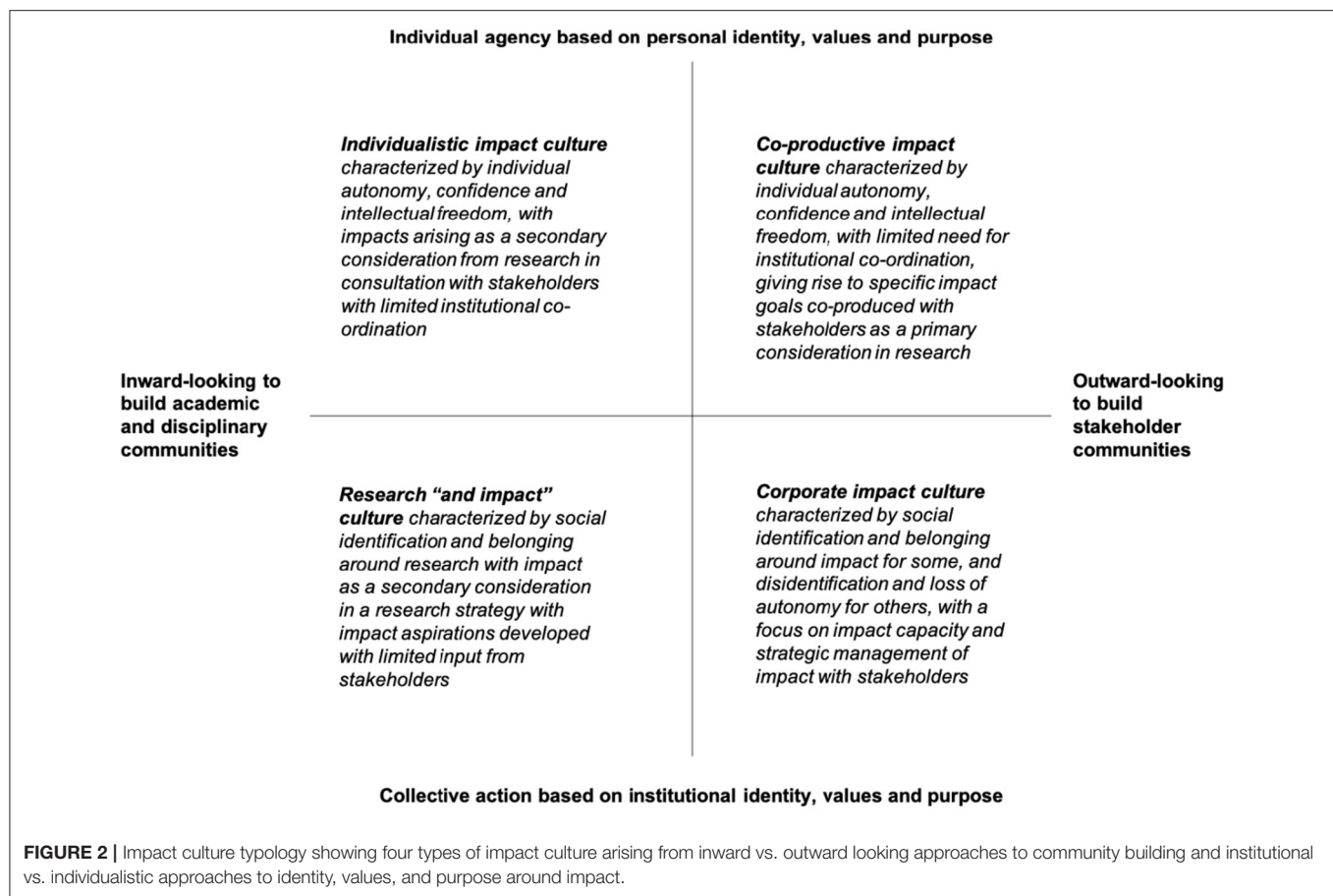
If we want to move toward the kind of impact culture proposed in our framework (Figure 1), we need to make three major shifts in our thinking. First, we need to move from counting the quantity of our outputs to weighing the quality of our thinking. It is important that we do not assume that everyone has the same ethical grounding and capacity we expect, ensuring all new researchers are given a basic training in ethics, open research, and evidence synthesis. The university may also have a role to play in creating spaces where people from different disciplines can have creative collisions between research disciplines and interests.

Second, we need to move from ignoring and compounding, to *tackling* the deep causes of demotivation. In so doing, our goal is to move our colleagues from being disengaged and stressed, to feeling engaged and inspired. We need to create the headroom and academic freedom for people to find and be themselves. And where necessary, we need to provide support for colleagues to do this inner work. Occupational health is good at providing physical and psychological care when things have gone wrong, but research institutions tend to be reactive rather than proactive in preventing mental and physical health problems, and more could be done to provide coaching and help early on to build emotional and physical resilience.

Third, if we want to move toward a healthier impact culture, we need to transform our view of the role that universities play in society. We need to move from seeing the university and researchers as knowledge generation machines, to recast researchers as knowledge brokers and universities as boundary organizations. We need to move from studying problems with objective distance, to researching solutions in collaboration with those who are looking for answers. This means we need to move from consultation and participation toward ways of engaging as equals with our colleagues outside the university, facilitating deliberation and co-production. To do this, we need to seek out and build social capital on purpose with those we might be able to help beyond the academy. We need to systematically connect researchers with issues and people that will inspire them to get interested in new questions that they can research together with the people who need answers. In doing so, we need to move toward a more co-productive and participatory research culture.

These three shifts in thinking require a balance between inward-looking initiatives to strengthen academic and disciplinary networks and more outward-looking activities to build social capital with the non-academic community (see the section on Community). They also require a balance between collective action and personal agency, based on the identity, values, and purpose of the individual and the institution (see the section on Research). Figure 2 visualizes this as two axes, which can be used to characterize four types of impact culture:

- **Corporate impact culture:** A large number of research institutions are currently creating impact culture from the top-down through the creation of institutional impact strategies



(Reed et al., 2021b). Although these often have significant buy-in from key stakeholders, for example around the co-creation of boundary organizations, they tend to be capacity-oriented rather than goal-oriented and focus on institutional strategy. While the corporate approach can lead to social identification and belonging around impact for some, it may lead to disidentification and loss of autonomy for others whose identity, values, and purpose do not accord strongly with key institutional impact initiatives (Rosso et al., 2010);

- **Research “and impact” culture:** The other common approach relegates impact to an afterthought in an institutional research strategy, either as a rationale or justification for research, or as an end (or by)-product of research, with limited development of specific impact goals or capacity, which tends to be aspirational, with limited active engagement or input from stakeholders. This can still result in social identification and belonging around research as a priority within the institution (Rosso et al., 2010), but is unlikely to facilitate communities of practice around impact (Wenger-Trayner and Wenger-Trayner, 2020);
- **Individualistic impact culture:** By empowering researchers to take their own approach to impact, it is possible to build individual autonomy, confidence and intellectual freedom with limited need for institutional co-ordination (Rosso et al., 2010). However, impacts are likely to arise as a secondary

consideration from research, in consultative rather than collaborative or co-productive mode with stakeholders (Reed et al., 2018);

- **Co-productive impact culture:** This approach also fosters individual autonomy, confidence, and intellectual freedom and requires limited institutional co-ordination. However, in contrast to more individualistic cultures, specific impact goals are co-produced through active relationship and dialogue with stakeholders as a primary consideration in research.

Rather than viewing impact culture as developing through a sequence of stages, as suggested by Rickards et al. (2020), we propose that any one of the four types of impact culture proposed in **Figure 2** may characterize different organizational units or groupings of researchers within the same institution at any given time. For example, it is possible for an individual research group or center to have a strong individualistic or co-productive impact culture within an institution that promotes a corporate or research “and impact” culture, which may dominate how other groups within the same institution operate. Impact culture may shift over time between any of the four types, depending on the extent to which groups within the organization focus on building social capital with academic vs. non-academic networks and promote individual agency vs. collective action.

CONCLUSION

This paper has proposed a definition, conceptual framework, and typology for research impact culture. While many of the principles may apply outside research settings, to organizations that seek to generate benefits for others in society, a *research impact culture* must be rooted in effective and ethical research, and we argue that healthy impact cultures promote action-oriented research. Our framework is normative, underpinned explicitly by the individual and shared identities, values, and purpose of researchers who create meaning together as they generate impact from their work.

However, the framework is not prescriptive in the identities, values, or purpose that can or should underpin these impacts. Instead, we emphasize the need for individuals and institutions to consider how their current identities, values, and purpose are aligned with the impacts they wish to see in the world. Where individuals and institutions are not achieving impact, instead of designing additional extrinsic incentives to push behaviors toward generating impact, we urge a more introspective (self-)compassionate, and empathic approach, in which we examine the values and identities that shape the purpose and day-to-day priorities of universities and individual researchers. Only in this way are we likely to address the deeper, existential challenges facing universities, reconceptualizing what they are for, and who they are meant to serve. In institutions that prize academic freedom, such introspection on an individual level might in some cases cause researchers to re-evaluate values, identities, and assumptions that were previously implicit, enabling an explicit refashioning of their role in the world that may enable them to prioritize the kinds of actions that might address global challenges. In other cases, by making their values, identities, and purpose explicit, it may be possible to reframe impact as a way of authentically expressing the curiosity, creativity, integrity, and other values and identities that intrinsically motivate researchers, whilst generating benefits for others.

In this way, it is possible for multiple communities of researchers to emerge who share complimentary identities, values, and purpose, which may conflict with those of other groups within the same institution. Instead of developing an institutional mission and set of values to which all researchers are expected to subscribe, we argue that intellectual freedom must understand, respect, and value differences in ontology, epistemology, values, beliefs, and norms. Instead of striving for a unified, unitary impact culture, multiple impact sub-cultures should be able to flourish, even if their goals are mutually exclusive. These communities can and should be porous

and dynamic, enabling mixed communities of researchers and stakeholders to work together on different projects, as their needs and interests intersect. Rather than waiting for this to happen, it may be necessary to more proactively build social capital beyond the academy, paying attention to trust, connection, and the role of social norms and power, for example through the co-creation of boundary organizations. Finally, these three foundations of a healthy impact culture (research, purpose, and community) need to be enabled with sufficient capacity, including skills, resources, leadership, strategic, and learning capacity.

Based on this, we argue for a bottom-up transformation of research culture, moving away from the top-down strategies and plans of corporate impact cultures, toward transformation that is driven by researchers and stakeholders themselves in more co-productive impact cultures (**Figure 2**). Responsibility for this change lies with individuals, but must also be held by institutions to create academic freedom and capacity for researchers to pursue priorities linked to their purpose more authentically. To enable this, universities may need to re-invent themselves as boundary organizations in which researchers can pursue these priorities with publics and stakeholders around twenty first century challenges.

AUTHOR CONTRIBUTIONS

MR: conceptualization, methodology, formal analysis, writing—original draft, writing—review and editing, visualization, and project administration. IF: writing—original draft and writing—review and editing. Both authors contributed to the article and approved the submitted version.

FUNDING

Open access charges for this article were paid by Fast Track Impact Ltd.

ACKNOWLEDGMENTS

This research would not have been possible without the input of many workshop participants and interviewees, to whom we are deeply grateful. Thanks to Nic Gratton for help summarizing the impacts of the Creative Communities Unit, to Julie Zaehringer for help summarizing the Managing Telecoupled Landscapes Project, and to David Phipps and Elisabeth Feltaous for help summarizing Ownership, Control, Access, and Possession principles. Some of the ideas in this paper were originally developed by the author in his book, *Impact Culture*, published by Fast Track Impact Ltd.

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Conflict of Interest: MR was CEO and Director of Fast Track Impact Ltd.

The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Factoring Future Generations Into Universities' Strategic Intent: Could a Law Help?

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OPEN ACCESS

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 17 December 2020

Accepted: 12 March 2021

Published: 22 July 2021

Citation:

Davidson J (2021) Factoring Future
Generations Into Universities'
Strategic Intent: Could a Law Help?
Front. Sustain. 2:643244.
doi: 10.3389/frsus.2021.643244

Wales is the first country in the world to have put into law the protection of future generations through its Well-being of Future Generations (Wales) Act 2015; the first country to have a legal mechanism through the Act to deliver on the Sustainable Development Goals and the first country to have put the Brundtland definition of sustainable development into law. What does this mean for the values taught in Welsh universities, and how can the university role be repurposed in the interests of future generations? Building on her research for the book *#futuregen: Lessons from a Small Country* which was published this year, Jane Davidson, who, in her previous role as Minister in Welsh Government, proposed what is now the Well-being of Future Generations (Wales) Act 2015, will explore the opportunities from this new values framework to transform the university sector, in particular, the student experience in Wales, and whether there are further lessons that would be valuable elsewhere.

Keywords: future generations, well-being, Brundtland, #futuregen, universities, Wales, law, Act

INTRODUCTION

Wales is the first country in the world to have put into law the protection of future generations; the first country to have a legal mechanism through its Welsh Government (2015) to deliver on the United Nations General Assembly (2015) Sustainable Development Goals and the first country to have put the Brundtland definition (Definition of 'sustainable development' from World Commission on Environment Development, 1987) of sustainable development into law—"development that meets the needs of the present without compromising the ability of future generations to meet their own needs." When the law was passed in 2015, Nikhil Seth, UN Assistant Secretary-General, said, "What Wales is doing today, the world will do tomorrow."

The Well-being of Future Generations (Wales) Act proposes simply that the needs of future generations are factored into all public sector decision-making processes in the responsibility of the Welsh Government and gives guidance on how to do that. It is revolutionary because it enshrines into law that the well-being of the current and future people of Wales is explicitly the core purpose of the Government of Wales—the value principle at the heart of government.

Such a core principle is revolutionary in its own right, but the Act goes further: it enshrines both the intention and the means, thus becoming a framework for collective action. If you ask the question, "What does the Act do?" its primary focus is the creation of seven goals linked to health, prosperity, resilience, communities, language and heritage, equality, and Wales' role in the world, requiring action to tackle climate change, enhance biodiversity, and live within environmental limits. The goals enable organisations' funding, policy, and implementation to focus on the delivery of sustainable outcomes.

If you ask the question, “How should people comply with the Act?” it directs five statutory ways of working to reach decisions: prevention, long termism, collaboration, integration, and involvement—to achieve positive outcomes for as many goals as possible. The seven goals are the “what”; the five ways of working are the “how.” The “what” and the “how” are underpinned by four domains: environment, society, economy, and culture. “Culture” is critical in capturing identity, heritage, and experience to support behavior-change.

This is a moral agenda, predicated on what is right, not in the short term nor for individual benefit, but for the well-being of our communities, countries, and our long-term existence as humans in nature. Independent oversight of the Act is provided by a Future Generations Commissioner, the Wales Audit Office, and the courts, through Judicial Review).

However, two notes of caution:

- The Act applies only to those public bodies in the direct responsibility of the Welsh Government. Thus, the Higher Education Funding Council for Wales must comply with the Act, but the universities as autonomous institutions are not.
- The Act was passed in 2015 and commenced in 2016. The delivery of the first round of the required well-being plans started in 2018. Thus, the Act has only been in a delivery mode for 2 years.

UNIVERSITIES IN WALES AND THE ACT

As the person charged with the responsibility of leading sustainability in the University of Wales Trinity Saint David (UWTSD) over most of the last decade, I can with confidence say the challenges and opportunities in embedding sustainability throughout a university in relation to the institution’s culture, campus, curriculum, and the relationship with the wider community are huge. Universities are organic, messy institutions, often growing up around individual power bases, disciplines, and needs. Their academics are their beacons—but not necessarily beacons able to shine a light on the wicked challenges of the early twenty first century. As the public appetite grows and wanes for specific disciplines, so does the potential fate of the institutions themselves without a determined vigilance, sufficient student financing, and alternative funding routes. The oldest university in Wales—Lampeter, founded in 1822—is also part of the newest university in Wales—the merger of four universities and two colleges in the last decade to become my own university, the UWTSD.

In this current climate, made immensely more difficult by the effect of coronavirus disease 2019 on the student experience, how can universities create the appropriate structures to embed futures thinking in everything they do, not least when the pandemic has led to their focus being increasingly reactive? Despite many universities’ councils passing resolutions led by student movements to decarbonize their investments and to declare climate emergencies¹, somehow, these initiatives are still

at the periphery rather than at the center of the universities’ operations. It could be argued that without fundamental principles, a clear mechanism, and systems in place to change behavior, we will continue with the best climate science coming out of universities, whereas those same universities explicitly do not make the commensurate changes to their own institutions on the basis of the science.

For the purposes of looking at a systemic approach to embedding any strategic aim into a university’s culture, I will use the phrases “well-being of future generations” or “sustainability” as shorthand for a commitment to designing in future-proofing, systems thinking, creative problem solving, self-awareness/open-mindedness toward difference, understanding of global issues/power relationships, and optimism and action for a better world—i.e., the skills and graduate attributes needed for a constrained future and the role universities should play in that.

Changing expectations of the role of an education system is a long job. Employers recognize the excellence of knowledge acquisition and potential in university graduates but rarely contribute to the content of undergraduate courses, despite the prevailing narrative from business organizations that students do not come into employment with the right skills. However, those same businesses risk registers are acutely aware of the shifting contexts of climate change, resource depletion, globalization, insecure energy sources, and unstable fiscal mechanisms (Franco, 2020). A student who has been encouraged to think critically about these issues within and beyond their discipline has an experience of working in an intradisciplinary team, has developed values about social justice, diversity, and human rights, and is far better placed to explore creative solutions than one who has had no opportunity to explore such challenges.

Factoring the well-being of future generations into the present is seen as a difficult concept and one where people often feel powerless and frustrated when they see governments and institutions acting in what they perceive as unsustainable ways. If sustainable thinking is interpreted as a process leading to better resource management and better long-term decisions, there is a very important role for universities to reduce their own negative impacts and lead by example. Through the National Union of Students’ longitudinal research (Students Organizing for Sustainability International, 2021), there is a 10 year evidence-based to show students consistently demonstrating—92% in 2020—that they want their institution to be doing more on sustainable development with 40% reporting low or no coverage in their course curriculum. However, in universities, the sustainability agenda most commonly lies with estate management because there are real savings to be had by better carbon, energy, water, waste, and environmental resource management systems. As these changes are also visible to students, the university can avoid making fundamental intrinsic changes to prepare their staff and students for the growing climate crisis.

The Welsh experience may be able to offer some lessons here. As outlined in my book *#futuregen: Lessons from a Small Country* (Davidson, 2020), the journey to the Well-being of Future Generations Act took 17 years, from the original duty in Section 21 of the first Government of Wales Act (1998), —which

¹For a list of universities who have declared climate emergencies, see University Fossil Fuel Scorecard, People and Planet. Available online at: <https://peopleandplanet.org/fossil-free-scorecards> (accessed May 14, 2021).

required the new National Assembly for Wales to “have a scheme setting out how it will promote² sustainable development in the exercise of its functions”—to the proposal for legislation to deliver³, now enshrined in the Well-being of Future Generations (Wales) Act. The “duty to promote” did lead to currency for the phrase “sustainable development” across the Welsh public sector but not to the hoped-for action, not least because there was no clear understanding of what “promote” meant, what “sustainable development” meant—or how to get there.

Welsh universities commonly apply the term “sustainable” in their strategic plans, but generally as a strategic enabler to “deliver a financially, socially and environmentally sustainable university (Bangor University, 2015)” or, under the heading, Vision and Ambition, is committed to “being socially and environmentally responsible” (Swansea University, 2020). In my own university, our first key performance indicator (KPI) was “Institutional Sustainability” [University of Wales Trinity Saint David (UWTSD), 2017b] and the KPI for which I was responsible, “Embedding Sustainability,” so it is easy to see how there can be confusion about what words mean, what priority they should be allocated, and how you deliver on them. After all, universities are completely familiar with what needs to be done to create financial “sustainability”—senior management will be focusing on this every day of their lives—but have very little idea how to prepare either themselves or their students for the complex empirical challenges ahead. Rather than the measures taken to keep a university in business, “institutional sustainability” should mean that sustainability (as in delivering on the Brundtland definition) and ethical decision-making in the interests of future generations are at the heart of universities’ DNA.

Our experience in the UWTSD of embedding sustainability throughout the university is a classic example. Through our virtual institute, the INSPIRE (Institute for Sustainable Practice, Innovation and Resource Effectiveness) established in 2012, we sought staff buy-in, management buy-in, governors’ buy-in, student buy-in, and community buy-in whilst undertaking 5 years of mergers. Using mechanisms such as a Sustainability Skills Survey to understand our staff skills, expertise, experience, and appetite for change was crucial, as were the strategic plan commitments, KPI metrics to embed change in faculties, student champions, curriculum change pioneers, and staff delivering on the ground. In 2015, the university rose dramatically from 113th to 8th in the UK and 1st in Wales in the People and Planet University League and took three Green Gown (Environmental Association of Universities Colleges (EAUC), 2015) top awards for its corporate and academic leadership. We may have arrived meteorically, but with yet another merger being completed, with yet another set of problematic buildings, this success could not be maintained. Despite the external success, within the university, the agenda was still seen as peripheral, something that had to be continually fought for, i.e., not actually sustainable at all in either meaning of the term, as neither was it able to be sustained without

constant attention nor was it embedded sufficiently to deliver on the Brundtland ambition.

However, deep in the university, something was stirring; staff and students together were advocating radical curriculum proposals linked to the Well-being of Future Generations Act, capitalizing on the permission to think differently. The 2017–2022 strategic plan was explicit: “We have placed the seven goals and the five ways of working of the Well-Being of Future Generations (Wales) Act 2015 at the core of our planning.” On each of the main campuses, new well-being oriented approaches were being delivered at the core of the UWTSD curriculum: whether through the School of Architecture in Swansea with its focus on sustainable development; the “Rethinking Business for a Changing World” ethical, sustainable, and profitable emphasis at the Carmarthen Business School [University of Wales Trinity Saint David (UWTSD), 2017a], or the Harmony Institute based in Lampeter.

HOW THE ACT IS INFLUENCING UNIVERSITY RESEARCH AND PRACTICE

These important changes linked to the Act are being reflected across Wales. New partnerships are being developed and actions taken to deliver on the Act’s required ways of working. Academics in the Sustainable Places Research Institute in Cardiff University worked with civil society on exciting proposals to create “A Welsh Food System fit for Future Generations” (Sanderson Bellamy and Marsden, 2020) linked directly to the Act and then with Welsh Government and the Future Generations Commissioner to build the Act into a Welsh procurement system focused on social value (Welsh Government, 2020) underpinned by new themes, outcomes, and measures.

What perhaps is most important in this context is that the universities may not be legally accountable directly under the Well-being of Future Generations (Wales) Act, but there is a clear government expectation on them to engage and deliver as partners, protectors, and enhancers of the opportunities of future generations and to deliver on government priorities linked to the legislation:

- Welsh universities are delivery partners on the Public Services Boards created by the Act to maximize cross-sector collaborative delivery in each local authority area in Wales.
- Welsh universities are required to have civic missions (Williams, 2017) in partnership with their communities and public services to deliver place-based outcomes, contribute to raising school standards, develop active citizenship, and act as the engine of social enterprise and innovation. Universities are mandated to maximize their civic contribution³ with clear action plans on achieving this, for which they are held accountable by governors, students, and Welsh Government.
- Universities are key partners in the four economic regions of Wales, which are charged by the Act to deliver innovative low carbon prosperity within environmental limits.
- Universities are encouraged to lead by example, e.g., all are now accredited Living Wage employers and signatories to the

² Author’s emphasis.

³ *Ibid.*

Welsh Government's Code of Practice on Ethical Employment in Supply Chains (Welsh Government, 2017).

Oversight arrangements in Wales are due to change, as the Higher Education Funding Council for Wales (which currently has oversight of universities) is likely to be replaced by “a new Commission for Tertiary Education and Research as the independent regulatory body responsible for the funding, oversight and regulation of tertiary education and research in Wales, tertiary education will encompass post-16 education including further and higher education, apprenticeships and mainstream sixth forms (Welsh Government, 2020a).” Section 7(4) of the Draft Bill defines (Welsh Government, 2020b) “civic mission” as “action for the purpose of promoting or improving the economic, social, environmental or cultural well-being of Wales (including action that may achieve any of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015”. There is a real opportunity for all Welsh higher education institutions to embrace this challenge and make it an explicit part of their own offer as universities in the only country in the world with a law to protect the interests of future generations.

CONCLUSION

Universities' historic role and value—as educators of the next generation and the ones after that—are under scrutiny as never before. With young people, the length and breadth of the United Kingdom (UK), involved in climate movements such as the Mock COP (Mock, 2020), universities need to make sure that their core curriculum and campus experience is fit for purpose, recognizing the current and future challenges of the times. Universities start with a significant advantage—academics are trusted hugely by the public. In 2019, Parr (2019) found that 86% of people trust engineers and professors and 84% scientists. It is university academics who have brought both the climate challenges and solutions into the public domain. Universities could and should be partnering with governments the world over to deliver evidence-based solutions from their trusted experts, as we are starting to see in Wales in the context of the Act. What an opportunity it would be to demonstrate the influence of the climate expertise of UK universities on the UK Government when it hosts COP26 in Glasgow in 2021.

In Wales, the requirements of the Well-being of Future Generations (Wales) Act are starting to drive changes to behaviors and systems. A new Welsh statutory school curriculum based on areas of learning rather than traditional disciplines will be in place by 2022, enabling much more flexibility to adapt the curriculum to current and future challenges. Schools and colleges

are already directly subject to the Act—as agencies of local authorities and government—and there are major opportunities for the new Tertiary Commission to ensure that future students will leave school, college, or university both with in-depth knowledge of their chosen fields, and an approach to life that is adaptable, resilient, and understanding of the need to stay within environmental limits.

For 3 years now, my INSPIRE interns at the UWTSD have gone on to become Presidents of the National Union of Students in Wales. The current Welsh President, Becky Ricketts, is one of 140 people who contributed their views on the Welsh Act and the opportunities it creates in my book, *#futuregen: Lessons from a Small Country*. Her final act as the Student Union President in UWTSD was to persuade the governing body to not just declare a climate emergency but to create an action plan commensurate with the challenge. In her contribution to the book, she says, “My question to you is this: why are we preparing our children for a world that may not be able to support life as we know it? If I were to have the power, my primary decision would be to include real climate education and education of the Act into our schools, colleges, universities and even workplaces—the Well-being of our Future Generations depends on us all, and we have an obligation as a ‘Globally Responsible Wales’ to only positively contribute to this crisis.”

This challenge from our student president is one that should be heard in every Vice Chancellor's office. We have 10 years of evidence of students wanting universities to rise to the challenge—now those same students are taking to the streets. The Well-being of Future Generations (Wales) Act provides a values framework to drive future legislation in Wales in the interest of current and future generations. We already see Welsh universities start to rise to its challenges, but the opportunity is there for them to go further and faster, to be the beacons whose lamps shine far and wide from a small country. As John Rawls, the American philosopher, said, “Do unto future generations what you would have had past generations do unto you.” For all our benefits, and for the benefits of those after us too, that is the least we can do.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Towards Fully Purposing Universities to Deliver Public Benefit

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OPEN ACCESS

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 26 November 2020

Accepted: 01 July 2021

Published: 29 July 2021

Citation:

Tyndale N, Chaytor S and Price GD
(2021) Towards Fully Purposing
Universities to Deliver Public Benefit.
Front. Sustain. 2:634050.
doi: 10.3389/frsus.2021.634050

In leadership positions at UCL, we have spent more than a decade seeking to fulfil our university's founding commitment—inspired almost two centuries ago by the utilitarian philosopher Jeremy Bentham—to innovation, accessibility, and relevance for the benefit of humanity. Our guiding principle has been to make our institution and its activities greater than the sum of its parts. To enable us to have most impact in “sustainable human progress,” we have focused our approach on cross-disciplinarity—by which we mean collaboration between experts in different disciplines that transcends subject boundaries—because the problems faced by society cannot be solved by research from one discipline alone. In recent years we have come to understand the boundaries between disciplines to be a subset of the many types of barriers—such as those between communities (disciplinary, academic and otherwise) and between different kinds of activity—that can inhibit the fulfilment of our vision to maximise our public benefit. In order to address crucial challenges—from the local to the global—we need to form collaborations across society that increase our mutual knowledge and engagement. We need to understand how the translation and application of knowledge will change in different settings and according to different practicalities. And we need to better reflect and enhance our role as convenors of different stakeholders to promote greater shared dialogue, co-creation and action.

Keywords: universities and higher education institutions, public benefit, research strategy, cross-disciplinarity, collaboration

Regrettably, the key question for our generation of researchers has become: “How will society survive to the 22nd century?”

—Professor G. David Price, UCL Vice-Provost (Research),
Foreword to the 2019 UCL Research Strategy¹

INTRODUCTION

The coronavirus pandemic has provided a stark illustration of a truly global challenge which has left no one unaffected. It has also highlighted the vital societal role played by universities, who have collectively mobilised their skills, knowledge, and expertise to work with governments, hospitals, industry, charities, and others to help tackle the effects of COVID-19, from analysing data and providing policy advice, to developing new treatments and exploring the longer-term

¹https://www.ucl.ac.uk/research/sites/research/files/uclresearchstrategy2019_final.pdf Accessed 20 October 2020.

impacts, implications and recovery. No other type of organisation has been capable of responding so immediately across such a broad sphere.

While the effects of coronavirus have been severe and far-reaching, it is not the only immense threat facing humanity. There are numerous urgent, pervasive and systemic challenges to our survival, wellbeing and prosperity—from climate change and inequalities to global security—with consequences likely to be even more severe than the pandemic.

The COVID-19 crisis has confirmed our long-held belief that universities have a unique capability to draw together the breadth of knowledge and expertise necessary to address global challenges. In this article we draw on some of our experiences at UCL in delivering on this conviction over the last decade. Our path was instinctual, experimental and iterative, and our lessons practical. We leave others to draw any theoretical conclusions.

A UNIQUE ROLE FOR UNIVERSITIES

A 2019 article observed, tongue in cheek, “Not long ago, universities said they solved problems. Now, many university leaders have upped the ante: their research will save the world.”² Without wishing to appear arrogant, we hold that this is exactly what universities should aspire to do. This is not to say that universities alone will save the world: rather it is to assert their unique ability to advance knowledge and to work with partners across society to apply that knowledge to global problems.

The question posed in this special issue is highly salient, and builds on considerations of the (potential) transformative role of universities and the need for a new “socially robust” compact with society.³ We do however, propose a slight nuance. In “re-purposing academic institutions for sustainable human progress,” one must not lose sight of the constructive role which universities are already playing, nor the unique characteristics that underpin their potential to do more.⁴ Foremost among these qualities and strengths are, in our view: first, the recognition of the inherent value of enquiry and discovery, in their own right and regardless of their application; second, the cultivation of academics’ ability to determine their own research direction, based on their own curiosity about and commitment to their chosen subject area; and, third, the ability to investigate societal questions over the long term and from multiple perspectives.

We argue, therefore, less for “re-purposing” and more for “fully purposing” academic institutions to meet their obligation and potential to support sustainable human progress. In other words, those unique qualities form an essential prerequisite. The question then becomes how universities can bring those qualities fully to bear on societal challenges.

In leadership positions at UCL, we have spent more than a decade protecting these precious attributes, while also seeking to fulfil our university’s founding commitment—inspired almost two centuries ago by the utilitarian philosopher Jeremy Bentham—to innovation, accessibility and relevance for the benefit of humanity.

OUR JOURNEY AT UCL

UCL is a large, multi-faculty university based in central London, with a research income of over £450 million in 2019/20. We have c.7,000 academics and researchers, and c.6,000 postgraduate research students, working in 11 faculties across a significant breadth and diversity of academic disciplines.

The introduction of UCL’s first (ever) research strategy in 2008 coincided with the growth of the “impact agenda” in the UK.⁵ The latter prompted an increased focus on articulating the social and economic benefits of research, in addition to the value of discovery and development of new knowledge. Universities now increasingly make reference to the broader benefits of research and to ambitions in helping to solve societal problems. (In 2008, the UCL Grand Challenges programme—of which more below—was pioneering; since then universities around the world have adopted similar mechanisms to assemble expertise to tackle defined societal problems.)

Some might see a fundamental tension between, crudely put, academic freedom and institutional mission. At UCL we do not, although this does not mean there is a lack of tensions to be addressed along the journey.

Each university will need to balance these tensions in the way that is most appropriate for its own community. At UCL, in seeking to contribute to “sustainable human progress,” we have encouraged our researchers to address long-term questions of high significance, influence the thinking of their peers, students and successors, develop the connexions of their work to other fields and practices, and maximise the public benefit of their insights. We seek to inspire and enable them to develop their research leadership through collegiality and collaboration, within and beyond the university.

In a nutshell, our aim has been to make our institution greater than the sum of its parts. A fundamental aspect of this has been encouraging what we call “cross-disciplinarity,” by which we mean collaboration between experts in different disciplines that transcends subject boundaries. (We distinguish this from multi-disciplinarity, which brings multiple approaches but without necessarily synthesising them; and interdisciplinarity, which does not necessarily incorporate deep disciplinary knowledge in the same way.)

Cross-disciplinarity at UCL provides a flexible framework for individuals and groups to adapt their own preferred modes of working—from integrating disciplines and forging new fields, synthesising knowledge and developing challenge-based research, to undertaking research across and between several

²<https://www.insidehighered.com/views/2019/09/03/analysis-pros-and-cons-universities-grand-challenges-opinion> Accessed 20 October 2020.

³Gibbons (1999) [https://www.nature.com/articles/35011576#:~:sim:text=A%20new%20contract%20must%20now,be%20both%20transparent%20and%20participative.&text=\\$Modern%20science%20has%20until%20recently,and%20the%20rest%20of%20society](https://www.nature.com/articles/35011576#:~:sim:text=A%20new%20contract%20must%20now,be%20both%20transparent%20and%20participative.&text=$Modern%20science%20has%20until%20recently,and%20the%20rest%20of%20society) Accessed 10 June 2021.

⁴Lozano et al. (2013) Editorial: Advancing Higher Education for Sustainable Development: international insights and critical reflections, In: Journal of Cleaner Production (48) pp.3–9 Accessed 4 May 2021.

⁵This term refers to the growing focus in research funding and assessment on generating and demonstrating economic and social, as well as academic, impacts from research over the past 15 years or so.

disciplines, and pursuing careers that move across and between disciplines, and between academic, non-academic, and non-university roles.

In the face of the complex, systemic and existential problems facing humanity, the significance of cross-disciplinarity is that collaboration between experts can produce a much more nuanced and holistic understanding of any given issue, and thereby generate solutions more fit for application in society.⁶ It is also a foundational aspect of the broader engagement with external stakeholders necessary to enable their application. We have also found that it helps to provide a framework for discussion of wicked problems that asks what we don't know, as well as what we do, and questions who else we may need to learn from or work with to make progress.

CULTIVATING CROSS-DISCIPLINARITY

While there are many practical advantages to providing a single home for researchers from related disciplines—in UCL's case, within a set of departments and faculties—these homes risk creating disciplinary siloes that can inhibit the wide-ranging collaborations we wish to stimulate. Our approach to cross-disciplinarity has been to provide provocations to and facilitate engagement by academics; to tempt them out of their homes rather than mandating such engagement.

We introduced and developed a range of mechanisms in which researchers could participate when they recognised it would benefit their own aspirations. One such mechanism is UCL Grand Challenges,⁷ stimulating thematic problem-focused activity to address societal challenges. This programme was initially organised around the themes of Global Health, Sustainable Cities, Cultural Understanding, and Human Wellbeing; in more recent years we added the themes of Justice & Equality, and Transformative Technology.

Over a little more than a decade, UCL Grand Challenges has brought many members of our research community into working groups to apply their collective expertise to diverse problems such as homelessness, energy consumption, migration and displacement, and antimicrobial resistance. It offers small awards (typically £2,000–£5,000) to support novel collaboration on specific issues. (Small grants have led to big things: for example, the Global Disability Innovation Hub,⁸ now a major research,

teaching and engagement centre on the Queen Elizabeth Olympic Park, had its roots in one.)

UCL Grand Challenges has also organised major commissions, starting with the 2009 UCL–Lancet Commission on Managing the Health Effects of Climate Change⁹, ultimately leading to the creation of the Lancet Countdown¹⁰, which works to ensure that health is at the centre of how governments understand and respond to climate change.

Where our provocations and facilitations have resulted in academics forming a community of interest with a critical mass and an aspiration to achieve more, UCL has often responded by investing strategic seed funding to set this work on a more stable platform, from which they can become self-sustaining through the usual teaching and research routes. These bodies, now formally established cross-disciplinary departments and centres, include, for example, the UCL Institute for Global Health¹¹, the UCL Centre for Behaviour Change¹², and the UCL Institute for Sustainable Resources¹³.

CULTURAL CHANGE

The organisational change which we have implemented has in some ways been very simple: ascribing greater value to cross-disciplinary and impact-focused activity; providing modest resources to facilitate meetings and conferences, and small grants; and creating new fora in which to convene those with similar problem-interests but very different disciplinary backgrounds. Bringing heads of department and deans of faculty on the journey has been important in building support for researchers' engagement in such activities.

These mechanisms have been reinforced by other institutional measures, including: research coordination and facilitation teams to support research funding proposals (particularly those which are cross-disciplinary); a revised framework for progression in academic careers¹⁴, which explicitly values a wide range of different academic activities; an emphasis on Open Science and Scholarship to share the outputs of our research¹⁵; further development of research-based education; and strategies for public engagement, knowledge exchange and global engagement which emphasise the value of, and provide opportunities for, proactive societal engagement.

More significant has been the cultural change within UCL. We learned much in our early attempts to provide roundtables to bring academics from different disciplines together to examine a problem. The diversity of specialist knowledge, perspectives, terminology, methodologies and evidence could make communication problematic. Our participants were often

⁶In the 2011 iteration of our research strategy, we set out to achieve this through delivery of a “culture of wisdom, that is an environment committed to the judicious application of knowledge for the good of humanity” (<https://www.ucl.ac.uk/research/sites/research/files/UCL-Research-Strategy-2011.pdf> Page 1, accessed 20 October 2020). “Wisdom” proved a term that sadly was not universally popular among academic colleagues, and by the following iteration we settled on alternative phrasing: “We want to stimulate disruptive thinking across and beyond our university to transform knowledge and understanding, and to tackle complex societal problems. We wish to help to enable society not only to survive to the next century—an urgent challenge requiring unprecedented collective action and partnership—but also to thrive, so that the lives of future generations are worth living: prosperous, secure, engaged, empowered, fair, healthy, stimulating, and fulfilling” (https://www.ucl.ac.uk/research/sites/research/files/uclresearchstrategy2019_final.pdf Page 5, accessed 20 October 2020).

⁷<https://www.ucl.ac.uk/grand-challenges/> Accessed 20 October 2020.

⁸<https://www.disabilityinnovation.com/> Accessed 20 October 2020.

⁹[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(09\)60935-1/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60935-1/fulltext) Accessed 20 October 2020.

¹⁰<https://www.lancetcountdown.org/> Accessed 20 October 2020.

¹¹<https://www.ucl.ac.uk/global-health/> Accessed 20 October 2020.

¹²<https://www.ucl.ac.uk/behaviour-change/> Accessed 20 October 2020.

¹³<https://www.ucl.ac.uk/bartlett/sustainable/> Accessed 20 October 2020.

¹⁴<https://www.ucl.ac.uk/human-resources/sites/human-resources/files/ucl-130418.pdf> Accessed 20 October 2020.

¹⁵<https://www.ucl.ac.uk/library/ucl-office-open-science-and-scholarship> Accessed 20 October 2020.

at the forefront of their disciplines, accustomed to being the leading expert in the room. Fostering a sense of community was important, but usually required nurturing the perception that they were in a “safe space,” where it was acceptable to acknowledge ignorance. Many early conversations reached a tipping point with a comment such as, “I know what I mean by “x,” but please explain what it means in your discipline.”

Over the course of a decade, the concept of cross-disciplinary research grounded in disciplinary expertise has become central to how our university understands and projects itself. Many hundreds of UCL academics have been directly involved in Grand Challenge activities, but the “ripple effects” —the promulgation of a culture of collaborative working—have been much wider. As one academic colleague observed to us several years after the inception of UCL Grand Challenges: “I feel for the first time that I don’t just work in my department but that I’m part of the wider university.”

BEYOND CROSS-DISCIPLINARITY

In recent years, as we updated the institutional research strategy, we have come to understand the boundaries between disciplines to be a subset of the many types of barriers that can inhibit the fulfilment of our vision to maximise our public benefit. In order to amplify and inform our research we identified the need to cross conventional, but often artificial, boundaries—not only between disciplines, but between communities (disciplinary, academic and within broader society) and between different kinds of activity. In order to address crucial challenges—from the local to the global—we need to form collaborations across society that increase our mutual knowledge and engagement. We need to understand how the translation and application of knowledge will change in different settings and according to different practicalities. And we need to better reflect and enhance our role as convenors of different stakeholders to promote greater shared dialogue, co-creation and action.

Much of UCL’s response to COVID-19 has been made possible because of our existing broad research base, our established culture of collaboration across academic disciplines, and our productive partnerships with National Health Service hospitals, commercial organisations, research institutes and others. We have been able to rapidly assemble cross-disciplinary teams and mobilise partnerships in order to address many aspects of the pandemic, such as: sequencing the virus genome; tracking infection within different communities; collecting real-time patient data; conducting surveys of public understanding and opinion; and developing rapid, low-cost vaccine manufacturing through Vax-Hub, a global consortium of industrial partners, associations and networks jointly led with the University of Oxford.

Development of the UCL-Ventura breathing aid offers a striking example of agile, cross-disciplinary application of research in partnership with industry. To address a shortage of ventilators in hospitals, a team of UCL engineers, UCL Hospitals clinicians and existing industry partner Mercedes-AMG High Performance Powertrains developed a breathing aid that can help

to keep COVID-19 patients out of intensive care. They reverse-engineered a Continuous Positive Airway Pressure (CPAP) device—based on an existing off-patent CPAP system—which can help COVID-19 patients with serious respiratory problems to breathe more easily and prevent the need for invasive ventilation. Within 100 hours of the team’s first meeting, the first prototype of the new design was manufactured; within 10 days, the process of testing, obtaining regulatory approval and moving to full-scale production had occurred; and within 1 month, 10,000 devices had been delivered. The designs and manufacturing instructions were made freely available, with almost 2,000 requests from 105 countries approved in the first 51 days of release. A colleague termed this one of many “pandemic partnerships in a hurry.”¹⁶

Another sphere in which we have strengthened our capacity to engage is that of public policy. Over the past decade, we have focused on how our research community engages with policy stakeholders in order to support the greater use of evidence in the formation of public policy. Along with promoting discipline-specific research findings to relevant policy audiences, the UCL Public Policy programme¹⁷ stimulates and facilitates cross-disciplinary, multi-stakeholder investigation of societal issues (for example on the communication of climate change, green innovation, structural inequalities, and mission-oriented innovation). Through brokerage to connect researchers and policy professionals—including through events, seed funding and a fellowships programme—UCL Public Policy enables collaborative approaches to tackling policy problems and the co-creation of knowledge. We are also working with other UK universities and policy partners through the Capabilities in Academic–Policy Engagement¹⁸ project, to understand “what works” best in different institutional, geographic and policy settings to support collaboration between academic and policy communities and ensure that decision-making is supported through high-quality evidence and expertise.

It is increasingly apparent that engagement with stakeholders beyond academia is a critical aspect of how universities can deliver public value. The latest iteration of our research strategy committed us to “crossing boundaries” in order to increase such engagement, to better understand the problems we can help to address, and to foster collaboration and co-production with communities beyond our university. This includes, for example, fostering dialogues between academics, citizens and policymakers, and facilitating greater public participation in research. We recognise we still have a long way to go here.

¹⁶An internal UCL analysis of the circumstances which made this project successful identified 12 key factors. These included:

- [the] ability to work in and across disciplines, with professionalism and mutual respect
- the importance of investing in, operationalising and optimising interdisciplinary workspaces
- having institutional support from dedicated, experienced, and incentivised professionals
- the importance of prior relationships, proximity, and strong ties among collaborators
- the importance of clear goals, trust, and lines of accountability
- the importance of knowledgeable innovation intermediaries.

¹⁷<https://www.ucl.ac.uk/public-policy/> Accessed 20 October 2020.

¹⁸<https://www.cape.ac.uk/> Accessed 20 October 2020.

Grand Challenges and Missions

The UCL Institute for Innovation and Public Purpose (IIPP)¹⁹, established in 2017 by Professor Mariana Mazzucato, offers an embodiment of UCL's approach. The IIPP's cross-disciplinary work on "missions" offers new ways of tackling societal problems which have informed research and innovation policy in the UK and the EU. Missions identify explicit problems to be solved through cross-sector, cross-actor, and cross-disciplinary collaboration, using research and innovation to deliver societal value through multiple competing solutions. For example:

- The Commission on Mission-Oriented Innovation and Industrial Strategy²⁰ brought together UCL academics and world-leading industry experts from cross-disciplinary institutions to map out missions²¹ for each of the Grand Challenges outlined in the UK Industrial Strategy²² (as well as UCL's own Grand Challenges), including how to ensure the design of these missions are able to crowd-in investment and innovation across different actors and sectors in the economy in order to deliver sustainable and inclusive investment-led growth
- Professor Mazzucato's work for the European Union informed the development of research funding and the incorporation of missions as "an integral part of the Horizon Europe framework programme", with each setting "a mandate to solve a pressing challenge in society within a certain timeframe and budget."²³

PUBLIC EXPECTATIONS

The UK has set an ambitious target to increase investment in R&D from 1.7 to 2.4% of gross domestic product by 2027, the result of a growing political consensus over the past two decades that investment in higher education and in research drives economic growth. As research funding accounts for a growing proportion of the public purse, we anticipate greater expectations of tangible public benefits in return—not least by each university's local and regional communities.

We predict an increasing shift towards a more explicit reflection of societal needs in the way in which research is designed, funded, undertaken and communicated, along with demand for new and expanded ways of engaging with non-academic stakeholders. Universities should be reflecting on what the compact between society and research should be, and how this reflects the shared aim of sustainable human progress. We should not simply be passive recipients of government directives and funder requirements here; rather we should seek to work with government, funders and other actors to shape the future research agenda, and respond to it in ways which are both societally relevant and true to universities' defining attributes and purpose.

Research by Britain Thinks on public perceptions of universities suggests that, at present, the importance of research²⁴ is often overlooked—but that when examples are highlighted it is seen as the single biggest benefit arising from universities. More recently, Public First has found that a majority of the UK population are proud of UK research—but that more work

is needed to foster public support.²⁵ There is an opportunity to help to build a broad public coalition around the crucial role that universities and university research have to play in meeting local and global challenges. It's time we upped our collective ambitions.

In particular, within the UK, universities need to think much more proactively about how they can collaborate with each other to develop effective cross-regional partnerships and networks that can support a connected knowledge and innovation ecosystem delivering local, national and global benefits. The COVID-19 pandemic has shown how universities can act in partnership with local organisations and communities to address the impacts of the crisis. This fluidity will need to be fostered to address the future challenges we will face, with universities playing a prominent role in the fabric of our economy and society.

Our own university is seeking to employ the UN Sustainable Development Goals (SDGs)²⁶ as a framework to understand better the shape of its own research, teaching and external engagement, and maximise our beneficial impact internationally, in the UK, and in London. The SDGs also provide a set of targets against which we can assess and improve the sustainability of our institutional policies and operational practices—so that as an organisation we can ensure our own house is in order, recognising that universities as institutions must acknowledge our own, sometimes problematic, role where planetary sustainability is concerned.²⁷

THE ROAD AHEAD

At UCL, we have benefited from a clear and distinctive institutional ethos, but we recognise and value a diversity of missions in higher education. The institutional transformation

¹⁹<https://www.ucl.ac.uk/bartlett/public-purpose/> Accessed 20 October 2020.

²⁰<https://www.ucl.ac.uk/bartlett/public-purpose/policy/commission-innovation-and-industrial-strategy-mois> Accessed 20 October 2020.

²¹<https://www.ucl.ac.uk/bartlett/public-purpose/publications/2019/dec/missions-beginners-guide> Accessed 20 October 2020.

²²<https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges> Accessed 20 October 2020.

²³https://ec.europa.eu/info/horizon-europe/missions-horizon-europe_en Accessed 20 October 2020.

²⁴https://britainthinks.com/pdfs/Britain-Thinks_Public-perceptions-of-UK-universities_Nov18.pdf Accessed 20 October 2020.

²⁵<https://wellcome.org/sites/default/files/public-first-advocating-rd-investment.pdf> Accessed 23 November 2020.

²⁶<https://www.ucl.ac.uk/sustainable-development-goals/> Accessed 20 October 2020.

²⁷See for example, Corcoran and Wals (2004) *Higher education and the challenge of sustainability—problematics, promise, and practice*; Ecological Literacy: Education and Transition to a Postmodern World. Albany, State University of New York Press.

others seek should reflect their own purpose, culture and local setting. As a sector we should all recognise the ever-more fundamental and ever-more urgent role we must play across society.

The initiatives described above were instigated under the leadership of co-author David Price, then UCL Vice-Provost (Research). Shortly before final submission of this article, his portfolio was expanded significantly with the addition of UCL's London and UK remits, global engagement, innovation and enterprise, and public and cultural engagement. A test of this portfolio will be whether, through the removal of organisational siloes leading discrete activities, we are better able to support and stimulate the 'crossing of boundaries' that we feel underpins the delivery of public benefit.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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How to Repurpose the University: A Resilience Lens on Sustainability Governance

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OPEN ACCESS

Edited by:

Victoria Hurth,
University of Cambridge,
United Kingdom

Reviewed by:

Wim Lambrechts,
Open University of the
Netherlands, Netherlands
Iain Stewart,
Royal Scientific Society, Jordan

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 28 February 2021

Accepted: 19 July 2021

Published: 27 August 2021

Citation:

Robinson ZP and Laycock
Pedersen R (2021) How to Repurpose
the University: A Resilience Lens on
Sustainability Governance.
Front. Sustain. 2:674210.
doi: 10.3389/frsus.2021.674210

Universities have an important role in moving society towards a more sustainable future. However, this will require us to repurpose universities, reorienting and refocusing the different university domains (education, research, campus, and outreach) towards sustainability. The governance structures and processes used to embed sustainability into the activities and operations of the institution are critical to achieving the required transformation. Our current university systems which are seen as contributing to socio-ecological system *unsustainability* are resilient to change due to slow variables such as organisational and sector-wide prevailing paradigms and culture. Therefore, to repurpose a university requires us to destabilise our prevailing system, crossing a threshold into a new stable system of a ‘sustainable university’ across all its domains. This paper utilises an adaptation of Biggs et al. (2012) resilience principles for the governance of social-ecological systems to provide a framework to consider aspects of university governance for sustainability that can be utilised to repurpose universities towards sustainability, and destabilize unsustainable elements of the system. This paper draws out examples relating to sustainability governance within universities with regards to the four principles of (i) managing diversity and redundancy, (ii) managing connectivity, (iii) managing slow variables and feedbacks, and (iv) encouraging learning and experimentation within the context of complex adaptive systems. In this article, we have shown that using resilience in a non-normative way is possible (to decrease resilience of an unsustainable system), and that it can also be valuable to help understand how to shift organisational governance towards a particular end-state (in this case, university governance that advances sustainability). This paper provides an example of how to operationalise resilience principles of relevance to the resilience literature as well as providing a practical framework to guide higher education institution governance for sustainability.

Keywords: social-ecological resilience, resilience principles, higher education, education for sustainable development, sustainability governance, universities

INTRODUCTION

Higher Education Contributions to Sustainability

Universities have an important role in moving society towards sustainability. Universities educate our world leaders (Jones et al., 2010), yet the lack of significant improvement in many of the world’s sustainability challenges serves to feed the critique that our current higher education systems simply perpetuate “unsustainability” through, amongst others, uncritically reproducing the norms or our

unsustainable present (Orr, 2001; Sterling, 2001). Despite the myriad international and national initiatives which have served to increase the momentum of Education for Sustainable Development (ESD) in universities (see Michelsen, 2016 for a review) there remains debate about the need for reorientation and transformation of the current system (e.g., Sterling, 2001, 2013; Jucker, 2014) vs. advances which can occur within, and be steered and “nudged” by our current neoliberal and marketised university system (Bessant et al., 2015), and the extent to which the rhetoric of the role of universities in contributing to a more sustainable future is being met by action (Jones et al., 2010).

Universities are complex organisations (Sterling, 2013; Thomas, 2016) with equally complex forces shaping the higher education environment, including globalisation, commercialisation and corporatisation (Bessant et al., 2015). University activity can be split into four different “domains” of activity—the campus, research, education and outreach. Each of these domains has the potential to contribute to sustainability (Bessant et al., 2015; Niedlich et al., 2020a) in different and also interlinked ways. The “campus” domain has historically seen the most focus and progress through improvements in environmental management (Sterling and Scott, 2008), with more latterly, focus on the role of the domains of education, research and outreach in driving sustainability within and from universities (Fadeeva and Mochizuki, 2010; Barth and Rieckmann, 2016).

Important also to the complexity of the university are the missions of the university. Teaching and research are considered the first and second missions, respectively. The “third mission” is articulated in different ways, including public service (e.g., Scott, 2006), as a contribution to society (Compagnucci and Spigarelli, 2020), or entrepreneurial/economic mission based, around developing economic performance (Etzkowitz et al., 2000; Trencher et al., 2014), linked with the changing direction of university strategy towards increased income generation, commercial enterprise and business engagement (Jary, 2005; Bessant et al., 2015). The use of mission and purpose is often used interchangeably (i.e., in the mission statement of the university), and there may be a difference between the espoused purpose of a mission (research to drive societal transformation) and the practical purpose (to increase university ranking). This paper conceptualises the use of domains, missions and purposes of a university in an overlapping but separate manner. For example, a university may have a research domain covering the research activity of the university, which enacts the mission to carry out research for the purpose of, for example, driving societal transformation. All four domains of activity may intersect and contribute to both the different missions and the espoused purpose of the university. For example, research informs teaching, educational research is carried out, the campus provides a hidden curriculum for learning (Winter and Cotton, 2012; Cotton et al., 2013), and the campus can act as a living lab for research into sustainable solutions (Evans et al., 2015; Robinson et al., 2021).

Universities can be seen also as socio-ecological and complex adaptive systems with interdependencies between people (social systems) and nature (ecological systems) (Colding and Barthel,

2019), as well as subsystems that interact at different levels (Anderies et al., 2004). Therefore, universities are made up of social systems such as bureaucratic and governing structures and social-cultural norms and rules, as well as their physical space including multi-purpose buildings and green space. All of these have direct and indirect environmental (or ecological) and social impacts of their activities. Thus, governance for sustainability within universities is both part of the system itself, as well as a means to direct change in other parts of the system.

The Relationship Between University Governance and Sustainability Governance in Universities

Transforming universities to fulfil their role in a more sustainable future requires effective systems of sustainability governance, whether from an uncritical reformist viewpoint focusing on how change can be driven through the existing system; the critical transformative tradition, with a focus on the need for full system reform; or a more pragmatic tradition which advocates for working within the system while seeking greater systemic reform (e.g., Bessant et al., 2015). Governance within an organisation comprises a complex web of interacting elements, including legislative frameworks, how money is allocated to and within the organisation, processes of decision making and policy and objective setting and monitoring as well as less formal structures and relationships which steer and influence behaviour (Organization for Economic Cooperation and Development, 2003 p. 68; Oxford, 2006; Trakman, 2008).

University governance for sustainability (used herein interchangeably with “sustainability governance”) is the governance of matters pertaining to social and ecological dimensions of sustainability across all domains of the university. It includes governance of matters related directly to the university itself and its activities outside of the campus boundaries, as well as the influence of wider systems of governance (e.g., national regulation of higher education), as university sustainability governance does not take place in a vacuum removed from other layers of explicit governance and implicit influence.

Sustainability governance sits within the broader framework and processes of university governance. However, in this paper we take the position that sustainability must be at the core of all elements of a university’s operations and activities because (nearly) all governed activities at a university have sustainability implications, whether directly or indirectly. As such, wider university governance and sustainability governance within universities must be treated as inseparable when considering structures and processes of sustainability governance in universities. Even if the matter being governed is not directly related to sustainability (that is, it is not governance *of* sustainability), the governance process still ought to be sustainable (governance *as* sustainability) and contribute to sustainability (governance *for* sustainability).

Governance for Sustainability in Universities

With a growing interest in the role of higher education in contributing to a more sustainable future there is a concurrent interest in sustainability governance in universities (e.g., Bauer et al., 2018; Leal Filho et al., 2020; Niedlich et al., 2020a,b) and in understanding the challenges, processes, and barriers to amplifying the sustainability contributions of Higher Education Institutions (HEIs) (e.g., Hoover and Harder, 2015). Governance structures form a basis for institutional action, management decisions, and regulations made within organisations and can affect the way in which sustainability is perceived and practiced in higher education (Leal Filho et al., 2020). Sustainability governance encompasses many different elements, from formal organisational staffing and reporting structures, to sustainability assessment tools, resourcing, training, communication and participation structures as well as external structures including funding sources.

In addition to these elements of sustainability governance, there are many different important *attributes* of sustainability governance in universities, including reliability and accountability, and adequate resourcing, long-term planning, staff support and the commitment of senior management (Vaughter et al., 2016; Leal Filho et al., 2020). Other important attributes of sustainability governance include participation and dialogue, the inclusion of diverse stakeholders, and co-creative processes (see Niedlich et al., 2020b). The role of committed and motivated individuals, often referred to as “sustainability champions,” is also highlighted by many writers as being an evident part of university change processes towards sustainability (e.g., Lozano, 2006; Newman, 2007). Despite the plethora of emerging literature on mechanisms and attributes to drive sustainability (Leal Filho et al., 2020), there is a relative lack of literature exploring the overarching structures for sustainability governance in universities (Hoover and Harder, 2015), the impact of organisational culture on sustainability governance (Niedlich et al., 2020b), the link to organisational learning and change theory (Cebrián et al., 2013; Sylvestre and Wright, 2016), and the extent to which the resilience of sustainability governance can be leveraged for universities’ transformations towards sustainability.

Resilience and Sustainability Normative and Non-normative Concepts of Resilience in Social-Ecological Systems

The concept of resilience has been influential in the field of sustainability. Many permutations of the term exist, such as social resilience, community resilience, organisational resilience, and urban resilience. Further complicating the landscape is the colloquial similarity between sustainability and resilience which can cause the terms to become conflated. In this article, we use social-ecological resilience, “the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure and feedbacks and therefore identity, that is, the capacity to change in order to maintain the same identity” (Folke, 2016, p. 8). In other words,

it has to do with how a social-ecological system copes in the face of stressors.

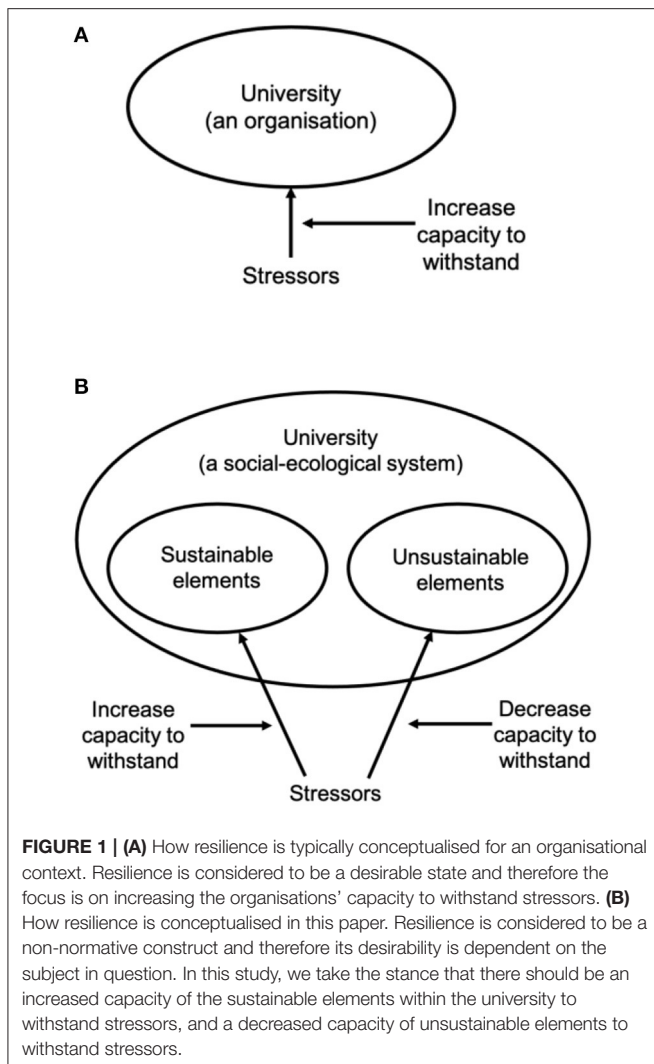
What is especially valuable in the social-ecological tradition of resilience is that it can be used in a non-normative way. In organisational governance, resilience is usually assumed to be a desirable state. This is because, if the organisation is resilient, it will better cope with stressors and therefore will continue to exist (**Figure 1A**). However, taking a non-normative approach to resilience the question may be how can the resilience of an organisation be destabilised in order to repurpose the organisation towards sustainability. Resilience can also be used as a neutral descriptor, to help us to understand how a system can be resilient in an undesirable condition. This also helps to clarify the difference between resilience and sustainability, since their aims can actually be at odds with one another (Elmqvist, 2017). Instead of focusing on reducing the impact of the stressors on the organisation as is typically the goal in organisational resilience, we might want to *increase* the impact of stressors on the university to destabilise unsustainable elements, while also enhancing the resilience of the more sustainable elements (**Figure 1B**).

Resilience of What to What?

When operationalising the concept of resilience it is important to state *what* we want to be resilient and *to what* do we want it to be resilient (Carpenter et al., 2001). In this paper, we have two foci for which we need to specify the resilience of “what to what”: we want to retain the sustainable elements within the university by making them more resilient, and we want to destabilise unsustainable elements by making them less resilient. This leads to the question, what is a sustainable university? Although (or perhaps, because) many scholars have attempted, theoretically and empirically, to pin down definitions, models, and frameworks to explain what a sustainable university is (e.g., Velazquez et al., 2006; Lukman and Glavič, 2007; Sterling, 2013; Hussain et al., 2019), contestation persists.

Given the lack of consensus, we, like Sterling (2013) do not define sustainability in a prescriptive or operational sense. We see the sustainable university as “one that through its guiding ethos, outlook and aspirations, governance, research, curriculum, community links, campus management, monitoring and modus operandi seeks explicitly to explore, develop, contribute to, embody and manifest—critically and reflexively—the kinds of values, concepts and ideas, challenges and approaches that are emerging from the growing global sustainability discourse” (Sterling, 2013, p. 23). We want to enhance the resilience of parts of the university that embody these activities, through research, education, outreach, and the physical campus itself. The inverse, a university (or elements within the university) which does not seek to carry out these activities (or perhaps, even stands against these activities), is what we want to destabilise through undermining its resilience.

Sustainable elements of the university need to be resilient to stressors like the changing socio-economic (e.g., demographic changes, internationalisation, funding mechanisms), political (e.g., policy, environmental campaigns), and technological (e.g., digitalisation) factors that can pressure universities to adapt or



transform (Pinheiro and Young, 2017). Conversely, we suggest that the resilience of unsustainable elements of the university need to be eroded such that they can be destabilised and potentially exchanged for more sustainable replacements.

Operationalising Resilience Through Resilience Principles

One of the main criticisms of the concept of social-ecological resilience is that, while it might be useful as a descriptive concept, it falls short of being operational. For over a decade, scholars have been working to operationalise the concept (Chapin et al., 2009; Cilliers et al., 2013). A recent evolution is the development of principles for enhancing the resilience of ecosystem services (Biggs et al., 2012, 2015). Biggs et al. (2012, 2015) propose seven generic, policy-relevant principles for enhancing resilience in the face of disturbance and ongoing change in social-ecological systems in the context of ecosystem services and natural resource management. The principles are split into two components: system properties to be managed (diversity and redundancy;

connectivity; slow variables and feedback) and attributes of the governance system (complex systems thinking; learning; participation; polycentricity). However, when the governance system is also a component of the social-ecological system under investigation (in this case, a university), there is blurring of the *governors* and the *governed*. This can result in analyses that duplicate themselves across the principles. Therefore, Laycock Pedersen (2019) has proposed a reformulation of Biggs et al.'s (2012, 2015) principles for contexts where the subject(s) to be sustained are not ecosystem services, but rather social-ecological system(s) in which the social systems or constructs are at the fore. These principles are to:

1. Manage diversity and redundancy
...with respect to variety, balance, and disparity...
 - a. ...including in participation in governance
 - b. ...including through polycentric governance
2. Manage connectivity
...with respect to presence/absence, distribution, intensity, strength, modularity, and nestedness of connections...
 - a. ... including in participation in governance
 - b. ...including through polycentric governance
3. Manage slow variables and feedbacks
4. Encourage learning and experimentation
...with respect to the system and its governance, complex adaptive systems, and unknown unknowns

These principles still overlap in some places, and taking steps towards one can help fulfill or undermine another. This will be reflected in the subsequent analysis of the use of these principles in the context of university sustainability governance. These principles will be explained in greater detail in turn in the section Applying Resilience Principles to Sustainability in Universities.

Previous attempts to work with these resilience principles have demonstrated that their application can become highly complex (Clarvis et al., 2015; Laycock Pedersen, 2019), due in large part to the large number of potentially relevant variables in any given context (Laycock Pedersen, 2019). Other scholars using the resilience principles have narrowed their analysis by focusing on only two or three of the principles (e.g., Kummur et al., 2020; Rööfs et al., 2021), which means important connectivity between variables can be missed.

AIMS

Through this conceptual paper (Jaakkola, 2020), we aim to show how a non-normative resilience lens can help understand how to adapt a university's governance so the institution can be repurposed towards sustainability. We explore the current state of (un)sustainability in universities through an adapted version of Biggs et al.'s (2012, 2015) principles for building resilience (Laycock Pedersen, 2019), identifying different examples of how these principles can help us to adapt governance of sustainability within the university.

We draw on our own experiences at universities in the UK and Sweden, and academic literature in order to explore the intersection between resilience theory and governance structures for sustainability in universities. This paper will consider each of the four resilience principles in turn. We explore how each principle could be applied to sustainability governance, and through this lens, identify how different attributes contribute to the resilience of current unsustainable systems, and/or can contribute to the vulnerability or resilience of already existing sustainability work. Through this analysis, we will identify how we might be able to adapt university sustainability governance to destabilise unsustainable systems, and create space for, enhance, and reinforce sustainability work and a sustainable purpose.

APPLYING RESILIENCE PRINCIPLES TO SUSTAINABILITY IN UNIVERSITIES

In the following section, we consider each of the four aforementioned resilience principles in the context of the sustainability and sustainability governance of universities, to identify how to enhance sustainability governance in higher education to repurpose universities towards sustainability. For each principle, we will first describe it in greater detail, and then consider a number of relevant variables and examples.

Principle 1: Manage Diversity and Redundancy

According to Biggs et al. (2012, 2015), there are three components which comprise diversity: variety (the number of different elements); balance (how many of each element); and disparity (how different are the elements from each other). Redundancy refers to the replication of elements. High levels of diversity and redundancy are important for resilience because they provide multiple response options when under stress. This is because, although limiting diversity can increase efficiency, too little diversity can result in too few response options in the face of stressors. However, too much diversity and redundancy can increase complexity, thereby “reducing the nimbleness of the system to adapt to change” (Biggs et al., 2012, p. 426). In some cases, too much diversity can also increase insularity (such as in social groups) and thereby reduce connectivity (Pemberton, 2017).

When managing diversity and redundancy, it is important to consider participation in governance and the extent to which governance is polycentric. Participation in governance should be broadened to include diversity and redundancy of actors, while paying attention to and mitigating power differentials. Polycentricity refers to a governance system in which multiple governing bodies interact within a specific area (Biggs et al., 2015). In polycentric governance systems, the level at which issue-areas are governed should reflect the size and scope of the issue (Schoon et al., 2015). By using this approach, efforts can be coordinated at a higher level, while devolved governance can allow for autonomy and integration of knowledge and practices at a local level. Polycentric governance systems involve a diversity of actors in matters that directly pertain to and

affect them, increasing the number of perspectives able to offer solutions, as well as building in redundancy in the case of non-participation. The redundancies built into the modular nature of polycentric governance also means that experimentation and learning (principle 4) can be undertaken more safely. That is, experimentation that fails in one module of the system will have a lesser impact on the wider governance system, allowing governance in other modules and at other scales to continue to function.

Table 1 outlines a series of questions to enable the analysis of the role of the three different types of diversity identified by Biggs et al. (2012, 2015) and redundancy across a number of selected areas relevant to university governance for sustainability. The relevance of these different areas to sustainability governance is then explored further below.

Diversity in the Types and Topics of Sustainability Work

Covering a diversity of and balance between types and topics of sustainability work is necessary to deliver sustainability holistically. The different types of activities sustainability should be embedded in span across each of the university's domains of activity. It is also important that a diversity of sustainability topics are addressed, spanning and integrating social and environmental areas, encompassing issues as diverse as food, water, energy, health, inclusion, and social justice.

Historically, sustainability work in universities has often been relegated to operational management of the estate, with an emphasis on environmental sustainability through, for example, energy efficiency and recycling. This unbalanced approach to sustainability has meant that many actors have not “seen” a place for themselves within the sustainability agenda. Conversely, a diverse sustainability agenda provides a diverse set of entry points (Jones et al., 2010) to help capture buy-in from a broad range of actors doing different types of work covering different topics. This can be encouraged through ensuring a wide range of topics in sustainability reporting activity and a wide range of areas represented in a university-level sustainability “steering group,” covering representatives leading in different areas of activity such as (amongst others), catering, procurement, events and conferencing, human resources, partnerships, research and education, alongside more traditional energy and environmental management representatives. Ultimately, this diversity can ground the agenda more deeply within the university.

Diversity in Participation in Sustainability Work and Governance

Participation from a wide diversity of stakeholders in sustainability work and governance is important. This includes diversity of staff (administration, teaching, research, operational, different disciplines, etc.) and students (e.g., degree types, levels, disciplines). It also means considering the identities of participants in question, such as gender, race, age, class, ability, sexuality, religion, and so on. Diversity of participation needs careful management to ensure that participation results in cooperation and learning rather than polarisation. For example, unspoken assumptions rooted in epistemological differences

TABLE 1 | Examples of elements of university governance for sustainability in relation to Biggs et al.'s (2012, 2015) three types of diversity and redundancy.

	Diversity			Redundancy
	Variety	Balance	Disparity	
Types and topics of sustainability work	Are there a variety of sustainability initiatives taking place (e.g., educational, infrastructural, research, student life, etc.)? Do they address different sustainability issues (e.g., social and environmental; food, water, energy, health, etc.)?	Is there a balance between the different types of sustainability initiatives taking place and the topics of the sustainability issues that they address?	How different are the types and topics of sustainability work? Are both social and environmental sustainability topics included? Is there work that falls into each of the core domains of university activity?	Is there overlap between different activities? Are there several activities tackling the same sustainability problem (but from different angles)?
Participation in sustainability work & governance	Is there participation from diverse staff (admin, teaching, research, operational, different disciplines, etc.), and students (different levels, disciplines, mature, home vs. campus based)? Are there participants with different identities (gender, race, age, class, ability, sexuality, religion, etc.) involved? Is this variety present at different levels of governance? Is there a variety of ways stakeholders can participate in sustainability governance at different levels of decision making? Does this include modes that are passive and active, in-depth and time-efficient? Is there involvement of participants in a variety of different stages in decision making?	Is there appropriate balance between students and staff involvement? Admin, operational, and teaching/research staff? Is the representation of different identities in balance? Is there an appropriate and suitable balance between different modes of stakeholder involvement?	How different are the stakeholders in sustainability governance? How different are the roles of staff involved? How different are the disciplines they come from?	Is there redundancy in participation from the most transient and/or hard-to-reach groups to ensure uninterrupted participation from these groups?
Motivations driving sustainability work	Are there different motivators that drive sustainability work? (National policies, institutional policy and priorities, key individuals within the organisation, funding streams, research agendas, etc.)	Is there a balance between different drivers of sustainability work, or are there one or only a few that genuinely motivate sustainability work?	How different are the drivers of sustainability work? Are there both intrinsic (e.g., moral rationales) and extrinsic (e.g., funding) drivers?	Is there redundancy in drivers? (e.g., if one funding stream dries up, is there another that can buffer its loss?)
Scales of activity	Is sustainability work happening at different scales e.g., cross-university initiatives and within individual degree programmes?	Is there a balance in responsibility for sustainability work at the most appropriate levels for the issues in concern (e.g., the balance between senior management decision making to enable greater roll out of sustainability activity vs. localised decision making to trial new approaches which has limited impact)?	Is sustainability work clustered at particular scales? Are there large-scale as well as small-scale initiatives taking place?	Is there overlap in scales of activity?

amongst stakeholders of different backgrounds has the potential to undermine trust and create divisions (Cinčera et al., 2019).

Considering redundancy in participation in sustainability work within the university is crucial. The role of committed individuals, often referred to as “sustainability champions” is highlighted by many writers as being an evident part of university change processes towards sustainability (e.g., Lozano, 2006). These roles require relationship building and institutional knowledge, requiring time for such a “champion” to be effective in their work within an institution. As such, a lack of redundancy (e.g., multiple “champions”) can make the system

very brittle with serious consequences for sustainability work if key stakeholder(s) leave. Having key sustainability champions can also make people see sustainability as the task of an individual elite (Rath and Schmitt, 2017), conditions that reduce diversity of participation.

Representation of all participant characteristics in all sustainability work and governance is not only unlikely, but probably impossible. Indeed, Biggs et al. (2012, p. 437) say that “who participates [in governance] and what they contribute are context specific and need to be continually revised throughout the policy process or adaptive management cycle.” Context

specific participation and revisions to participation processes are not the norm in most universities. For example, universities often stick to a standardised model of elected student representation from Students' Unions who participate in university meetings (about for example, decisions related to development of the campus estate, educational processes etc.), representing the student voice.

While it can be helpful to consider which voices are (and are not) represented, it is also crucial to consider the quality of participation in sustainability governance. Formal university governance structures can feature participation (especially student participation) in tokenistic ways, and ways that maintain hierarchies and existing power dynamics. As such, there should be a variety of different strategies for facilitating participation by stakeholders in decisions that affect them. For example, including elected student representation on committees is a common way to ensure student views are represented in decisions. However, often these students are new to committee structures, protocols (e.g., at which points opportunities to voice opinions are invited, and how decisions are made), and language, reducing their ability to optimise their participation. It is not uncommon for decisions to be made in advance of such meetings, rendering participation in them a formality rather than providing a genuine forum for discussion. Furthermore, some modes of participation are considered more legitimate than others. For example, campus activism, student newspaper articles, and social media are all places where student voices can be heard, however, these voices are not always acknowledged in formal governance systems. Efforts should be taken to elicit diverse participation at different stages and to different degrees (see Arnstein, 1969), and for different purposes (see Collins and Ison, 2009). For example, consultation following important university decisions, such as design and placement of student residences, ought not to be the only participation elicited. Alternative participation strategies such as focus groups or questionnaires at earlier stages can allow for more diverse perspectives to be captured at early stages in decision-making processes. Alternative and unconventional approaches, such as deliberative polling and citizen juries (CIVICUS, 2020), may also be helpful to bring in underrepresented views and/or hard-to-reach stakeholders.

Diversity of participation in sustainability decision-making or even sustainability activity can complicate the delivery of sustainable outcomes. The lack of diversity in senior management of universities (Croucher et al., 2020) can make decision-making less complicated because fewer views need to be accommodated and taken into account. Sustainability is a contested and ill-defined concept, so the presence of a greater diversity of voices, and especially greater disparity between the perspectives these voices offer, means that coming to agreement and working in coordination can be challenging. For example, students who study sustainability tend to have quite holistic, and, at times, idealistic ideas of what sustainability is, whereas staff who oversee the campus estate tend to prioritise environmental concerns, such as carbon reduction and waste management. This can lead to frustration from students, who perceive "the university" to be adopting a tokenistic approach, while estates staff can be

frustrated that students may expect them to work with issues outside the remit of their job role. As can be seen here, diversity can result in fractures within groups of people working with sustainability, reducing connectivity and their ability to act in a coordinated way. As such, from a resilience perspective, it could be desirable to limit diversity in order to improve coordination of sustainability. However, from an ethical perspective (and a social sustainability perspective), inclusion and representation is not a matter of improving the quality of the outcomes, but a matter of rights, fairness, and justice. This tension is important to consider.

Diversity in Motivations Driving Sustainability Work

Diverse motivations driving sustainability work means that change in government policy, leadership, key individuals, funding streams, research agendas, or student demands will be less likely to derail sustainability efforts across the university. It is also important for this reason that there is more than one key driver (i.e., a balance between different drivers). Redundancies in drivers can also provide vital buffers. For example, if one funding stream for sustainability research or sustainability campus improvements dries up, proposals and applications can be submitted through another. Also, having both intrinsic and extrinsic drivers for sustainability work has the potential to create more momentum than either driver could in isolation.

An example of the need for diverse motivations and drivers for sustainability work in universities can be seen by looking at the significant changes in key sector bodies championing and supporting the role of universities in driving sustainability. These changes have implications to the motivations for and level of sustainability activity within universities. Higher Education sector bodies can have a significant role in steering university sustainability activity (Bessant et al., 2015), yet themselves are subject to shifts and changing motivations. For example, the Higher Education Funding Council for England, that was responsible for the distribution of funding to universities, in 2005 set out its vision for how universities and colleges could contribute to sustainable development, providing a clear steer for universities to embrace sustainability. In addition, in 2013 HEFCE awarded £5 million to the National Union of Students for a Students Green Fund to support student-led sustainability activity. Yet, such funding opportunities are short-lived, and HEFCE no longer exists as an organisation, removing these specific drivers. Similarly the Higher Education Academy, which supported learning and teaching activities in universities in the UK, had a strong Education for Sustainable Development strand of activity which created a whole-institution sustainability-focused change programme and provided funding for ESD activity in organisations. However, governmental austerity measures led to the loss of this focus on ESD and ultimately the loss of the Higher Education Academy itself, further removing these drivers and support for universities. These examples highlight how a diversity and balance of different motivations and drivers for sustainability are needed within a university in order to keep momentum in the face of ever-shifting external (and internal) contexts of support and motivation.

Diversity of Scales of Activity

University governance usually has some degree of polycentricity, with powers devolved to committees and working groups with specific mandates. However, there are often fairly rigid reporting and decision-making structures that require reporting to higher levels of decision-making. Often budgetary decisions are made based on this reporting. If sustainability is not formally embedded in these structures, it can be difficult to demonstrate impact and access important financial and personnel resources. However, because of this devolved structure, not all activities are “controlled” by higher levels of governance. This means that sustainability initiatives can take place at lower levels regardless of a mandate from the top (provided they do not require substantial internal resourcing). Although it is preferable for the level of governance to match the scale of the issue, this means action can be taken from a different scale if the appropriate scale presents challenges. Governance at smaller scales also creates opportunities for participation and provides a low-risk environment for experimentation (principle 4). Furthermore, the devolved university structure means that sustainability activity can continue, even if sustainability-supportive leadership (e.g., a dean or head of operations with an affinity to sustainability) changes. As such, this variety of scale “allows some of the elements to persist through particular disturbances” (Biggs et al., 2012, p. 425). This said, support from higher levels of governance for smaller scale activities can provide stability for bottom-up activities. This is especially true for activities led by students, as they are so transient (Laycock Pedersen et al., 2019). Higher-level support can also help to scale successful initiatives trialled at a smaller scale.

However, even if there are degrees of polycentricity in their governance, universities tend to emphatically eschew redundancy, because redundancy is costly, and seen as inefficient. This is largely because of the current drive for economic efficiency within the sector. High levels of redundancy can increase administrative costs, and also result in power struggles, and contradictions in, for example, goals or approaches from different groups or individuals.

Principle 2: Manage Connectivity

Connectivity within a social system refers to the “degree to which different actors and entities interact across a social landscape” (Biggs et al., 2012, p. 427), and comprises nodes and links between nodes. The structure and strength of the connectivity is determined by (i) the distribution of links between nodes, whether these are “generalist” with lots of links, or “specialist” with few links; (ii) the frequency or “thickness” of interactions between the social actors comprising the nodes, and (iii) “modularity,” the mix of densely and loosely connected nodes. The strength and structure of links are not constant in time (Biggs et al., 2012, p. 429), and may reflect formal or informal changes in relationships between actors and the establishment or disestablishment of nodes. Nodes will change as individuals leave or join the organisation, or new formal or informal groupings are formed, fall into disuse, or are disbanded. The quality of the links between nodes is also important. Where nodes represent individuals or groups of

people these links represent relationships, with high quality relationships characterised by trust and reciprocity. Connectivity also facilitates exchange of information or material between different components of the system (Biggs et al., 2012), and hence may play a role in establishing culture or new norms or sharing learning. Connectivity can have either positive or negative effects on the sustainability agenda and sustainability governance within universities, and ultimately the goal of repurposing universities towards sustainability. This is dependent on which nodes are present, the strength of connectivity between them, the quality of the links, and the nature of a disturbance to the system.

Connectivity Within Universities Between Estates and Academic Domains

The different university domains (e.g., campus, education, research, outreach) contribute to the modularity (and polycentricity) of the university system. High connectivity across different domains can help develop a common purpose between different cultures that exist within different domains (Sylvestre and Wright, 2016). Typically, connectivity *within* these domains is high, while connectivity *between* domains tends to be low, meaning that sustainability work across domains can feel fragmented and unconnected. For example, it is common to have limited connectivity between the estates functions and the academic functions of a university. Where universities have started leading education for sustainable development activities from an estates-based directorate where leadership for “sustainability governance” often sits, the weak connections between campus operations and the academic functions of the university can limit the impact on the academic domain.

“Sustainability champions” are an important formally or informally-recognised aspect of university sustainability governance and change agendas (e.g., Lozano, 2006; Brinkhurst et al., 2011), and may exhibit different levels of connectivity between nodes. Sustainability champions can hold important coordination roles linking different nodes and increasing connectivity within the system. However, if a high level of connectivity is supported by a single individual, it is highly fragile. This is because connectivity will be largely dependent on the individual’s ability to develop quality relationships with diverse actors across the university, making connectivity highly vulnerable to the individual leaving the organisation.

Between Students and University Administration

Another common area where connections tend to be weak or poor quality is between the university and students or students’ unions. Students are highly transient, typically rotating in and out of the university community in 3 or 4 years, meaning that connections between students and staff are regularly disrupted, hindering the development of trust and quality relationships (Laycock Pedersen et al., 2019). Students’ unions are typically used to help create more effective relationships between the student body and the university, and serve the purpose of representing students within the institution as well as providing a variety of services for students. These formal structures of students’ union representation in university governance and decision making can be brittle as they often involve only a single

student representative. Relationships between students' unions and university management are seen to be more constructive and less adversarial than in the past (Brooks et al., 2015), improving the *quality* of this connectivity. However, if there is low connectivity between the students' union and the wider student body, then it does not serve to effectively increase the connectivity between students and university governance. Students' unions are not the only way to build connections between students and university governance. There is an increasing drive to increase connectivity through both formal structures such as programme level committees to give students a voice in curriculum development, as well as pedagogical movements such as treating students as partners in the co-creation of education and research (e.g., Healey et al., 2014; Warwick, 2016; Barrineau and Anderson, 2018). External bodies have also devised structures to improve the connectivity between university governance and students' unions and students to foster education for sustainable development, such as the UK's National Union of Students' (now Students Organising for Sustainability, SOS-UK) Responsible Futures accreditation programme (National Union of Students, 2021).

Connectivity Between Universities

High connectivity between higher education institutions can create norms that present resistance to change if unsustainable attributes are common throughout the sector. Biggs et al. (2012) state that "high levels of connectivity among actors can lead to synchronized behavior [...] or to strong barriers for changing unsustainable practices" (Biggs et al., 2012, p. 429). In social networks actors tend to have strong ties to other actors with similar characteristics (McPherson et al., 2001), which can lead to high connectivity between actors with similar perspectives, and a lack of diversity overall. Within the higher education system in the UK there are a number of different "mission groups" (such as the Russell Group) which connect universities with common interests, and promote different agendas (Furey et al., 2014). There is also a clear hierarchy in mission groups. The Russell Group ("committed to maintaining the highest standards of research, education, and knowledge transfer") is viewed as the elite group in UK higher education, therefore setting aspirations for other universities. Where there is a shift in position towards sustainability from actors in an elite mission group, this shift has the potential to influence a wider range of institutions than changes in "lower ranking" mission groups. Alternatively, establishment of a new mission group or network which connects universities with a goal of repurposing towards sustainability could increase the influence of these actors on the rest of the sector network as well as providing support for each other. The impact of this new modularity would be enhanced if it includes a diversity of institutions, including some of the "elite."

In 2011, the Higher Education Academy in the UK launched a change programme called "Green Academy" which worked with a cohort of 10 universities to initiate systemic change towards sustainability in their universities. One of the unplanned outcomes of this programme was the development of an informal, albeit short-lived, network of participant universities (McCoshan and Martin, 2012) which included

universities across different mission groups (including the Russell Group). This programme also led to increased connectivity *within* organisations due to the requirement of cross-hierarchy participation, and hence through its influence on connectivity this programme is believed to have had an impact in driving sustainability both within individual institutions and across the sector (McCoshan and Martin, 2012).

Connectivity With External Non-academic Partners

In order for universities to be genuinely repurposed for sustainability, connections between universities and actors outside of the university are also important for "bringing outside perspectives and new ideas to local issues" (Biggs et al., 2012, p. 428) and producing genuinely transdisciplinary and collaborative forms of inquiry and knowledge creation (Sylvestre and Wright, 2016). Universities are increasingly referred to as "civic" or "anchor" institutions (e.g., Birch et al., 2013), given their potential to positively influence local communities and economies. Connections may be formalised through university representation on formal regional governance bodies (such as Local Enterprise Partnerships in the English context), as well as involvement in regional coalitions around different issues (e.g., place-based climate change responses). Universities can play an important role in such coalitions as "honest brokers" (Andereggen et al., 2012; Bogenschneider, 2020). Engaging with external partners not only increases universities' own connections within local networks, they are often a key node connecting other actors to one another.

Connections with external actors are also important to the educational and research domains and missions if universities are to genuinely serve a wider purpose for society. Greater connectivity with external actors can create opportunities for students to work with partner organisations on sustainability goals, providing them opportunities to work with sustainability problems in different contexts, as well as contributing human resources to different actors. University research missions also benefit from connectivity with external organisations to ensure impact of research by shaping research with external actors, while a new mission focus on "knowledge exchange" (Johnson, 2020) also highlights the shift towards increased external connectivity.

Principle 3: Manage Slow Variables and Feedbacks

Slow variables are variables within a system which change over long timescales (Walker et al., 2012). They determine the underlying structure and conditions within the system. Within a social system these can include, amongst others, legal systems, values and traditions (Biggs et al., 2012). Fast variables tend to receive more attention than slow variables because when they change, consequences can be observed with greater immediacy (Walker et al., 2012). Feedbacks are "the two-way 'connectors' between variables that can either reinforce (positive feedback) or dampen (negative feedback) change" (Simonsen et al., 2014).

Managing slow variables and feedbacks requires thinking through the influences that operate at different timescales, as well as their consequences (the feedbacks) of factors in the system. Changes in slow variables are often hard to observe because

they happen so slowly. However, changes in slow variables in complex systems can lead to sudden, unpredictable, and non-linear changes if a tipping point is reached. This can ultimately force a transformation such that the structure and behaviour of the system is of a fundamentally different character (Biggs et al., 2012). Hence, consideration of slow variables may be one of the most essential of Biggs et al.'s (2012) resilience principles when seeking to shift systems from undesirable states, such as in the case of repurposing higher education towards sustainability.

Slow Variables

Universities are historic institutions. The first institutions recognisable as universities, combining higher learning, corporate autonomy, and academic freedom, arose in Medieval Europe (Perkin, 2007). Although universities and their “missions” have continually evolved (Trencher et al., 2014), their longevity shows that these institutions are designed to endure over time, withstanding change and short-lived crises (Newman, 2007). Universities are therefore not designed to enable a quick and easy transformation towards sustainability (Newman, 2007). Academic traditions and cultures can act as slow variables, as can external socio-economic and cultural factors. These can affect the ease of repurposing universities for sustainability. In the following sections we will consider the following slow variables: (i) academic traditions and organisational culture, and (ii) national regulatory and funding body ethos and requirements.

Academic Traditions and Organisational Culture

The traditions and culture that exist within the higher education sector as a whole and within individual organisations can be seen as a slow variable. Drawing on early work by Schein (1985), Niedlich et al. (2020a, p. 375) describe organisational culture as “a pattern of assumptions shared by members of an organisation, developed over time, and transmitted through day-to-day interaction with one another.” This culture is reflected in visible elements, such as structures and language (as reflected in increasing managerialist language, Sterling, 2001), as well as those that are more opaque, such as beliefs (Niedlich et al., 2020a). Organisational culture within any one institution can be seen as part of the context dependent conditions of any university (Niedlich et al., 2020a), but equally aspects of that culture emanate from historical and global academic traditions. Factors such as size, location, disciplinary scope, as well as overall political regulatory measures can all affect the cultural orientation of an organisation (Niedlich et al., 2020a).

Organisational values, attitudes and behaviours, as dictated by organisational culture, can be a key component of achieving deeper change within an institution (Niedlich et al., 2020b). This is because elements of organisational culture and academic tradition, such as authority and self-determination (Niedlich et al., 2020b), may act as mediators in an organisations' response to fulfil its role in addressing unsustainability challenges.

Some have argued that the cultural foundations of universities are an inherent part of the current unsustainability of the university system therefore repurposing universities for sustainability requires “a change in their cultural foundations”

(Niedlich et al., 2020b, p. 375). This is highlighted by the recurring emphasis on organisational culture as a driver of organisational change (Verhulst and Lambrechts, 2015). As well as an organisational culture of the institution as a whole, the different domains of academic activity, education, research, campus, outreach, as well as different disciplines, are all marked by differences in cultures (Sylvestre and Wright, 2016; Niedlich et al., 2020a), even within a single organisation. For a whole institution transformation towards sustainability, organisational culture in all areas is important.

“Academic freedom” within teaching and research is a prized tradition in Western universities, but can make it difficult to “force” transformation of teaching, learning and research activities in a particular direction, including towards sustainability (Jones et al., 2010; Bauer et al., 2018). This is powerfully demonstrated by Peter Knight's vitriolic and sarcastic article in one of the UK's national newspapers, in response to the Higher Education Funding Council for England's (HEFCE, 2005) consultation document on sustainable development in higher education. In the document, HEFCE suggested that universities should promote sustainable development through the curriculum (amongst other areas). Knight (2005) called this document “pernicious, shameful and dangerous” referring to the document's “self-righteous waffle” as the “final assault on the last remaining freedom of universities.” He concludes by saying:

“The issue here is not whether sustainable development is a good or bad idea. It is about the basic rights and responsibilities of universities and the need to safeguard academic freedom. It is not the job of universities to promote a particular political orthodoxy.”

However, in the 16 years since this article was written, sector bodies in the UK have become more supportive of the incorporation of sustainability into the curriculum (and the wider university). Academic freedom still remains an important tenet of higher education, but our shifting understanding of what academic freedom means in the context of rapid degradation of our life support systems and its interplay with the moral imperative of sustainability is a slow variable to be observed.

International and National Policy and Regulatory/Funding Body Requirements and Ethos

Slow variables relevant to the governance of sustainability in universities also exist outside of the institutions themselves. They may include international drivers; national policy and higher education bodies' drivers, regulation, and values; and requirements of funding bodies. These, in turn, influence different university domains and organisational culture.

In theory, slow variables at an international level are in place to support repurposing of universities. Successive United Nations (UN) Education for Sustainable Development initiatives (e.g., UNESCO, 2015, 2017, 2020) highlight the importance of education in achieving a more sustainable future. Yet, despite these international level initiatives, there are still calls for rapid structural (rather than incremental) change in global governance to bring about the needed extent and speed of

societal change (Biermann et al., 2012), as well as criticisms of a lack of significant impact. National political discourse can also deter pro-sustainability change at a university level. Unaligned national policies were amongst several national-level challenges for transforming universities identified by sustainability leaders of colleges and universities (Scott et al., 2012). Over several decades, neoliberal ideologies and new public management approaches dominating UK higher education have impacted universities' foci and culture. In England, universities have been repositioned as contributors to the knowledge and industrial economy, and this has resulted in their gradual repositioning to sit under government departments associated with business and industrial strategy (Bessant et al., 2015; Bessant, 2017). Likewise, moves to measure the "worth" of a student degree through the salaries that their graduates earn places an emphasis on particular subjects (and institutions), and encourages universities to focus on preparing graduates for the workforce, rather than emphasising the intrinsic worth of education and learning.

Increasing sustainability research can also be impeded through, for example, active discouragement of education for sustainable development research (Bessant and Robinson, 2019) and national funding mechanisms that discourage transdisciplinary research (Scott et al., 2012; Bessant and Robinson, 2019). These prevailing norms are slow variables which act as barriers to university transformation towards sustainability.

Conversely, other national research-focused drivers can also support repurposing universities for sustainability. For example, the discussion of research "impact" and transdisciplinary co-creation is increasing, and being actioned through research funding mechanisms. For example, the European Horizon 2020 funding programme emphasises multi-actor and public engagement in research and innovation in order to align "the process and its outcomes with the values, needs and expectations of society" (European Commission, 2020). Although this highlights slow variables external to the university, such as national drivers and funding mechanisms, are outside direct university control, there are signs of movement within some of these slow variables which may be critical in repurposing universities towards sustainability, and bringing attention to pro-sustainability changes in slow variables can be used to drive change at an institutional level.

Feedbacks

Feedbacks are essential in maintaining or shifting slow variables. Explicit feedback loops are built into many governance structures, for example, through monitoring and evaluation processes. Implicit feedback loops also exist within social systems, for example in the rewarding of particular behaviours or areas of achievement. Reinforcing feedbacks can more deeply entrench current paradigms and values within the university. Therefore, identifying what these reinforcing feedbacks are and identifying ways to weaken them are important leverage points for change. This section explores examples of explicit and implicit reinforcing feedbacks that are entrenching current paradigms and values as well as ways to use feedbacks to drive change.

Explicit Feedbacks: Monitoring and Evaluation Systems

Quality processes, which include monitoring and evaluation, are important to the governance of a university. However, these governance processes have been designed within the framework of the existing university system, and hence can reinforce unsustainable dominating values, goals, worldviews, and social structures. Monitoring requirements are also imposed from outside the university. For example, national government requirements for universities to report on graduate salaries can perpetuate a narrow focus on an economic mission in universities. This focus, in turn, reinforces the idea that graduate salaries are important metrics to measure.

Despite many of the negative aspects of neoliberal and managerialist control mechanisms which are used to govern universities, Bessant et al. (2015) highlight the potential for amplifying feedbacks through such mechanisms (like monitoring and evaluation) to be hijacked for a more sustainable focus. For example, interweaving sustainability into instruments which publicly measure institutional performance could influence student choice of university and degree course, and thereby amplify the sustainability agenda in universities and increase its value within the managerialist and market-led monitoring mechanisms which govern academic systems. An example of this can be seen in how the recent evaluation of education for sustainable development in Higher Education in Sweden (UKRI, 2019) has renewed an interest in the imperative to embed sustainability in the curriculum (SOU 2019:13, 2019).

The choice of what to monitor is critical to how monitoring and evaluation feedbacks function. In the UK, metrics that are monitored across teaching and research domains include student numbers, degree outcomes, research income, and "quality" of research outputs. There is less focus on long-term impact of either education or research activities. There is a tendency to use measures which monitor what is short-term (i.e., fast variables) and easily quantified, creating a myopic view of the "success" of a university. A shift in explicit feedbacks through the choice of what is monitored, to include a focus on longer-term sustainability-focused impact, could have substantial impact on shifting slow variables that enable repurposing the university. Investment in, and greater respect for, qualitative monitoring measures would also be appropriate to capture a fuller picture of sustainability in universities.

Implicit Feedbacks: Rewarding Behaviour and Communication

Feedbacks can also be implicit, such as how particular behaviours are rewarded and therefore incentivised through mechanisms such as promotions and appraisal processes, public celebration of individuals and their achievement, and formal time allocation to particular activities.

The language used within an organisation can also reinforce the dominant paradigm. This is because it is a surface-level manifestation of organisational culture (Niedlich et al., 2020a). That is, the language shapes the culture, and the culture shapes the language we use. Much of the language used in governance of HE is managerialist and that of monitoring and metrics,

rather than the purpose lying behind the metrics (Sterling, 2001). For example, a focus on grant income at the expense of the societal contribution or wider impact of research, or student degree outcomes rather than student learning and development. Therefore, actors can become focused on the short-term metrics rather than considering the larger scale purpose of activity in different domains.

Funding opportunities also provide feedback mechanisms. For example, interdisciplinary research is seen as essential for addressing sustainability challenges, but the funding and reward system has been biased against interdisciplinary research (Bessant and Robinson, 2019), potentially reducing researchers' engagement with interdisciplinary research. However, there are clear signals in the UK research system that this is changing, as the number of research funding calls explicitly requiring interdisciplinary research is increasing.

Principle 4: Encourage Learning and Experimentation

The fourth principle is encourage learning and experimentation with respect to the system and its governance, complex adaptive systems, and unknown unknowns. Biggs et al. (2012, p. 434) define learning as “the process of modifying existing or acquiring new knowledge, behaviours, skills, values or preferences.” Learning can play a key role in changing worldviews and values. Consideration of the different levels of learning (i.e., single, double and triple loop learning) and change (i.e., first order change and second order change) highlight the importance of considering the “type” of learning that is necessary in repurposing universities towards sustainability and the depth and transformational extent of change (Sterling, 2001). Single loop learning, or first order change, asks us to question whether we are doing things right, leaving basic values unexamined. Double loop learning, or second order change, involves critically reflective learning (Sterling, 2001) and asks us to question if we are doing the right things, and questioning underlying assumptions. Triple loop learning, or third order change, asks us to question how we know what the right things are to do, questions our values and norms, and involves deep awareness of alternative worldviews and ways of doing things (Sterling, 2001). Hence double and triple loop learning is a requirement for the genuine repurposing of universities, yet most change for sustainability in higher education has been largely engaged with first order change (Albrecht et al., 2007; Sylvestre and Wright, 2016).

For change of a large organisation like a university, individual learning is helpful but not sufficient, hence transformation at universities calls for social learning (Sylvestre and Wright, 2016). Social learning is a process that “must (1) demonstrate that a change in understanding has taken place in the individuals involved; (2) demonstrate that this change goes beyond the individual and becomes situated within wider social units or communities of practice; and (3) occur through social interactions and processes between actors within a social network” (Reed et al., 2010). Hence social learning requires participation, which enables diverse perspectives (principle 1)

and builds trust and relationships that can contribute to collective action (Biggs et al., 2012).

Placing learning in the context of complex adaptive systems (CAS) also builds resilience (Biggs et al., 2012). A complex adaptive system worldview emphasizes uncertainty and the need to “continually learn and experiment and adaptively manage uncertainty, disturbance, and surprise, rather than attempt to eliminate it” (Biggs et al., 2012, p. 432). This sits in contrast to technical, reductionist, and one-size fits all approaches to learning and solution seeking. Mechanisms of learning within a CAS include formal monitoring mechanisms (feedbacks, principle 3) and experimentation, as sits at the heart of the ethos of using universities as living labs (Evans et al., 2015). Reflection on the efficacy of processes at all levels, as well as the learning process itself, is also required to ensure adaptation of approaches, and the development of a genuine learning organisation (Senge, 1997; Hodgkinson and Stewart, 1998).

Learning for Sustainability Education: Curriculum and Staff Development

In universities, learning is both a key domain of sustainability activity and a core university mission. Therefore, the curriculum, staff development, and structures that support and govern curriculum development need to be adapted for a university repurposed for sustainability. The role of education (or learning) in achieving a more sustainable future has been widely acknowledged, and widely reinforced by myriad international initiatives. Yet, David Orr's famous quote highlights how our prevailing educational programmes and approaches can further *unsustainability*:

“The truth is that without significant precautions, education can equip people merely to be more effective vandals of the earth” (Orr, 2004).

This highlights the need for the application of double and triple loop learning, requiring reflection upon the assumptions, norms, and values behind teaching activities and universities themselves, as well as the responsibilities of educators (and their students) to society (Robinson, 2019). How many educators truly question what learning is for?

Education for Sustainable Development (ESD) has been described in many ways, and grouped into different typologies (i.e., Scott and Gough, 2003; Sterling, 2003; Vare and Scott, 2007). Vare and Scott's simple bipartite division highlights the critical differences in thinking about ESD. Their “ESD1” relates to informing specific skills and behaviour to guide positive actions, referred to as the sort of environmental education advocated by policy makers, where there is a set of underlying values and behavioural outcomes; whereas ESD2 focuses on the development of the capacity to think critically, and the ability to analyse and question alternatives, and make sound choices in the face of complexity. Although Vare and Scott (2007) note that both types of ESD have a role, a repurposed curriculum for the “sustainable university” must ensure ESD2 is incorporated, not just ESD1, thus the curriculum itself must reflect the higher levels of organisational learning and change.

Reference to these different ESD typologies highlights that the “how” of learning is at least as important as the “what” of learning. Learning in groups, as well as different forms of experiential and active learning, are therefore essential to providing opportunities for learners to develop sustainability competencies. There is growing recognition of the importance of broader participation in the learning process by all parties involved, and a growing interest in “students as partners” in their own learning and learning design (Healey et al., 2014; Mercer-Mapstone et al., 2017). Furthermore, the role of the co-/informal curriculum in ESD is widely advocated because of the active and experiential learning opportunities that these spheres enable.

As we repurpose student learning to incorporate ESD we must also consider how educators, as key enablers, develop competence in ESD (Barth and Rieckmann, 2012). ESD-focused professional development structures have been shown to support individual staff learning and competence development as well as support organisational change towards sustainability, and hence form an essential component of sustainability governance (Barth and Rieckmann, 2012).

Learning by Doing—The University as a Living Lab

University campuses have been called “privileged space[s] of innovation” (Evans and Karvonen, 2014, p. 415) because they have potential to trial new technologies and approaches that would be difficult to undertake in other settings/by other actors. In this way they can be “living labs” for sustainability (Verhoef et al., 2020). The living lab concept, if done well can exemplify the transdisciplinary and collaborative enquiry necessary for transformation for sustainability at universities (Sylvestre and Wright, 2016), bringing together students, academic staff, campus staff, and external stakeholders to co-produce knowledge and solutions for sustainability challenges faced by the university or wider stakeholders (Evans et al., 2015; Waheed, 2017). A typical living lab approach will see researchers working with students to investigate new sustainable innovations relating to an area of the university’s campus or operations or a sustainability challenge posed by an external partner, hence addressing an element of the sustainability of the university campus operations, as well as contributing to research and education missions. The university-based “living lab” approach therefore is at its heart about learning and experimentation for sustainable solutions through using the campus (or wider community) itself, while also providing active learning opportunities for students and staff.

Although universities as living labs have been viewed as a panacea for repurposing universities towards sustainability by some (see Waheed, 2017), adopting some living lab concepts or labelling activity as a living lab does not necessarily lead to effective learning, nor to repurposing a university for sustainability. The lack of connectivity between estates and academic functions of a university (principle 2) can reduce the effectiveness of this approach. Experimentation involves active manipulation of a piece of the university’s processes and structures in order to observe and compare outcomes (Biggs et al., 2012). However, experimentation on inappropriate (i.e., short-term) timescales can actually lead to inappropriate conclusions and management decisions (Biggs et al., 2012).

Particularly within complex adaptive systems, time lags may exist between the interventions and their impact, and therefore short-term monitoring may lead to inappropriate conclusions about the impact of an intervention. Likewise, it is necessary to consider how an intervention fits within its wider system to include monitoring of a wider range of variables to avoid unseen impacts in another part of the system. This requires the inclusion of diverse stakeholders and perspectives (see principle 1) as well as willingness and structures to facilitate reflection and double and triple loop learning. For living labs to be effective as a method of learning, the learning from experimentation and monitoring and its link to management decisions needs to be explicitly built into the design of the living lab process. This should also include monitoring and evaluation of whether learning has taken place within the governance itself (Robinson et al., 2021).

Learning for Sustainability Governance: Universities as Participatory Learning Organisations

We do not have a blueprint for a “sustainable university” and therefore we need to learn how to “do” sustainability and to implement governance structures that enable reflexive learning and inclusion of multiple stakeholders and co-creation principles (McCrorry et al., 2020). Accepting universities as complex adaptive systems implies the need for a more integrated approach (principle 2, connectivity), that can be difficult to address across governance units that are usually separate (Biggs et al., 2012) and may exist in tension. Therefore, universities need to embrace the concepts of a “learning organization” with different project stakeholders working together to improve capacities and transform practice within the organisation (Senge, 1990) through continual reflexive practice embedded in the governance processes. This could be achieved by a specific regular agenda item on project learnings built into project meeting governance, and actions recorded and implemented focused on using these learnings to drive improvements within the organisation and its governance for sustainability.

The development of a community of practice for the repurposing of a university towards sustainability should not be exclusive to those involved in direct governance and decision making, but should include interaction between diverse stakeholders to develop more deliberative forms of engagement (Hammond, 2020) and integrate different perspectives. Yet power dynamics and organisational cultures can still limit the effectiveness of universities as learning organisations. For example, institutional governance systems rarely learn from academic expertise within their own organisation as university staff are typically not empowered to create knowledge on behalf of their institution (White and Weathersby, 2005).

A traditional view of governance and organisational decision making assumes a need to reduce uncertainty before taking action. This is problematic in the context of repurposing universities due to the complexity of the systems and the unknown pathways and processes required. Biggs et al. (2012, p. 433) state that “viewing complexity simply as the unknown tends to overwhelm managers and lead to gridlock and stagnation.” Such a view can lead to a heavy investment in monitoring and data collection of current systems, and significant time

and resources being used in monitoring the current situation before acting. This can be seen in the number of initiatives within universities to “map” sustainability activity. Such is the urgency of the sustainability issues that our society faces and our acknowledgement of the unsustainability of many of our systems, that we argue that resources should be prioritised towards action, with monitoring and learning focused on interventions and action rather than waiting until mapping of the current situation has been undertaken.

Action to repurpose a university towards sustainability requires management experiments that support learning (Biggs et al., 2012) and the willingness to experiment and learn from action and reflection, on both the success and failures that result. Yet higher levels in university structures may provide little opportunity for experimentation, meaning that experimentation takes place at smaller scales, within individual departments. Such smaller scale experimentation may be referred to as “pilots,” yet without connectivity to the wider university governance structures there may be limited opportunity for the wider organisation to learn from the success and failures of these experiments. This highlights both the important role of polycentricity in sustainability governance (principle 1) but also its connectivity (principle 2).

DISCUSSION AND RECOMMENDATIONS

How Resilience Principles Help us Understand the Governance of Sustainability in Universities

When exploring how to repurpose universities towards sustainability, much of the literature emphasises case studies of successful initiatives (Corcoran et al., 2004). This is underpinned by an assumption that replicating and learning from successful initiatives is how change is made within universities. However, these assumptions are generally left untested, and little consideration is given to understanding the processes through which institutions can (or cannot) be changed. However, in order for strategic and timely action to be taken, it is necessary to understand the pathways through which change happens. Addressing this gap, our article offers a non-normative framing of social-ecological resilience to understand how change processes happen in universities. The four resilience principles explored in this paper help us develop important insights with practical implications and a framework of questions for practitioners to ask themselves about university governance for sustainability. This section draws together some of these insights and the framework.

The Tension Between Efficiency and Resilience

In most Western countries, universities are underpinned by a paradigm of efficiency, stemming from the neoliberalisation of the university, and increasingly business-orientated models of governance (Bessant et al., 2015). Universities have been criticised for undermining their core values and the inevitable trade-offs as they embraced their position within a neoliberal ethos (Saravanamuthu and Tinker, 2002; Devaney and Weber,

2003), while others have demonstrated how neoliberal and new public management instruments can be used to help “steer” and “nudge” sustainability (Bessant et al., 2015).

This drive for efficiency has spillover effects into sustainability governance and the context in which sustainability repurposing must take place. A drive for efficiency reduces redundancy, reflected in sustainability leadership or “championing” often being restricted to one individual. Efficiency drives can also lead to overwork of these individuals, leading to simpler “doing-less bad” than more generative “doing more good” approaches, erosion of relationships (connectivity), and a lack of diversity in participation.

There is therefore an inherent tension between efficiency and resilience, a phenomenon which has been previously observed by resilience scholars (e.g., Holling and Gunderson, 2002; Golgeci et al., 2020). Efficient systems can be more vulnerable to shocks and pressures. This means that highly efficient but unsustainable systems within universities may be ones that can be most readily shifted. For example, where decisions are very “top down” and limited to a very limited number of people, recruitment of a new leader specifically with a sustainability leaning can support a more rapid shift towards sustainability. However, where there is positive sustainability action, it also means that there needs to be redundancies built into sustainability work, for example a number of individuals involved in sustainability initiatives, that although seeming inefficient at times, can ensure that the entire sustainability agenda will be less likely to be derailed in the event of a failure or collapse of one initiative. This can be achieved also through having multiple overlapping initiatives with different loci of control.

From our analysis, it can also be seen how important it is, from a resilience perspective, that sustainability work happens in many places in the system. Therefore, it is imperative that sustainability work is driven by a team. Given the lack of connectivity between university domains, having sustainability champions who work with and tend to different matters can help to ensure work is taking place in each of these different domains, and also coordinate work between domains.

The Importance of People and the Relationships Between Them

In our analysis of connectivity, we saw that sustainability work is heavily dependent on certain individuals (as or within nodes) and their relationships, both within and outside of the university. Hence even where formal structures may promote connectivity, the *quality* of connectivity is still dependent on individuals and their relationships. This focus on the quality of relationships between individuals makes the sustainability agenda vulnerable to staff leaving, making the connectivity “brittle.” However, connectivity is always in flux, with strength and structure varying over time through planned changes in formal governance structures, or staff turnover. A key question is then how do we try to ensure “quality” connections, or rather, the fostering of good relationships? The answer must surely lie in valuing and developing the “soft” relationship skills of not just key sustainability actors, but all within the university system.

Connectivity is a subjective feature. Universities may be resilient to change due to limited connectivity meaning that disturbances towards sustainability do not transfer through the system, or highly connected systems may be resilient to disturbance towards sustainability, due to a strong, resistant organisational culture. However, some of the negative elements of either too much or too little connectivity, can be offset by increased diversity (principle 1) ensuring different voices are heard and that there is diversity in leadership. Within the context of ecosystem services, Biggs et al. (2012) argue that if those who use certain ecosystem services are not engaged in their management, then critical knowledge of the system's function and monitoring can be missed. The same can be said within the context of university sustainability governance, highlighting the need for connectivity to hear voices from different parts of the system.

Controversially, we question the imperative for highly connected sustainability activity. Those seeking to repurpose universities for sustainability can often be heard lamenting that pockets of good practice are isolated. Too much focus on increasing connectivity and understanding everything happening within the university can waste limited resources and also lead to “ownership” of sustainability by a small group of actors, making it vulnerable to changes in governance structure. In contrast, greater modularity in where “repurposing” activities are driven from can lead to enhanced resilience through ensuring multiple centres from where sustainability transformation can ripple.

Patently Paying Attention to the Undercurrents

Time and temporality in higher education has come into focus in recent years through, for example, the theorisation of slow scholarship (Mountz et al., 2015) and how different members of the university experience time (Laycock Pedersen et al., 2019). The third resilience principle, monitoring slow variables and feedbacks, adds a new dimension to this discussion. While applying a complex adaptive systems lens to an organisation or even a university is not new, the third resilience principle highlights how long-term monitoring can help us identify whether we could be close to crossing a tipping point.

Paying attention to slow variables and feedbacks reminds us of the need to be patient, and not to expect our actions to have direct and immediate consequences, and the need to monitor change and variables over longer timescales. In complex adaptive systems, actions can have indirect or delayed consequences.

Bringing attention to pro-sustainability changes in slow variables can be used to drive change at an institutional level, while less favourable changes in these slow variables can alert institutions and sustainability champions to forthcoming pressure or possible shocks to the higher education landscape, giving time to prepare and plan for such situations.

Learning About Learning

Learning and experimentation are critical to repurposing the university towards sustainability, because we need to find ways to do things differently, including changing our

worldviews and paradigms. Working towards sustainability is inherently uncertain and situated within complex adaptive systems, requiring reflexive approaches to governance to be able to respond quickly to threats as well as to be “creatively opportunistic” (Lichtenstein, 2000).

Learning does not only happen through success, but through failure. However, failure is rarely discussed (Harrowell et al., 2018; Holdsworth, 2020) limiting our opportunities to learn from failure. For us to unlock the value of failure, we must destigmatise it. This can be done through sharing the experience and the responsibility, as well as talking more openly about our failures (Whittle et al., 2020).

How This Paper Advances Scholarship About Resilience

A Non-normative Orientation of Resilience

This paper offers a novel contribution to organisational resilience research, as most resilience scholarship in the study of organisations or groups of people uses a normative approach where resilience is understood to be a fundamentally good thing (e.g., Evans et al., 2021). In addition to allowing us to identify ways to improve the resilience of already existing sustainability initiatives, we have shown that using resilience in a non-normative way is possible, and that applying a non-normative resilience lens to sustainability governance can help identify how to destabilise unsustainable elements of a system.

For example, we have described how a non-normative understanding of resilience can help us understand how unsustainable cultures within the highly-connected higher education sector or in a university can be disrupted. Since high connectivity can lead to synchronised behaviour, disrupting these connections, through weakening them, developing alternative networks, or reconfiguring the network's constellation, can create opportunities for experimenting and creating new, more sustainable norms.

Furthermore, Biggs et al.'s (2012, 2015) principles urge monitoring of slow variables. Keeping a close eye to cracks and fissures that may be emerging within a university's organisational culture, or those appearing in the higher education sector at large, can help sustainability change-makers know where and how to apply pressure to accelerate sustainability transformation. For example, re-orienting research language around impact to mirror the emerging impact and knowledge exchange agendas can help leverage change towards sustainability in an organisation, using external shifting paradigms.

The resilience principles themselves are value-neutral descriptors. This helps us understand how the properties of a university that has a deeply entrenched unsustainable purpose can be the same properties that a repurposed, more sustainable university will need to be resilient to the tides of change in the university sector.

Operationalising Resilience Principles in the “Middle Ground” and in Different Contexts

The literature on resilience has been critiqued for a lack of operationalisation of the concept (Biggs et al., 2012; Laycock

TABLE 2 | Questions for reflection on sustainability governance based on the four resilience principles.

Resilience principle	Questions for reflection on sustainability governance
Manage diversity and redundancy	<ul style="list-style-type: none"> How diverse is participation in sustainability activity and governance? How diverse is leadership for sustainability? How diverse are the areas where sustainability is considered? How are different voices within the system heard? Are different voices heard in a way that minimises tokenism and power dynamics? How are diverse views and approaches handled so as to maintain effective working relationships and decision making? Is sustainability activity driven from multiple different university domains? Is sustainability tackled from a diversity of angles covering both environmental and social sustainability? Is there redundancy in the system? Are there multiple 'sustainability champions'? Are there multiple people involved in sustainability projects, able to pick up on responsibilities if one person leaves? Is sustainability driven at different levels within the university?
Manage connectivity	<ul style="list-style-type: none"> What is connectivity like across different levels of the university? What is connectivity like across different university domains? What is connectivity like across different disciplines? What is connectivity like across students and staff? What is the quality of relationships between key nodes? Do multiple people have these relationships? How are relationship skills developed and valued? What connectivity with external partners does the university have? Does the university bring other actors together to support sustainability initiatives within and outside of the university? What networks and alliances with other universities can be utilised to drive sustainability?
Manage slow variables and feedback	<ul style="list-style-type: none"> What are the internal and external slow variables at play that affect sustainability in universities both negatively and positively? How close to a tipping point are slow variables? How can these internal or external slow variables be used to leverage transformation for sustainability? What is the organisational culture? How does this support or challenge sustainability transformation? How is impact of sustainability interventions monitored? Is impact monitored over long timescales? Are indirect consequences considered? What is the slow direction of travel internally and externally? How does organisational communication and language impact organisational culture? How is organisational culture affected by reward and recognition such a promotion, awards or funding? What are the reinforcing feedbacks that impede sustainability transformation? What long-term monitoring feedbacks could be put in place?
Encourage learning and experimentation	<ul style="list-style-type: none"> Is learning from projects formally reflected on and recorded? Is learning implemented and recorded? Is there academic expertise in the institution that can be bought to bear on sustainability transformation? What is the balance of resources put to understanding existing activity vs. driving action? Is experimentation encouraged? How are small scale pilots scaled up? What processes are there to support this? How is learning embedded in governance? How is failure handled? Is failure discussed openly and used for learning? How is double and triple loop learning built into governance processes?

Pedersen, 2019). There are also critiques about a lack of studies in the “middle ground” between very general and very specific case studies. This article outlines how these principles can be applied in this “missing middle ground” and within the context of higher education institutions.

Through this paper, we have identified key variables within a higher education governance context that can be used to flesh out existing generic principles for building resilience. This is important because, although these principles themselves are valuable for operationalising the concept of resilience, their application within different contexts will likely differ drastically. As such, this research contributes to a body of scholarship applying these principles in different contexts, and furthers learning about how such principles can be used in enabling improved governance for sustainability across different contexts.

Recommendations for Practitioners

Drawing on the analyses within this paper, a series of recommendations relating to each principle can be made, to enable practitioners to further leverage universities towards sustainability, and increase the resilience of positive sustainability developments.

- Diversity should be sought in participation in sustainability, domains in which sustainability is tackled, and levels of governance where sustainability is embedded. Some elements of redundancy should be built in to ensure that the loss of individual sustainability actors does not destabilise positive sustainability improvements that have been made.
- Assessing and enhancing connectivity of sustainability actors across different system domains and levels can ensure the integration of sustainability activity into diverse parts of the

system. Key sustainability actors can act as essential nodes to connect activity. The skill sets of relationship building across diverse actors should be acknowledged and actively sought for these roles. Sustainability co-ordinating roles should not be undertaken by a single individual, which leads to system brittleness, and should be sought at different levels within the system hierarchy.

- Attention should be paid to slow variables and feedbacks. Some slow variables may be outside of an organisation's control, yet some changes in slow variables (e.g., increasing emphasis on research impact and knowledge exchange) can be co-opted for sustainability re-purposing. Organisational culture is a key slow variable, and can be influenced through feedbacks including internal communication and resource allocation, and language in line with sustainability repurposing.
- Ensuring explicit and embedded structures to support organisational learning and reflection that incorporate double and triple loop learning is essential to repurposing the university towards sustainability. This may involve critically questioning what is being measured and monitored, how such data is used in learning, as well as the willingness to experiment and to fail and to share and learn from failures.

Table 2 outlines a framework of questions structured around the four resilience principles, to enable sustainability practitioners in universities to reflect upon their governance for sustainability, and identify areas to leverage change through either enhancing the resilience of sustainability elements or eroding the resilience of unsustainable elements. Ultimately, this paper appeals to the practitioner to use these resilience principles not just to improve the resilience of current aspects of sustainability, but to question how the current system can be destabilised to create space for sustainability.

CONCLUSION

Universities have been conceptualised in this paper as complex adaptive and socio-ecological systems that require repurposing

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towards sustainability. We have used (Laycock Pedersen et al., 2019) adaptation of Biggs et al.'s (2012, 2015) resilience principles in a novel non-normative manner, to address how to *decrease* resilience to destabilize our prevailing unsustainable university systems, as well as seeing how these principles can help us adapt university governance for sustainability.

We have highlighted the importance of diversity in participants and spheres of sustainability activity as well as the importance of embedding some redundancy within sustainability governance structures, and the danger of a focus on maximising efficiency. We highlight the importance of connectivity between different actors within the system, mediated strongly by the quality of these connections and the strength of relationships between nodes. Slow variables such as academic traditions and organisational culture as well as national policy and regulation trends provide an important and shifting backdrop that influence universities' engagement with repurposing towards sustainability. Monitoring of these slow variables and reflecting on their influence can be important to flexible and adaptive management within sustainability governance. Feedbacks within these systems present potential leverage points to destabilize currently unsustainable university systems. Finally, we highlight how developing explicit structures and culture to facilitate learning, that critically reflect through double and triple loop learning and engage with failure, are at the core of a university genuinely working towards repurposing towards sustainability.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

All authors equally contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Renewing Universities in Our Climate Emergency: Stewarding System Change and Transformation

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OPEN ACCESS

Edited by:

Iain Stewart,
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Reviewed by:

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University of Naples Federico II, Italy
Sarah Ivory,
University of Edinburgh,
United Kingdom

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 08 March 2021

Accepted: 16 June 2021

Published: 01 September 2021

Citation:

Fazey I, Hughes C, Schöpke NA, Leicester G, Eyre L, Goldstein BE, Hodgson A, Mason-Jones AJ, Moser SC, Sharpe B and Reed MS (2021) Renewing Universities in Our Climate Emergency: Stewarding System Change and Transformation. *Front. Sustain.* 2:677904. doi: 10.3389/frsus.2021.677904

This paper outlines climate emergencies facing universities and, by drawing on research on system transition, provides insights about how change to overcome the challenges might be stewarded. Climate change brings three interconnected and urgent emergencies for universities: (1) Manifest emergencies such as risks to operations and business models; (2) Conceptual emergencies that arise because assumptions, ideologies, systems, and structures cannot match the scale of the manifest challenges; and (3) Existential emergencies where current identities and sense of purpose are incapable of supporting the changes needed to overcome the conceptual challenges. To be viable leaders in the world, universities will need to renew their commitments to serving the public good, be dedicated to an unwavering challenge-orientation, create post-disciplinary structures, and be the change one seeks to see in the world. Importantly, universities will need to overcome the emergencies on the inside if they are to help society address the scale of the challenges on the outside, to which both universities and human capacity are seriously cognitively and emotionally ill-prepared. Fortunately, new insights from research on system transition provide helpful advice on how to steward transformational change. This work highlights that successful transformation requires strong adherence to transformational intent and, in the case of universities, working with all three emergencies simultaneously. Successful transformation will also require harnessing opportunities to disrupt the status quo; supporting an interplay of different forms of management and orientations to the future; developing appropriate infrastructure to support transformation; and rapidly accelerating the development of capacities for transformational change. By actively developing capacities for transformation on the inside universities will then be in a much better position to help and lead others beyond the halls of the academy.

Keywords: transformation, system transition, emergencies, university, climate change

INTRODUCTION

Societal transformations are inevitable as change accelerates globally. Such transformations will emerge through growing impacts of twenty-first century challenges such as climate change, artificial intelligence, obesity, pandemics, misinformation, other environmental changes, and their intersection (IPBES, 2018; IPCC, 2018; Mendenhall and Singer, 2019; Bonini, 2020; Dhimal et al., 2020; Logan et al., 2021; Tan et al., 2021) and how societies choose to respond (O'Brien, 2011). Effective responses to climate change—the primary focus of this paper—will require systemic change in and across diverse sectors, such as food, transport, and finance (Creutzig et al., 2015; Clark et al., 2020). Effective response will also require fundamental changes in structures, mindsets, and beliefs (O'Brien, 2012; O'Brien and Sygna, 2013) and a psycho-cultural shift away from dominant social paradigms that underpin unsustainable societal patterns (Berzonsky and Moser, 2017). No sector, from transport, finance, or education, will be untouched as economies shift and societal demands increase for low carbon ways of living and as the impacts of climate change accrue (Klein, 2014; IPCC, 2018). This includes institutions like universities as they themselves decarbonize and respond to changing demands for new kinds of knowledge and education (Fazey et al., 2020; Yañez et al., 2020).

Over centuries, universities have provided many benefits through their contributions to education, knowledge creation, and to major global movements and socio-political change around diverse issues such as human rights and environmental protection (Schofer et al., 2021). This has also led to the emergence of whole suite of new insights about strategies and actions for sustainability, including pathways for societies future economic development (Caputo et al., 2018a,b; Schofer et al., 2021). Universities bring major capabilities, frameworks, structures, and intellectual capital (Cash et al., 2003) and are supported by, and highly integrated within, educational and economic agendas (Frank and Meyer, 2007). They have demonstrated remarkable adaptability throughout history with rapid and continued expansion post-WWII (Frank and Meyer, 2007). This has been enabled by the way universities have shaped national and global societies, expanded professions, and established common frames (Schofer et al., 2021). While critics of the way universities have developed may argue that they have contributed to an erosion of academic “rigor” or other values (e.g., through knowledge creation being focused on more utilitarian goals), this view grossly understates the extent to which academic thought has gained prominence and affected and dominated contemporary societies (Frank and Meyer, 2007). The result has been a remarkable globalized notion of what constitutes a University as well as what counts as knowledge and ways of knowing (Frank and Meyer, 2007; Schofer et al., 2021).

Despite these benefits, capacities, and influences, there are many and growing criticisms about the limits of universities in relation to the often-underestimated threats facing humanity from environmental crises (Bradshaw et al., 2021). Universities have been criticized for their slow response (Yañez et al., 2020); for being complicit in reproducing high carbon and consumptive economies (Kläy et al., 2015); and for continuing to rely on

dominant knowledge creation approaches and pedagogies that are incapable of transcending the thinking and approaches that have led to the challenges in the first place (Sterling, 2010; Hanlon et al., 2012; O'Brien et al., 2013; Aufenvenne et al., 2014; Müller and Riegler, 2014; Lotz-Sisitka et al., 2015; Umpleby, 2016; Fazey et al., 2018, 2020; Bina and Pereira, 2020; O'Riordan et al., 2020).

Calls for new kinds of thinking and learning range from suggestions of the need for universities to focus on new competencies (O'Riordan et al., 2020; Brundiers et al., 2021) and much more fundamental shifts, such as toward forms of subversive learning (Selby and Kagawa, 2018), production of wisdom about how to act within the world (Maxwell, 2007), and developing consciousness (Woiwode, 2020). These deeper critiques highlight a wider need for a new enlightenment and “grammar of responsibility,” underpinned by a new praxis, ethic, and whole scale philosophical shift (Maxwell, 2007, 2021; Vogt and Weber, 2020). Universities, it has then been argued, need to move from being institutions of human education to becoming institutions of human development (Berzonsky and Moser, 2017; Moser and Fazey, 2021). Given the scale and seriousness of environmental challenges, if universities themselves are to survive and be a genuinely creative force in ensuring longevity of human life on this planet, they will need to undergo rapid and significant change and renewal (Maxwell, 2007; Sterling, 2009; Beynaghi et al., 2016; Fazey et al., 2020; Vogt and Weber, 2020). Thus, while universities clearly bring many benefits (Trencher et al., 2014; Fazey et al., 2020; Schofer et al., 2021), the question is no longer about *whether* universities should change but rather *to what* and *how* this change might be achieved.

This perspective paper aims to explore how change might be approached so universities can become more viable and active players within a rapidly warming world. To do this, we first explain our approach and underlying assumptions, then outline some of the changes needed in universities if they are to respond effectively to the climate challenge. This includes using a tripartite lens of three climate emergencies to draw out the kinds of changes needed. This lens, which has not yet been applied to universities, is important for drawing out the deeper issues which, if left unaddressed, threaten the perceived relevance, and very existence of our universities. After raising some of the different interconnected issues, we then draw on another set of insights from the field of system transition and transformation to explore how change might be stewarded. Overall, the paper is novel in the way it allows for more immediate and deeper issues to be understood in relationship to each other and in applying a system transitions perspective to exploring institutional change.

APPROACH

This perspective has been developed through a combination of conceptual reasoning, integration of different studies, and philosophical literature, a self-reflexive account of some of our own experiences in attempts at working within our respective organizations and in supporting re-purposing of universities. Our ideas come from authors that include researchers and teachers in senior and more junior university positions from

environmental and health fields with expertise in pedagogic multi and individual programme development for systems thinking and change making. It also includes a range of education and change-making practitioners and educators that have established alternative organizations that take a more radical approach to how they support capacity development for the complex world in which we now find ourselves, including Directors and co-founders of the International Futures Forum (IFF) and H3Uni. Much of the insights and practical know-how for working with systemic change outlined in this paper have come from these organizations rather than academia, and are now being applied by those of us working within universities. Through our various efforts, some of us have had to question our own assumptions and what makes our work meaningful within our own institutions and how this then shapes our approaches to change. Thus, while we do not claim our insights are based on empirical data, they do come from deep reflections and extensive and diverse experiences within and beyond academic circles, including about how to facilitate change.

In formulating this work, and to move more quickly to questions about how change can be achieved, our paper starts from (and doesn't try to fully revisit), four important assumptions. First, we accept the broad thesis already articulated by many that universities are currently incapable of addressing the scale and urgency of challenges like climate change (Maxwell, 2007; Vogt and Weber, 2020; Moser and Fazey, 2021). Second, given the scale of challenges (Bradshaw et al., 2021), we assume renewal will require transformational changes that go beyond improving what we already have (Sterling, 2009; Müller and Riegler, 2014; Bina and Pereira, 2020). Third, while it may be possible to resist in the short term, the forces of change globally around issues like digitalization and climate change will simply be too great for universities to avoid (Bonini, 2020; Fazey et al., 2020). We therefore assume change is inevitable at some point in time as societal change more generally accelerates (Umpleby, 2016). It is then largely a choice for institutions like universities about when and how to act, not whether they need to do so. Finally, while universities face many challenges, we recognize they also have phenomenal and enormous potential (Bina and Pereira, 2020). This is partly because of the way they are already influential in global societies and the professions (Frank and Meyer, 2007; Schofer et al., 2021). If fully unleashed, this potential could help societies rapidly accelerate and advance learning and knowledge creation to support societal sustainability transitions (e.g., from research), capacity development for societal change (e.g., through teaching), and provide exemplary and moral leadership by showing how rapid but difficult decarbonization within institutions can be brought about (e.g., by focusing on change within their own institutions).

In addition to these assumptions our paper is bounded in its focus on *universities* and *climate change*. This helps us constrain some of the complexity, but then brings with it two potential limitations. First, while universities have enormous potential from the way they support globalized professional knowledge and rapid world integration, such globalization can also reinforce certain ideas about what constitutes, and the norms associated with, knowledge, knowing, and action (Schofer et al., 2021).

This can then play into neoliberal and high carbon economies, shaping notions as to what kinds of knowledge are accepted or considered useful (Lave et al., 2010; Kläy et al., 2015; Olssen, 2016). Such dynamics can then reproduce societal elites that have already benefitted most from globally common notions of professionalism and expertise (Schofer et al., 2021). For our paper, there is thus a danger that by focusing on "*Universities*" we may not be sufficiently accounting for wider sociological, ideological, and philosophical challenges regarding the nature of science and a global academy nor its potential limitations in overcoming existential threats like climate change and how it reinforces global inequalities (Carr-Chellman, 2005; Maxwell, 2007, 2021; Healy, 2011; Aufenvenne et al., 2014; Kläy et al., 2015; Fazey et al., 2020; Vogt and Weber, 2020). To get a sense of what future universities need to look like and how to get there, more of these wider issues may then need to be taken into account. We have, however, addressed some of the issues by examining deeper conceptual and existential aspects that underpin universities that partly reflect the kinds of wider societal assumptions and cultural patterns that need to change in response to a warming world.

The second limitation is our focus on *climate change*, which is integrated with many other drivers of change affecting universities, including rapid technological change (Bonini, 2020), growing debates about decolonization (Lotz-Sisitka et al., 2015), and commercialization of knowledge as part of neoliberal ideologies and economies (Lave et al., 2010; Olssen, 2016). The reality is that these synergistic forces together shape the conditions to which universities need to respond, all of which are different and highly interconnected symptoms of the current way in which societies have developed and operate. If universities want to provide exemplary leadership, for example, then they will also need to consider growing global and local inequalities, injustice and how they are part of and shape the influence of a global elite. Focusing on climate change alone, despite already being highly complex, may thus be problematic. Despite this, we have attempted to hold some of these more diverse considerations in the background as we have formulated our ideas, such as viewing the challenges facing universities as systemic. The result has been an attempt to open our thinking broadly while also providing sufficient bounds to provide a meaningful account of what needs to change and how it might be achieved. The outcome is a set of insights more directly oriented toward climate change but which also has wider generic applicability to other forms of global change.

THREE EMERGENCIES OF CLIMATE CHANGE

Universities are facing increasing challenges associated with climate change. Many universities have already taken a significant step in declaring a climate emergency (Dillon, 2019). This helps elevate its urgency and importance, but it is unclear and difficult to act on such a declaration (Dillon, 2019). A helpful lens for unpacking some of the confusion and for drawing out some of the kinds of changes needed is to view climate change as three important and interrelated emergencies: the manifest,

conceptual, and existential (Fazey et al., 2021). The *manifest* emergencies relate to more tangible impacts from climate change. These are, however, starting to become so pervasive that they require the *conceptual* foundations of universities to be questioned. The conceptual emergencies, in turn, cannot be addressed without considering the *existential*, such as changing purpose and identity. In the sections below, we explain each of these emergencies which together highlight the diversity of issues, the imperative for system change, and kinds of changes that will be needed.

Manifest Emergencies

The first of the three emergencies are the manifest, which demand a different operational and strategic orientation as the impacts of climate change accrue (**Table 1**). Manifest emergencies include direct, transitional, and reputational impacts. Direct impacts include extreme weather, such as bushfires and hailstorms which, together with the impacts of COVID-19, cost the Australian National University AUS\$75 million in 2019–2020 (News, 2020).

The transitional impacts (**Table 1**) relate to changes around decarbonization of universities themselves and to wider societal changes in economies and markets. Transitioning to decarbonization within a university can generate costs, such as when divesting from fossil fuel-based endowments, renewing the building stock, changing teaching practices, or changing faculty behavior (e.g., less conference travel) and having low carbon student bodies (e.g., finding ways to mitigate high carbon costs of face to face teaching of international students). Such issues are complex and intertwined. They often raise dilemmas, such as maintaining potential influence and reach of working with an international student body while also finding ways to mitigate carbon impacts. Working with such dilemmas will require creative solutions, new business models, and patterns of working.

Transitional risks also emerge as shifts in markets and demands in society occur more widely leading to stranded assets in terms of infrastructure, facilities, skills, expertise, and capacities (Bank of England, 2017). For universities, an example are the growing risks from changes in societal demands for different kinds of knowledge creation, training, and learning. Many of the big challenges the world now faces—climate, inequalities, health, and so on—demand less focus on understanding the problems and more on how change can be effectively stewarded. This includes a rapidly growing need for new approaches capable of working with highly interconnected, contested, and ethical issues (**Table 2**), as well as new modes of knowledge creation—methodologically, conceptually, empirically, and pedagogically—to support learning about how effective stewardship might be developed. New training and learning that enhance “know how” capacities are also then needed, including helping students develop practical and experiential knowledge about working with change (**Box 1**) (Caniglia et al., 2016, 2020; Fazey et al., 2018). Such capacity development will gain increasing and rapidly growing demand from what are now a climate change aware and solution hungry student demographic. Demand will also increase as the levels to which humanity is severely cognitively impaired

when it comes to facing the scale of the climate challenge become apparent.

While wider societal transitions and shifts in markets relating to such training and learning may feel like a long way off, recent experience of the pandemic has taught us just how quickly change can occur. The pandemic has led to stranded assets such as empty student halls, conference venues, and services as students stayed away from campuses (Bolton and Hubble, 2021). Here, it is important to recognize that transitional risks emerge because of changes of perceptions of actors operating within markets, not necessarily because something is “real” or “important.” From a carbon reduction perspective, the inevitable economic transition to low carbon is thus likely to happen in unpredictable ways, and possibly suddenly or very rapidly as investors jump on bandwagons or become afraid of being left behind. Thus, given the timeframes of turnover of staff, expertise, estates, and infrastructure in universities relative to emerging critical tipping points around climate action, the transitional risks to universities, and their business models are real and urgent.

These risks then extend to the reputational, such as when universities are perceived to be failing to reduce carbon emissions or contribute to the kinds of social dialogues needed to build a broader public mandate for change (EAUC HEBCON, 2019) (**Table 1**). These reputations are core to maintaining trust and support from governments, recruit students and quality staff, and for attracting partners such as businesses or government departments. Here, reputation is closely related to both how well a university “walks the talk” and shows relevance to the climate challenge. Many civic authorities, NGOs and public bodies, for example, still have the perception that the knowledge created and the learning within universities is a long way off from being relevant to the big and practical challenges they face. Universities will thus need to be much more proactive in civic engagement and demonstrate that meaningful change is possible if they want to be viable in a rapidly changing world and be legitimate stewards and leaders.

Manifest emergencies—as increasingly lived realities—can help push universities toward taking climate change seriously (Adey and Anderson, 2012). They help focus attention, enable quicker decision-making, and garner wider social and political support for action. Yet despite being urgent relative to the time needed to shift investments and expertise, climate change is still often not viewed as high-priority. Such inaction and avoidance partly comes from a sense of uncertainty and other psychological barriers (Gifford, 2011; Slawinski et al., 2017). Yet, if universities are to survive the societal upheaval that climate change brings, then they will need to find ways to make responses much more immediate. This may include embedding climate change, and elevating the manifest impacts into risk registers, business models, operational processes, and decision-making. Importantly, however, as the direct, transitional, and reputational impacts of climate change grow, it will become increasingly difficult to overcome them by simply adapting or improving what exists now. At some point, more fundamental kinds of change will be required.

TABLE 1 | The three emergencies of climate change facing universities.

Emergency		Explanation	Domain of change	Domain of learning
Manifest	Direct	Impacts facing universities worldwide from changing weather, such as floods, storms, water shortages, or financial crises or commodity price collapses affecting investments (e.g., pensions) that result in emergencies. Slowly changing stressors may culminate toward critical thresholds (e.g., unaffordable or undesirable university fees for some students).	Actions, behaviors, technologies, decisions, investments, policies, and programmes.	Single-loop learning that asks: “Are we doing things right? (e.g., learning to improve methods of knowledge creation, teaching, developing new technologies).
	Transitional	Emergencies associated with shifts in society toward low carbon, such as in rising costs (e.g., old high carbon energy) or market shifts leading to stranded assets (e.g., empty student halls if low carbon online teaching prevails). Demands for staff with new expertise and skills (e.g., for bringing about societal change).		
	Reputational	Emergencies facing universities if they fail to act or are seen to be greenwashing, or through failure to adapt to changing notions of value in society by not playing a key role in developing a wider mandate for change.		
Conceptual	Conceptual foundations	Emergencies where new concepts, approaches, tools and capacities are needed for working with complex, highly interconnected issues, across social scales, values, and goals, and with anticipatory forms of knowledge and transcend the problems created by past approaches and thinking. Critical pedagogical shifts will be needed to develop capacities for working with complex integrated challenges. New concepts will be needed to support Universities’ own transitions.	Systems, structures, formal and informal rules, norms, strategies, approaches, modes of governance, assumptions, mindsets.	Double-loop learning with change in strategies and approaches. It involves asking “What are the right things to be doing?” (e.g., re-structuring departments to be networked rather than siloed, or developing new kinds of rules and governance).
	Systems and structures	Emergencies relating to the way current systems and structures are unable to support uptake of new behaviors, technologies, concepts, and approaches (e.g., silo based disciplines can make integrated working difficult). Structural issues need to change to enable alternative research and teaching, to emerge.		
	Rules, norms, and models of governance	Emergencies arising from limited capacity of existing informal and formal rules, norms, and modes of governance to support change and new practices. Current business and planning models, for example, support old patterns, limiting possibilities for novel configurations or ways of working.		
	Mindsets, worldview, assumptions	Emergencies arising from mindsets and assumptions that limit new patterns and concepts. Examples include assumptions of what constitutes learning, teaching, education, knowledge, knowledge creation, progress, or development. Many models of research and teaching, for example, are underpinned by assumptions that effective knowledge creation comes from distant observers standing on the outside looking in, which limits possibilities for including other kinds of knowledge, ways of knowing, or learning.		
Existential	Values and ethics	Emergencies arising from past values and ethics no longer congruent with a rapidly changing world. For example, universities have developed over the last three centuries alongside high carbon and fossil fuel-based economies, notions of colonial power, or knowledge and expertise. Societal shifts, e.g., in millennials, about what is considered “right” and “whose voice matters” mean that implicit values and ethics are increasingly under question.	Values, ethics purpose, cultures, identity.	Triple-loop learning with changes in higher order processes. It involves askings: “What is right?” (e.g., ethical issues associated with purpose of a university, and how these change as societal needs change)
	Cultures, identity, and purpose	Emergencies arising from a threat to the maintenance of a way of life, a culture, in a particular place that challenge a sense of “who we are” or “role and purpose.” For universities, relevance in a world of climate change is increasingly being challenged, and there is a risk of being perceived as outmoded or anachronistic. To be viable, universities will need to re-purpose toward being institutions more focused on the public good.		
	Psychological well-being	Emergencies striking at an ability to make sense of and work effectively in the world. A core requirement for health is a sense of coherence, yet people are becoming overwhelmed by rapid change and complexity and struggling to fathom their place within it. Universities need to consider to what extent they themselves are an extractive-industry. Can an academic system that burns out staff and students survive in the mid to longer term? A regenerative approach to education will need to cultivate well-being not just as a “nice to have” but as a critical enabler of quality and performance.		

TABLE 2 | Examples of some of the core competencies needed for societies if they are to successfully navigate twenty-first century challenges (based on Wiek et al., 2011; Hodgson, 2013; Leicester et al., 2013; Beynaghi et al., 2016; Fazey et al., 2018; Bina and Pereira, 2020; O’Riordan et al., 2020; Brundiers et al., 2021).

Core competency	Explanation
Creative development of solutions and new approaches	Strengths in universities tend toward critical analysis of problems and less on creative development of solutions or enacting them. This applies to both research and teaching. Universities will need to foreground learning (teaching and research) that leads to design or creation of new ideas or solutions, such as new policies, ways of working or approaches, and how to bring about change through collaborative action. Stewarding change cannot be learned just from books or lectures and requires learning by experience. Creating new ideas or solutions also often comes from trial and error, and is thus often not separate from implementation. Shifts toward more engaged action-oriented research and teaching is needed to help develop such capacity.
Working with uncertain and desired futures	Rapid development of futures consciousness is needed to work with twenty-first century challenges. Most universities focus on knowledge creation methods that rely on an evidence base from the past or present. This is important, but can be akin to driving forwards while looking through the rearview mirror. Relying on evidence alone limits understanding of, or actions for, bringing about change and how the complexity, rapidity, extent, and uncertainty associated with the environmental changes hurtling toward us is navigated. Research and teaching needs to rapidly enhance development of competencies for working with the future in co-creative ways. This can include futures tools (e.g., scenario planning, visioning, stretch goals), creative and active learning processes, and working with deeply held assumptions about how change occurs.
Working with complex, interrelated challenges	Urgent development of new approaches is needed to work with ill-defined problems, complexity, and inter-related issues. Very few environmental challenges are easily defined, and most are complex, dynamic, and cross many disciplinary fields. Developing ability to understand, surface, and make sense of complexity and inter-relations is important, as are understanding underlying dynamics and how subjective experience of those dynamics shape the way people respond. “Interdisciplinary” approaches, problem-based learning or systems thinking are often suggested as a solution. But these approaches are rarely given serious attention. New integrative approaches are also needed to transcend the kinds of thinking that have led to twenty-first century challenges like climate change, including through new fundamental research to develop the kinds of knowledge creation and teaching that can help societies work across interconnected challenges.
Navigating highly contested issues	New competencies are needed to work with diverse subjective, normative, contested, and ethical or moral aspects of change. Most change is contested, but there is still insufficient emphasis on how to work with, for example, conflict, negotiation, mediation, or dilemma resolution or how to surface and work with different values. Most students who leave university face such issues, especially when engaged in environmental sustainability related work but usually have not received any training in these areas. Developing such competencies takes time and requires personal work on “the inside” to enable more effective working with “the outside.” Culture shifts and new competencies in staff will be needed to support the development of more nuanced change or solution-oriented research and teaching that are underpinned by greater attention to the personal transformations that are needed to enhance one’s effectiveness in working with change.
Stewarding transformational change	Effective societal change in relation to issues like climate change cannot be achieved without addressing systems and structures, cultures, values, and mindsets that underpin them. Realizing the Sustainable Development Goals, for example, needs systemic change. New research and training to develop competencies for bringing about transformational change as a distinct form of change is essential.

Conceptual Emergencies

The second kind of climate emergencies are conceptual. These arise when merely improving existing ways of working is insufficient to deal effectively with the scale or speed of the manifest emergencies and when new approaches or ways of thinking about problems and solutions are required. Working with the manifest requires re-evaluating “*what are the right ways of doing things*” while the conceptual requires re-evaluating “*what are the right things to be doing*” (Table 1). At some point the extent or scale of manifest emergencies will mean that they cannot be addressed without deeper or more fundamental changes, and the urgency and importance of the conceptual emergencies come to the fore.

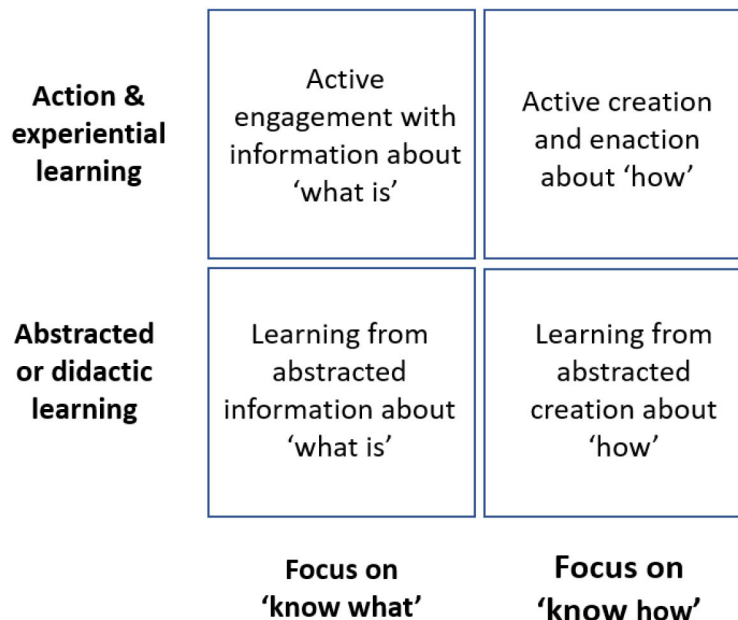
For universities, conceptual emergencies are diverse (Table 1). They include the need for new ideas, framings, and thinking and demand appropriate enabling environments, such as overcoming silo-based structures in universities to allow for more integrative and holistic approaches to teaching and research. This in turn requires different norms, rules, and modes of governance. In the UK for example, 5-year national research assessments continue to

have a powerful effect on reinforcing disciplinary structures even though government research funding is shifting toward larger, interdisciplinary, system oriented, and collaborative projects. Existing structures, norms, and formal or informal rules thus make it difficult to develop the new thinking and ways of working—more holistic, integrative, co-creative, action-oriented, and reflexive (Hanlon et al., 2012; Kläy et al., 2015; Umpleby, 2016)—that are needed to respond to the changing societal demands that climate change brings.

To support systemic and structural changes, shifts in mindsets, worldviews, and assumptions that underpin existing patterns is then also required (Table 1) (Sterling, 2004; O’Brien and Sygna, 2013; O’Brien et al., 2013). One of the most pervasive assumptions underpinning universities is that researchers can and should be separate from what they observe (Aufenvenne et al., 2014; Umpleby, 2016). This is largely a fallacy given that researchers are never independent nor value free (Vogt and Weber, 2020) and are instead deeply embedded in, and shaped by, the societies and cultures which define what questions are asked or what gets funded (Midgley, 2000; Aufenvenne et al., 2014; Umpleby, 2016).

BOX 1 | Active creation and enaction forms of learning

Rapidly advancing capacities for working with twenty-first century challenges needs extensive focus on action-oriented forms of learning that develop know-how for working with change in practice. Learning from abstract information about what exists in the world (e.g., papers or lectures on the nature of social and bio-physical phenomena) currently dominates most teaching in universities (see figure below). Considerable learning also occurs from students actively developing practical skills in analysis allowing them to develop new information about the world (e.g., learning practical skills in analysis from doing lab experiments or conducting fieldwork, writing dissertations). Some learning also occurs from analyzing attempts to create solutions and enact change. Rarely, however, does learning occur in the active creation and enaction quadrant, such as by learning to actively create and test solutions or through trying to enact change. This is needed to develop embodied know-how for working with climate change (e.g., to help create change and rapid carbon reduction). Much greater attention is then needed on active creation and enaction.



The active creation and enaction quadrant can be applied to many areas of knowledge creation and learning. It is particularly needed in five areas where knowledge advances and capacities are currently very limited and which are needed in most professional settings or environmental studies (see **Table 2**):

- Creative development of solutions and approaches (e.g., learning from trying to bring about change, creative development of designs and possible solutions, and the complex human social challenges involved);
- Working with uncertain and desired futures (e.g., learning how to apply futures methods and supporting actions to bring desired futures into being, which requires very different kinds of orientations and considerations of what constitutes evidence or truth, and developing futures consciousness and new practices around different orientations to time);
- Working with complex interrelated challenges (e.g., developing know-how to engage with and intervene in complex systemic challenges);
- Working with highly contested issues (e.g., developing know-how by actively applying dilemma resolution, mediation practices, or deliberative democracy processes such as citizen assemblies);
- Stewarding systemic and transformational kinds of change (e.g., developing know-how from actively working to try and instigate transformative outcomes or stewarding system transition in the real world).

While being extremely powerful in generating certain kinds of knowledge, the dominant assumption of observer-independence as being the hallmark of “robust” knowledge has led to reduced acceptance and production of other knowledges (Fazey et al., 2018). The assumption has, for example, contributed to greater emphasis on the value of abstract epistemic knowledge presentable in written form. This has been at the expense of embodied knowledge needed to support change, including “technical” know how (*techné*) and knowledge about what constitutes ethically “good” or “right” ends and ways to get there in a particular time and place (*phronesis*) (Vogt and Weber, 2020). While emphasis on episteme is not inherently

wrong, it has led to a focus on analyzing problems rather than how to shape societal change toward addressing them, as highlighted in the work presented in most scientific global environmental reports (e.g., IPBES, 2018; IPCC, 2018). Developing the kinds of knowledge and capacities the world urgently needs, including the critical thinking and capacities for stewarding transformative change in our graduates (e.g., **Table 2, Box 1**), will require learning from being actively involved in “doing” or “making” (Boiral, 2002; Johannisson, 2011). Yet such knowledge is often not accepted or supported because it violates the assumption that “good” science comes from standing apart from the object of study, looking at it from

the outside rather than learning from within (Fazey et al., 2018).

The assumption of observer independence underpins many aspects of how our universities have developed and what is supported and emphasized. In the USA, for example, universities in the 1960s were developed explicitly to be separate from practice because of beliefs that maintaining distance enhanced creation of more robust and value-free knowledge (Gordon, 2014). The assumption is also linked to implicit theories of the relationship of knowledge and change, such as the idea that change occurs by first creating knowledge independently then disseminating it to other “users,” rather than from much more nuanced forms of sensemaking, co-creation, action, and social learning where researchers are just one of many kinds of knowledge creators (Wittmayer and Schäpke, 2014; Fazey et al., 2018).

The assumption also partly explains the prevalence of didactic approaches to teaching, where knowledge is assumed to be something produced independently which can then be passed on in inert form (Fazey et al., 2014) as opposed to something developed through complex interactions between tacit and explicit understandings and developed through experience (Nonaka et al., 2000; Boiral, 2002; Johannisson, 2011). Prevalence of particular notions of knowledge and learning limit our ability to bring in alternatives, such as learning from all of our senses rather than primarily from the sharing of codified understanding of the world produced by someone else or of what is already known (Jinan, 2014). Modern notions of learning can make it difficult to step out of existing systems and paradigms (Jinan, 2014) and doing so, such as moving beyond high carbon paradigms, then greatly depends on what we think cognition, knowing, and learning is and how it occurs. Transformations in cognitive science and understanding of the mind are paving the way for new paradigms of learning (Eyre and Fazey under review¹), but this new understanding is still a very long way off from being embedded in education.

Acceptance of the validity of assumptions about observer-independence or particular notions of knowledge, knowing, or learning has also enabled certain kinds of structures and business models in our universities. Large lecture halls designed for mass delivery of information and teaching in quantities, for example, has been enabled by assumptions that education is possible as a process of transmission rather than, for example, competence development (Wilhelm et al., 2019). Instead, students need to develop practical experiential knowledge and opportunities for more co-creative learning so they can be more effective change-makers (Caniglia et al., 2016; Wilhelm et al., 2019). Imagine an alternative to the transmission model: empowering students from different programmes to collectively and creatively establish low-carbon practices within a university. Such an approach could unlock one of the biggest and most abundant resources available to a university (its students) while also stimulating the development of a very different kind of knowledge and student experience. To do this, however, requires challenging existing

notions of learning, teaching, structures, and business models (Perello-Marín et al., 2018) as well as the assumptions, conceptual foundations, and values underpinning current practices (Freire, 2014; Lotz-Sisitka et al., 2015; Shephard et al., 2017; Lambrechts et al., 2018). It also requires overcoming the wider societal trends toward commercialization of education based on neo-liberal ideals that harness mass education and science as part of knowledge based economies (Lave et al., 2010; Olszen, 2016).

The prevalence of particular assumptions about knowledge and knowing are just some of the kinds of conceptual foundations of modern universities that will probably need to be challenged if we are to be able to respond effectively to manifest and more operational emergencies. Overcoming the conceptual challenges is not easy because the underlying assumptions are so deeply entrenched within students, staff, and the wider education, sociological, and economic circles of influence in which universities are embedded. There are, of course, many examples of innovations seeking to challenge a variety of assumptions (Rodríguez Aboites and Barth, 2020). Yet many fail to result in change more widely or dissipate when a particular innovative faculty member moves on. For universities to provide the global leadership that climate change demands, bold and strategic systemic action will be needed that challenges ideologies and dogma that hold current patterns in place. To do this then requires universities and their leaders to address critical existential challenges that climate change brings.

Existential Emergencies

In addition to manifest and conceptual emergencies, universities now face existential climate emergencies (Table 1). In general, existential climate emergencies include threats to physical existence (e.g., of a species, or family), but also to cultures, identity, and psychological well-being. Examples of existential emergencies include impacts from climate change on indigenous cultures (Jaakkola et al., 2018), city identities (Bremer et al., 2020); threats to actual existence, such as from sea level rise and land loss (Connell, 2016; Bengé and Neef, 2020); and the psychological, such as the growing mental health issues emerging as climate change threatens notions of who we think we are (Middleton et al., 2020) and the challenges of trying to make sense of oneself in a world of rapid change, increasing uncertainty, and sense of uncontrollability (Panu, 2020).

When faced with such challenges the question “what are the right things to be doing?” is replaced with a need to re-evaluate “what is right?” and more existentially “who am I?”. This applies to individuals and organizations with some CEOs of fossil fuel companies, for example, beginning to advocate for a fundamental identity shift from being an industry of conservative upholders of the status quo—arguing they are important because they support an energy dependent society and economy—to being aspirational leaders of the global change (Schuller, 2020). Such shifts are being driven partly because of a need to navigate direct threats facing the oil industry: a growing population of environmentally concerned millennials, environmental activism, and racial and social justice movements (Schuller, 2020). Universities also face similar threats, as well as others relating to wider societal shifts in the extent to which they are perceived to be of value, and

¹ Eyre, L., and Fazey, I. (under review). Perception as a domain of transformation. *Sustain. Sci.*

especially in relation to the way society is struggling to make sense of twenty-first century challenges like climate change.

Importantly, the conceptual emergencies, such as responses to the need for new forms of knowledge creation or teaching, cannot be achieved without a shift in sense of purpose, role, and of whom one seeks to serve. For example, to facilitate the kinds of learning that leads to the development of wisdom about how to act in the world rather than just understand it (Maxwell, 2007, 2021), re-purposing universities for human development that attends to the whole person, including the emotional, spiritual, and embodied knowledge as well as the cognitive and technical is required (Moser and Fazey this issue). Very few courses or universities do this, and doing this well requires a new ethic of responsibility, philosophy, identity, and sense of purpose.

The trends, however, are starting to point toward an emerging shift. The University of York, UK in which some of the authors of this paper are based, for example, is exploring how to renew its commitments to being a university for the public good (Box 2). There are also many others struggling with an identity crisis and how they can overcome challenges of sunk costs, outdated models of learning and research, and old notions of purpose. New online universities are emerging with a more clearly defined purpose, such as Ubiquity university, which is a new accessible online University providing fully accredited degrees in global caretaking (<https://www.ubiquityuniversity.org/>). This brings together different kinds of provision from different places, but with the goal of supporting a flexible education focused on capacity for action and personal development. The online model, for all the strengths and weaknesses this might bring, also allows for diverse contributions from across the world and reduced high carbon travel. Another example is the London Interdisciplinary School, being developed in partnership with the UK government, that has a distinct challenge-oriented purpose, with degrees on issues like climate change as opposed to disciplinary-based subjects (<https://www.londoninterdisciplinarityschool.org/>). While still in development, it is intended that its structures will be based around challenges, not around disciplinary based models from the past.

These examples might be seen as disruptors taking up new emerging market opportunities given shifts in demand and potentially creating space for other, more radical innovations to emerge. There are also more radical initiatives that represent deeper value base shifts. Clark University (Worcester, MA, USA) has launched a university-wide participatory dialogue, called the *New Earth Conversation* (newearthconversation.org) asking how they should educate now for the world they wish to see. This has included introducing innovative transformative pedagogical forms and practices across the curriculum, asking students, faculty, and staff involved to enter a deep reckoning about the past, the present, and responsibility toward the future. Another is H3Uni (University of the Third Horizon) (<https://www.h3uni.org/>) and closely affiliated IFF (<https://www.internationalfuturesforum.com/>) which support development of know-how about working with complexity and transformational change. These radical innovations have significantly different value orientations to existing educational patterns, such as H3Uni and IFF being based on values of knowledge accessible to

all, presenting their work through open-commons licenses. They have emerged as potential pockets of the future in the present and explicitly external to existing universities in part because the current systems and structures would not support what they have been attempting to do. These smaller, more radical, innovations paint a particular visionary picture about the potential for a new kind of university for the public good in a future world with a different ethic, ethos, and value base.

Importantly, all of the examples—both disruptive and potentially more transformative—have considerable clarity about their purpose and mission that reflects a sense of how a shift in the wider social and economic landscape is changing. Rather than starting from a purpose based on a more general view that education is good or that producing more of the same kinds of knowledge is enough, they explicitly focus on addressing societal challenges and/or goals. The examples are also often underpinned by a deep foundational ethic—not just market-oriented values—about how they engage with society and those seeking to bring about change. This often includes recognition they may be as much a part of the problem as a solution and that transformations personally or institutionally may be required if transformations are to be achieved more widely. By addressing existential issues, changes in the conceptual domain then become possible, such as having a more explicit orientation towards the public good in a world of change leading to new assumptions about the kinds of capacity development needed for graduates, the kinds of education needed to achieve it or the way in which researchers may see themselves as co-creators of change, not just knowledge. In essence, while universities need to simultaneously work with all three kinds of emergencies, without addressing the existential issues, the systemic changes that will be needed for universities to be viable in the longer term will not come about.

HOW CAN UNIVERSITIES RENEW THEMSELVES IN THE FACE OF CLIMATE EMERGENCIES?

All three emergencies exist for universities in the present. It is an extremely important step to acknowledge their existence and that they can only be overcome by working with all three simultaneously. This is because this recognition leads to an inevitable conclusion that current patterns and ways of working will not be viable and that viability will only be achieved through transformation. The core challenge facing universities is thus to move from discussions about “what change” to asking “how” system transition might be brought about. There are many useful insights from the rapidly growing field of system transition and transformation that can help such stewardship, including a diverse array of frameworks and studies (Geels and Schot, 2007; Westley et al., 2011; Markard et al., 2012; O’Brien and Sygna, 2013; Feola, 2015; Fazey et al., 2017; Victor et al., 2019). We do not draw on all of this work here and instead focus on recent research on the different ways system transition can occur (archetypes of system transition) (Leicester and Fazey under review²). This

²Leicester, G., and Fazey, I. (under review). Archetypes of system transition and transformation. *Energy Res. Soc. Sci.*

BOX 2 | The University of York's search for a new identity

The University of York is currently undergoing a re-evaluation of purpose, driven by visionary leadership. This has included using a guiding goal to renew the University's commitment to being an institution for the public good (<https://features.york.ac.uk/vision-for-york/>). The University of York is exploring how partnerships and contributions can be strengthened locally while also expanding how our University serves and has impact nationally and globally. This deep revisioning has included divesting from fossil fuels and developing carbon emission targets, as well as beginning to try and work out how to tackle wider complexities associated with responding to climate change. The renewed commitment to being a university for the public good has provided a helpful frame around which conceptual issues can begin to be explored, such as new structures that help work across traditional boundaries. This, in turn, is surfacing some of the limits of disciplinary thinking and other conceptual challenges involved and raising challenging conceptual issues around how best to cohere activities to generate outcomes greater than the effects of the individual parts.

recent work is particularly helpful because it provides some core lessons for how change might be stewarded and how different aspects relating to all three emergencies might be considered together. Four of these archetypes are presented and explained in relation to universities in **Box 3**.

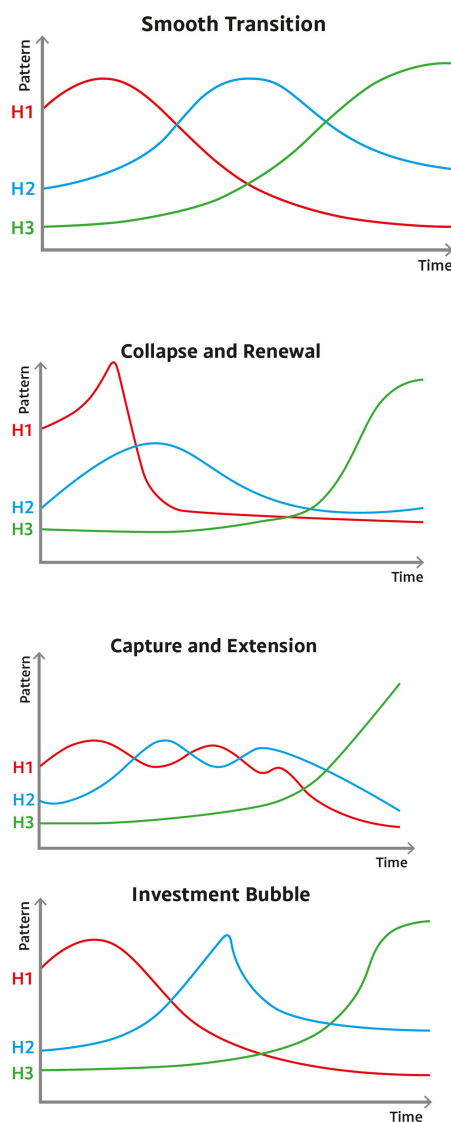
To appreciate the relevance of the archetypes to universities, it is important to understand the basic heuristic, which is called Three Horizons (see "Smooth Transition," **Box 3**) (Leicester and Fazey under review², Sharpe et al., 2016). In this heuristic, the future is viewed as emerging through three overlapping horizons. The first horizon (red line) represents the existing pattern of technologies, behaviors, systems, norms, modes of governance, cultures, values, identities, skills, or orientations (reflecting the different components of all three emergencies). This first horizon pattern naturally begins to decline as the wider landscape or context changes, such as due to climate change, shifting markets, or changes in digital technology. The third horizon (green line) then represents a pattern of an envisioned system that would be viable in the future. The second horizon (blue line) is the intermediary transition space where disruptive innovations and actions help create space for the third horizon pattern to grow. In the heuristic, all three horizons exist simultaneously—in the present, medium, and longer term—albeit to greater or lesser extents. Elements of the first horizon pattern are, for example, maintained in the future third horizon dominated pattern, highlighting that not all is thrown out in a process of system transition. Examples of the third horizon may also exist as pockets of the future in the present which are often perceived as radical because they are underpinned by a different value base and do not fit the norm. Again—while there are many theories and three horizons has its limitations—we have found the simplicity of the heuristic to be very helpful for actors trying to understand how present actions can strategically and more effectively be used to bring about systemic kinds of change and for enhancing their consciousness about relations between present and future (Sharpe et al., 2016; Fazey et al., 2020).

While the heuristic can be applied at various scales, for this paper we generally imagine it to represent how a single university might undergo transformation. This process is then imagined to be occurring within a wider educational and societal landscape or context, which itself is undergoing significant change in response to, and with, a changing climate. How actors act within and around universities shapes the systemic transition

of a particular institution (**Box 3**). The four major archetypes (including the Smooth Transition) all represent a process leading to a new systemic pattern. But each archetype also differs in how system transition emerges, how fast, and how much pain is experienced along the way. Specific lessons can be drawn from each archetype as explained in **Box 3**. Here, however, we focus on the wider lessons that come from considering all of the four archetypes together.

The first wider lesson from the archetypes is the need to maintain transformational intent. Without doing so it is very difficult to support smoother transitions. Transformational intent stems from recognizing the existence of all three emergencies. This leads to an inevitable conclusion that being viable can only be achieved through transition to a fundamentally new pattern that includes shifting identity and purpose (addressing existential issues) and then cascading this down to operations. The example of the University of York is a good one here. While it is still in its very early stages of change and very many challenges remain, its shift to renewing a commitment as a university for the public good is deeply significant. It then, however, requires continued transformational intent and active management of this process. This includes recognizing transformation is a qualitatively distinct form of change compared to, for example, adjustments or reforms which generally involve keeping a system the same. Maintaining a focus on transformation can be helped by strategically scanning for changes in the wider landscape and active alignment to this, such as using emergence of lower carbon economies to stimulate changes in structures, estates, pedagogies, or operational models. Decarbonization can thus be viewed as a powerful opportunity for disruption and renewal rather than just another issue on a long list of difficult things to do.

The second lesson is that stewarding renewal requires actively overcoming powerful existing patterns through gradual re-allocation of resources from the old to a new pattern. Failure to actively steward this process may result in delay (Capture and Extension, **Box 3**) or even collapse (Collapse and Renewal, **Box 3**). Active re-allocation can be achieved through rigorous experimentation and innovation while slowly decommissioning the existing dominant system over time. Successful system transition will, however, only be achieved if there is a general core commitment to the eventual vision and active support from those at the highest levels within an institution who are

BOX 3 | Archetypes of system transition for a University and different ways renewal might emerge

Smooth Transition involves a relatively orderly change through gradual dissolution of the old pattern, reconfiguration of its resources, and then creating something new. In this archetype the need for fundamental change and re-purposing is recognized early. Innovations that actively seek to disrupt current patterns and thinking are actively established. For example, rather than simply restructuring departments to enhance efficiencies, restructuring a University would also focus on disrupting disciplinary silos, creating novel configurations, and allowing for gradual transitions in faculty expertise or shifts in teaching. Opportunities for disruption might also be actively sought, such as using ambitious carbon emission targets that force structural and other kinds of change. At the same time, more radical innovations representing pockets of the future in the present (H3 innovations), would be purposefully encouraged and protected, to allow emergence of a fundamentally new pattern to grow with support from disruptive second Horizon innovation.

Collapse and Renewal arises when the existing system is under threat and the response is to double-down to protect and reinforce the status quo. Collapse follows when resistance to forces of change becomes impossible. Here, relatively successful incumbents may not acknowledge their model is failing as faculty and students seek something more meaningful elsewhere. Disruptions to student life through the current pandemic, for example, may lead to greater questioning of the value of a university education. A wide range of non-radical innovation is also likely, such as in better marketing of existing programmes, targeting higher student numbers or more profitable market segments, or broadening the income portfolio by building new student accommodation. None of these innovations fundamentally address the changing pattern of what students need to learn or what faculty might most valuably research, and how. The collapse scenario will likely arise in the sector as a whole rather than the failure of single institutions as forces of change overpower obsolete models. While this scenario suggests renewal after collapse, renewal is not guaranteed.

Capture and Extension occurs because of a strong gravitational pull of the dominant pattern and the way market mechanisms and government higher education policy are primarily concerned with maintaining and improving existing systems, rewarding efficiency, and supporting incumbents. Here, new, potentially disruptive second horizon innovations begin to emerge but these are co-opted to support the existing first horizon pattern and the maintenance of the status quo. The result is a delay of the emergence of the third horizon pattern. Initiatives to promote inter- or trans-disciplinary research, for example, typically fail to achieve their full potential because of the enduring strength of the structures of incentives that keep siloed, individual disciplines in place. Commitments to become “carbon neutral” also tend to be managed so as not to disrupt the status quo too dramatically, such as by drawing narrow boundaries around what is taken to fall within the university’s responsibility. As with Collapse, the ultimate outcome is a delay of the transition, with lost time, energy, effort, and resources.

The Investment Bubble emerges through herd phenomena where there is a rush to a “silver bullet” solution. Attention and investment is drawn toward a single idea or innovation which cannot bear the weight of expectation and eventually disappoints, releasing resources for redistribution elsewhere but delayed eventual emergence of a new pattern. Examples of silver bullets could include a rush to technology to support virtual and blended learning following the pandemic, a new set of measures or indicators for an institution’s carbon emissions in the race to zero, or shorter, cheaper degree courses in response to student attitudes to debt in a recession. Each of these might come to attract considerable attention offering significant short term gains. Those gains, however, may be short lived as other, more significant factors, come to prominence and attention inevitably shifts.

willing to make difficult choices and resist the lure of quick wins that reinforce the existing pattern. To date, promising second or third horizon transformative innovations in universities, such as those attempting to change operations, pedagogies, and conceptual foundations associated with manifest and conceptual emergencies, are easily suppressed or drawn back to maintain the existing dominant system. The Capture and Extension archetype (Box 3) is particularly common in universities because they, like many public bodies, are held in check by a strong public mandate, such as societal dependence on universities to maintain certain patterns of employment and education. Active focus on re-allocation of resources and bold and strategic leadership that attends to all three emergencies is thus needed for successful transformations to occur.

The third lesson then stems from the second, which is that effective transformation requires stewarding an effective interplay between three qualitatively different kinds of innovations: First horizon innovations to support existing systems and avoid collapse; second horizon innovations to create disruption and space for more transformative innovations to grow; and third horizon transformative innovations that embody a new value, identity and conceptual foundation that becomes the desired and envisioned future. As highlighted above, the focus in most universities is on “improving” kinds of first horizon innovations to overcome the manifest emergencies. This leads to a very powerful first horizon capable of continued reproduction and overcoming questions about “what are the right ways of doing things.” However, it is not capable of

addressing the more difficult issues around “what are the right things to be doing” or “what is right.” The result is considerable innovation to improve existing systems and some innovation that may be disruptive, but very little attention to how this genuinely supports or hinders systemic change. Instead, improving and disruptive innovations need to be part of a much more explicit strategy that also recognizes the need for transformative innovations and integrating all three kinds of innovations in ways that lead to a major pattern shift.

Fourth, system transition requires effective interaction between three different orientations to the future. These include first horizon managers who are essential to ensure the system doesn’t collapse; second horizon entrepreneurs who tend to be interested in seizing on opportunities available to help disrupt the status quo; and third horizon visionaries who tend to see the longer-term vision and are interested in helping more transformative innovations emerge and establish themselves. Enabling smoother transitions, for example, requires a careful collaboration between first horizon managers and third horizon visionaries to actively enable re-allocation of resources over time. Here managers need to maintain a diversity of approaches, be open to new thinking, not get locked into a dogmatic or ideological set of assumptions or identities, and be encouraged to see their actions as vital for change, not just resisters of it. The visionary innovators need to maintain integrity of the future vision and find ways to work with other actors who do not see or share their vision so resources can be gradually re-allocated. In effect, recognizing and working with different orientations to the future and change—ontological shifts in relation to time and action (Hodgson, 2013)—is an example of how new conceptual understandings and practices associated with the conceptual emergencies needs to be applied back into our universities if system transition is to be successful.

Fifth, four modes of governance and infrastructure are needed to simultaneously support smooth transitions (Leicester and Fazey under review²). Smooth transitions are generally rare, and when they do exist it is more common in technology and commerce. Here, governance and infrastructure exist for: (1) managing stable and less risky activities in the first horizon (e.g., pension funds); (2) start-ups and disruption in the second horizon (e.g., by markets that are generally open to risk and failure); (3) exploratory third horizon innovations (e.g., government or other research funding); and (4) overarching support to help govern the interplay between the three other forms of governance and infrastructure. All four, for example, were critical in transitions from horse drawn carriages to automobiles (Geels, 2005) and creation of the National Health Service in the UK (Rivett and Blair, 1998). In universities, there is extensive knowledge and infrastructure for governing the first horizon and for the second through innovation and seed funding. However, what is almost always lacking are mechanisms to support and enable transformative third horizon innovations and higher level strategic management that re-allocates resources from the first to the third horizon. Thus, while there is often

a huge intellectual resource and many ideas about the need to address existential emergencies, the infrastructure and different understandings of governance itself are rarely present to enable shifts to occur. Without building all four kinds of governance, supported by active acknowledgment of the existence of all three emergencies and transformational intent, smooth transitions do not occur.

Finally, as with most organizations, capacity is also generally lacking around how to stimulate system transition within universities. Skills and capacities needed for introducing the new in the presence of the old, for skilful and creative disruption, and for effective transition requires active development of new management, communication, engagement, governance, policy, and finance capacities. Core to this is recognition of the qualitatively different kinds of change involved; the need to support personal development among actors to transcend old patterns, habits, and thinking; and abilities to work with systems as a whole. Universities, as institutions squarely in the domain of knowledge creation, have an advantage given their extensive internal expertise. Yet the capacity limitations for internal change are often the same for the limits universities have for supporting change externally (e.g., capacities outlined in **Table 2**). Importantly, the more actors can be involved in developing understanding of how to work with transition, the quicker, more effective, and less painful any transition will be. Universities thus need to develop a range of initiatives within their institutions specifically oriented to support transformations that are different to traditional personal development training that tends toward management of the status quo.

In summary, universities are being required to respond to a rapidly growing combination of manifest, conceptual, and existential emergencies while experiencing them at the same time. The tendency is to try and innovate, but many innovations are not sufficiently oriented toward supporting the dynamics of creative destruction and renewal or are not sufficiently directly oriented toward addressing conceptual and existential issues. The first horizon pattern is also usually highly pervasive because of the way staff and students continue to participate within and reproduce them. Models of leadership training are designed for good management not transformation, and there is usually very limited appreciation of how to unleash capacities for creative destruction and renewal. Universities do, however, have an advantage in that they are relatively unique in being both part of the transition to a more viable world while also being a potential catalyst for transformation beyond their institutions. Yet it is here in which a major irony lies: To effect change in the outside world universities will have to change on the inside and overcome the same kinds of conceptual emergencies facing society more widely to which humanity’s capacity is seriously cognitively and emotionally ill-prepared. Universities will therefore need to match a renewed sense of purpose in society by rapidly accelerating development of new approaches and thinking that enable them to authentically bring change into being for themselves. They will then be in a much better position to be able to enact change on the outside.

CONCLUSIONS

Universities are some of the longest standing human institutions on the planet, with the oldest surviving being the University of al-Qarawinyin in Morocco, founded in AD 859. The endurance of universities over the centuries has largely been possible by holding together established communal practices of inquiry, communities of scholars and students, and governance structures to support them. Forms of inquiry have adapted to the times, such as shifting from dialectical argument around a disputed question to involving processes of empirical observation, induction, hypotheses testing, and experimentation (Jenkins, 2018). These methodological advances, which developed over the last three centuries, have been and will continue to be incredibly important. Yet the world is entering a new era in which universities in their current form do not provide what human civilization now needs for a sustained and thriving existence on an endangered planet. Universities urgently need a renewed sense of being an institution serving the public good in a world of existential challenges. They need an unwavering challenge-orientation, post-disciplinary thinking, and an action-orientation. They need to employ experiential pedagogies and forms of knowledge creation that overcome the thinking and practices that have led to our current societal challenges while authentically being the change they seek to bring to the world.

Given the extent of global changes, major change and transformation of universities—including collapse for some—is inevitable. Assuming humanity survives climate change, there will also be an inevitable and eventual emergence of a new enlightenment of science based on a new “grammar of responsibility” (Vogt and Weber, 2020). Yet, as highlighted by research on sustainability transitions even when the need for change is accepted, how, when, and the extent to which individual institutions choose to engage greatly matters. Smooth transitions are far from guaranteed and many universities will not survive the great changes that will occur in society from climate change.

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Effective stewardship is thus required for successful transition to occur, including maintaining transformational intent; harnessing opportunities to disrupt the status quo; supporting effective interplay of different forms of innovations and understandings the present and future; and developing new modes of governance and capacities. A good place to begin renewal is thus to accept the inevitability of climate change and strategically work with transitions to low carbon as an ally to stimulate structural, conceptual, and existential change while also surfacing and addressing head on deeply held assumptions, ideologies, dogma, and sacred cows. By actively developing capabilities to support transformative change toward low carbon on the inside, universities will then be in a much better position to help and lead others in the world beyond the halls of the academy.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

IF was the primary author of the manuscript, with conceptual development, and writing contributions input from all other authors. All authors contributed to the article and approved the submitted version.

FUNDING

This project was supported in part by the National Science Foundation (MCB #1408736 and IUSE #1524832) and the Kavli Foundation. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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Taking the Complex Dynamics of Human–Environment–Technology Systems Seriously: A Case Study in Doctoral Education at the University of Luxembourg

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OPEN ACCESS

Edited by:

Victoria Hurth,
University of Cambridge,
United Kingdom

Reviewed by:

Tom Waas,
Thomas More University of Applied
Sciences, Belgium
Zoe Robinson,
Keele University, United Kingdom

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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 26 February 2021

Accepted: 02 July 2021

Published: 20 September 2021

Citation:

König A, Ravetz J, Raber B,
Stankiewicz J, Rojas-Aedo R,
Hondrila K and Pickar K (2021) Taking
the Complex Dynamics of
Human–Environment–Technology
Systems Seriously: A Case Study in
Doctoral Education at the University of
Luxembourg.
Front. Sustain. 2:673033.
doi: 10.3389/frsus.2021.673033

Our existential sustainability challenges involve human–environment–technology systems that are complex, dynamic and tightly coupled. But at Universities, knowledge, in teaching and research, is mostly organized into discrete parcels, the disciplines. These are further divided into the categories of natural sciences, social science and the humanities. This paper addresses the question of how in their training of researchers, universities can equip them to better understand their roles and also to act as change agents. It describes a doctoral school course in transferable skills that is offered across faculties. The unique aim of the course is to provide a space for reflection on different research paradigms and the way they differ in their framing the role of a scientific researcher in pluralist societies that face existential challenges. The pedagogical framework and approach of the course encourages questioning one's own ontological and epistemological assumptions about the constitution of our world and how we might better understand it in dialogues with participants who come from diverse disciplinary backgrounds. The course includes discussions of: what is a discipline, and how disciplines differ in their understandings of the world and of the role of science within it; how tools and representations can shape or breach disciplinary paradigms; how instrumental science and interdisciplinarity can raise the dilemma of rigor or relevance; how complexity, contradictions and values are embraced in responsible research design, and last but not least we discuss the relation of science, progress and open futures. The course introduces diverse more recent approaches to scientific inquiry that harness the potential of democratizing science in our networked knowledge society, including critical interdisciplinarity, post-normal science, citizen science and transformative sustainability science, that complement normal disciplinary research practices.

Keywords: discipline, critical inter-disciplinarity, complexity, science, doctoral school course, responsible research and innovation (RRI)

INTRODUCTION

In the twenty-first century we not only are entering an era of less stable living conditions on planet earth, as suggested for example by evidence on the sixth mass extinction of species and climate change, but some researchers also point to the increasing instability of our knowledge systems (Hulme, 2009; Maggs and Robinson, 2016). Contemporary science faces a wide range of challenges. First and perhaps foremost, today, in the face of civilization's complex and existential sustainability challenges, there are urgent demands on science to be at service of society. The EU Horizon Europe programme will, for example, call for more and ever larger "mission-oriented research projects." Tensions between responsible and "embedded" research and the autonomy of science will be further pronounced (Tassone and Eppink, 2016).

Furthermore, in many disciplines conceptual simplifications and constraints hinder researchers from considering complexity, contingency, contradictions, and open futures in a manner that may be required to locally and meaningfully produce evidence for action on sustainability challenges, or even lead to contradictory advice from different disciplines or fields of knowledge. The credibility of science suffers due to divisions of experts on crucial and popular issues, exposing science even further to dangerous populist attacks.

Doubts are also spread by reports on the internal replicability crisis (where methods leading to results published in peer reviewed journals can't be replicated, impairing quality assurance in peer review—e.g., Bishop, 2019). Public trust in science is further undermined by instances of manipulation by vested interests due to the continued "industrialization" of science, or its proximity to industry and commerce (see also Ravetz, 2018). Several of these issues can be seen as a consequence of the way that science in general is organized, which can also lead to phenomena such as perverse career incentives of scientists from impact measures to publish in quantity rather than quality.

Accordingly, the understandings of science and its relation to society, morality, and individual responsibilities of scientists are changing rapidly and drastically. However, in our virtually connected information society there are also many new opportunities to fundamentally rethink knowledge production processes, including in science, and who plays what role within them in the (co-)creation and legitimation of new knowledge. All these related challenges and opportunities highlight the need for education among researchers about the nature and role of science in the contemporary world.

This paper describes a doctoral school course designed to offer researchers, most at the start of their career in science, a space for reflection on their research projects in view of these critical challenges to both science and society. This course starts from the assumption that these questions can be made explicit and deliberated on, within and across all disciplines and transdisciplinary approaches. We believe that such a reflection will be a requisite for the maintenance of public trust and improved teaching in schools and at university level. Furthermore, the goal is to equip researchers for reflexivity and in a next step, to invite them to return back to their respective

research groups and present these debates within their circles of peers, where they can act as change agents and multipliers across faculties and research.

This paper first presents a pedagogic framework, a set of competences and a learning environment that are the basis for how we understand and organize "learning." This pedagogy largely relies on the idea of widening of the student's own horizon and repertoire of action as a researcher through dialogues across different perspectives and understandings of the world. Against this background we provide a brief synopsis of course contents with reference to some cases of how students have engaged in it. In order to provide an outlook of further developing this type of reflective space at the University of Luxembourg and elsewhere, the merits and limitations of the approach to date are critically discussed as a basis for formulating some insights and recommendations for future improvements.

MUTUAL REINFORCEMENT OF THE PEDAGOGIC FRAMEWORK AND THE LEARNING ENVIRONMENT

In many, if not most, research universities technical rationality, an epistemology derived from a positivist philosophy (Shils, 1978), prevails. Knowledge in these epistemologies is often treated as a matter of representations of a reality that is pre-existing, and "rule-governed inquiry" is a quality attribute. Generalised abstract propositions then dictate problem framings, data gathering, inference and hypothesis testing. Learning is then understood to be a matter of acquiring the knowledge of these re-presentations. It has been strongly argued that this conception of knowledge, inhibiting criticism and blocking the path to wisdom, is a part of the problem of our failure to achieve sustainability (Maxwell, 2021). An administrative approach to the solution, fully utilising information technology, has already been suggested (Costanza et al., 2021). In this course we explore conceptual elements of a possible solution. One central question of our investigation is how under conditions of complexity it is impossible to divide knowledge from reality as if mind was separated from the world (Fenwick et al., 2011).

The number of sustainability programmes at universities, most of which aim to equip student for dealing with complexity and the diversity of approaches, is increasing (e.g., König and Budwig, 2016). In Italy, for instance, a new law requires a mandatory interdisciplinary course at all universities, modelled on the interdisciplinary concept of sustainability (Fioramonti et al., 2021).

One of the most cited competence frameworks for engaging on sustainability challenges in higher education directs attention to a set of six core and interlinked competences that students should acquire: systems thinking including reflections on boundaries and blindspots; values thinking and interpersonal competences, including in relation to the need of changing social norms, networks and power structures; futures thinking including strategic thinking and embracing uncertainties; and integrated problem solving that often relies on transdisciplinary research that draws on social and natural sciences and is

embedded in practice (Wiek et al., 2011, recently amended by Brundiers et al., 2021). The results of Brundiers 2021 Delphi study with experts suggested to expand this list with an emphasis on the need for transgressive learning to unlock path dependencies and dismantle power structures that prohibit required change. Furthermore, the need for capacity-building for action research and transdisciplinary research was highlighted. Other scholars often respond by shifting the emphasis to other, arguably less instrumental aspects, including “an affinity for life and appreciation of diverse life forms;” wise decision making; the ability to question, critique, transgress and disrupt hegemony and routines; unlocking creativity and appreciating chaos, and learning to be and to care, and engaging in non-conceptual states of mind (Sterling, 2013; Barth, 2015; Wals, 2015; Glasser and Hirsh, 2016; König and Budwig, 2016, p. 129; Sterling et al., 2017).

The course described in this paper for early career researchers fills a gap in that whilst a large number of initiatives even in higher education and research universities highlight the need for interdisciplinary approaches for “knowledge integration” for addressing complex sustainability challenges, the issue of knowledge integration is rarely unpacked any further. This course provides an entry point and relevant wisdom from history and philosophy and sociology of science and science and technology studies to discuss challenges to identify and work with different assumptions about our world, and the associated issue that different sets of methods and tools each of which have their limitations and constraints, and the vexing issue of contingency in science.

Therefore, a competence framework for responsible research and innovation that emerged from the EU-funded EnRRICH project is at least as relevant as sustainability competence frameworks (Tassone and Eppink, 2016). This framework shows an important overlap to the above sustainability-related competences by referring to the main competencies of anticipation for future-oriented proactive engagement: a reflexivity that includes situational awareness; inclusiveness and inter-cultural communication as required for participatory research; and responsiveness to navigate complexity or wickedness. Arguably, one of the most fundamental and cross cutting philosophical aims these competences are rooted in is the ability to engage with disparate sets of conceptual constructs that reflect different understandings of constituents of our world and how they might interact (ontologies) and sets of methodologies to study this (epistemologies). This ability is grounded in a researcher’s critical and reflexive awareness of their own (disciplinary) assumptions and constraints.

Core assumptions of this course concerning knowledge, science and learning, are that knowledge arises as we engage with the world (building on John Dewey, 1938; Osberg and Biesta, 2007; Wals and Peters, 2018). Accordingly, scientific inquiry is a planned, systematic, structured, self-critical process to create new knowledge that relies on iterative learning processes from action and reflection in practice. Current definitions of action research are closely aligned with this pragmatic understanding of scientific inquiry (see e.g., Reaso and Bradbury, 2008, pp. 4–5). Science can serve to manage but not represent realities. For Dewey education builds the capacity to frame purposes, to judge wisely,

and to evaluate desires by their consequences, which will result from acting upon them. There is no greater defect in traditional education than its failure to secure active cooperation of the pupil in construction of the purpose involved in his studying.

The main learning outcomes we want to foster in this course are therefore as follows (Figure 1):

Acknowledging values and contradictions in research:

- a. A clear understanding of how different disciplines convey different ontologies along with different understandings of what science is and what role it might play in society.
- b. The capacity to reflexively and self-critically engage in one’s own research choices (concepts and assumptions, methods, substance) in relation to other research paradigms.

Disciplining complexity:

- c. The capacity to engage in critical research on complex societal challenges with researchers from other disciplines in a team.
- d. An enhanced understanding and repertoire of action in the face of contemporary challenges to disciplined science with respect to complexity, uncertainty, contingency, contradictions, in the face of open futures.

Dependencies on methods and tools:

- e. The ability to communicate disciplinary depth across disciplinary boundaries in the awareness of disparate understandings of the world that can be mediated with different methods and tools. This includes the ability to hold a constructive conversation on contradictory facets of specific problems that can be revealed with different methods and tools that are associated with different disciplines.

Allowing for contingency:

- f. An acute awareness of limits of generalisations across places and circumstances.

On open futures:

- g. The ability to embrace and make explicit a wide range of dimensions of uncertainties and ignorance in relation to one’s own and other’s research in a constructive manner.

The pedagogic approach relies on staging such genuine dialogues between participants with different understandings of the world by creating a shared space in which participants can learn from each other how they think, and analyse the world in different ways (Mercer, 2000). Rooted in Vygotsky understanding of learning 1962, this implies active and open-minded listening and being prepared to question one’s own assumptions and conceptions if there is dissonance or contradiction between diverse understandings (Mercer, 2019, p. 368). Through participation in such a process, learners can experience how knowledge may be constructed and validated (Wegerif and Major, 2019, pp. 113–114). Such a dialogic space that contains (and sustains) perspectives from a diversity of theories and methods including the natural, social and practice-based sciences and humanities that react with each other fosters a *critical interdisciplinarity* that can according to Boix-Mansilla (2010):

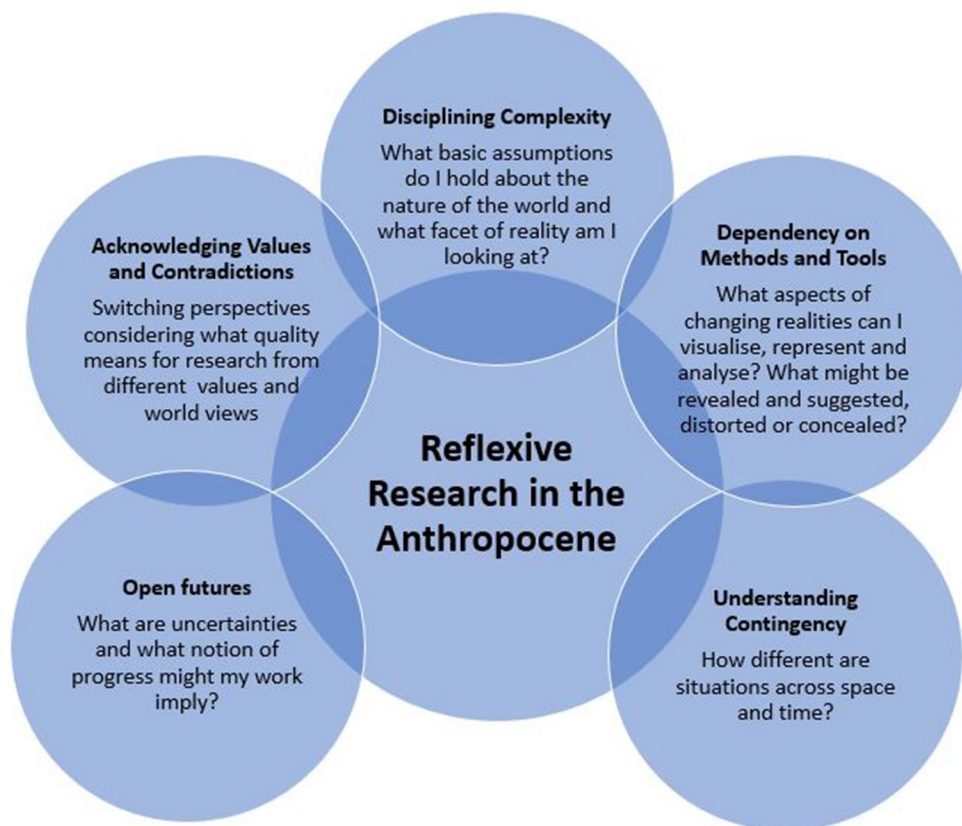


FIGURE 1 | Pedagogic framework of competences for reflexive research in pluralist societies. Scaffolding questions for participants to reflect on their research relating to each competence field: **Acknowledging values and contradictions:** What are the underlying assumptions about the nature of science/knowledge—and the role of the researcher in producing it? To what extent are you/ can you be “objective”? What is the overarching societal question you are interested in and your personal motivation/reasons/rationale for engaging with it? Do you know of others who might not agree and why? **Disciplining complexity:** Which facet of complex phenomena does my chosen discipline direct attention at? How might it relate to other facets/fields of knowledge? What is the main chosen discipline/research area and what are your core theories and concepts? What makes your field of research different from others? Why have you chosen it? What are your 3–5 main research questions? Please state your field’s underlying assumptions about the nature of actors, agency, system, and the relation between actors and the system, or the conception of the ability of actors to contribute to systemic change? **Dependencies on methods and tools:** What is your research methodology? Are you tri-angulating insights from several research methods? Which facets do your theoretical and methodological choices highlight, suggest, reveal? Which blind spots might you produce? What aspects might you distort or conceal with your methodological choices? **Understanding contingency:** In how far do you engage with abstract situations and concepts and models and with how many different situations do you test these? **Open futures:** What is the relation between your research and “progress?”

- help to overcome limiting assumptions and pre-suppositions;
- make explicit divergent preferences and priorities and their value bases that are united in their orientation to co-create more sustainable futures;
- serve as a basis for processes to critique, judge and evaluate new knowledge emerging from such processes from diverse points of view; and
- foster empathy, humility, reflection required when directing attention to people, roles and relationships in place- and issue-based analysis.

The pedagogic tools and activities to scaffold participants reflections on their own research, motivations, and justification of choices of concepts, methods and substance, and to link these to materials in each course session we developed for this course bear some similarity to those developed by Kemp and

Nurius (2015) to equip students for transdisciplinary research. These include opportunities to reflect on personal knowledge frameworks and their origin in one’s own personal experiences, including in future by developing an intellectual biography and a set of scaffolding questions similar to the tool box dialogue method by Eigenbrode et al. (2007) (see caption of Figure 1). The tasks include to summarise and engage in debate on philosophical texts across different ontological backgrounds; present research react to others research. The participants and the convener jointly develop the plan for the course—who chooses to present their research in order to best match the philosophical contents of the sessions with the contents of the research projects and the interests of the participants. Participants are asked to complete a final reflective report relating materials and debates covered in all sessions to general insights they gained as well as reflect on implications for their own research.

In terms of learning environments, the University of Luxembourg, founded in 2003, is extremely suitable as it offers diversity not only across disciplinary, but also cultural, backgrounds. It is tri-lingual, has an international orientation with students from 130 countries, and is close to several key EU institutions. The highly international and therefore also multi-cultural nature of the University has exchange agreements and research cooperation with more than 100 universities worldwide, and cross-border study and research is commonplace. It has three faculties (broadly divided between social sciences and the humanities, natural science and engineering, and economics and law), and furthermore three interdisciplinary centers. The university rectorate runs transversal skills training courses for doctoral researchers from all faculties. The course presented in this paper is part of the transversal skills training. This is significant given that the presented approach to learning relies on participants with very different understandings (even ontologies) engaging in dialogue with each other. While originally (since 2014), run as part of one of the doctoral schools within the faculty of social sciences, as of 2020 it is offered as a cross-faculty course. The setting also guarantees a diverse cultural field—in 2020 ten participants came from four continents.

COURSE CONTENTS, STRUCTURE, AND DISCUSSIONS

The course is structured in accordance with the pedagogic framework of **Figure 1** in five sessions of 3 h each and invites a maximum of 10 participants that approximately correspond to the five competence fields in the framework. One or two doctoral research projects are selected for presentation at each session and all participants are asked to summarise one to two readings at the start of each session and to discuss the readings and main insights gained with each other.

1. What is a discipline purpose of science and received framings—challenges to science from **complexity and contradictions** in the face of complex sustainability challenges relating to human environment interactions
2. **Methods and tools**, uncertainties and the role of science in paradigm shifts
3. **Contingency and instrumental interdisciplinarity**
4. **Values and interpersonal competency**
5. **Futures and dynamics—accelerating change**

This results section covers what the authors consider the essence of the core readings recommended on the topics of each session. Three case studies of how participants' research projects have been related to a session topic are presented.

SESSION 1. ON THE EMERGENCE OF DISCIPLINES AND THE CHALLENGE OF COMPLEXITY

The introductory session serves to critically discuss what science is and what science does. Participants introduce their research,

trying to relate their research approach in informal conversation to those perspectives that resonate most with them.

A simplified overview on the evolution of the disciplines building on a synthetic chapter by Peter Weingart (2010), serves the course introduction extremely well. In the nineteenth and twentieth century, rapid growth of data sets resulted in pressure to treat data selectively according to criteria specific to science. The constitution of problems of study increasingly took its point of departure from abstract concepts and methods, rather than from place-based practical questions or interests. Experiences were no longer grasped but constructed, research laboratories with controlled environments were devised for inquiry. A growing stock of concepts, theories, and instruments allowed expanding this new scientific mode of knowing to new subject matters. Increasing specialization both gave rise to more enclosed “communities of practice” within different knowledge fields, in which “relevance” is constructed by peers (e.g., in specialised journals). The pressure to discover something original and novel became a disincentive to cycle through diverse disciplines, but to remain within one field—specialization through division of labour leading to the increasing fragmentation of knowledge fields and difficulties to communicate across these (see also Kuhn, 1962). Concerns about specialization and fragmentation arose already with the emergence of the disciplines: “a thousand busy ants are producing daily countless details... only concerned to attract attention for a moment to obtain the best price for their goods,” the stream of discovery is split into ever more and ever more unimportant trickles (Du Bois-Reymond, 1886, p. 450).

A discipline today can be seen to comprise the following elements: A complex of problems—that presents a delineated subject area with associated sets of permissible questions; Shared concepts, methods and instrumentation; A social community with identity, quality criteria and membership rules they adhere to.

Different disciplines convey different ontologies, as highlighted by Thomas Kuhn (1962), who takes issue with the dogmatic way that many disciplines are taught at Universities tightly defining permissible sets of questions and tools for inquiry. Peer review and career incentives usually suppress divergent questions that are not within a field's frame. This can further exacerbate the fragmentation of knowledge, and entrenching disparate fields of knowledge with divergent ontologies and accordingly different criteria for legitimating new knowledge.

In the natural sciences instrumentalist or positivist view often prevails. Today some scholars distinguish between three and five fundamentally different ontologies that can be associated with different knowledge fields in the natural sciences, social sciences or humanities (**Table 1**), including positivism, social constructivism, and pragmatism's belief in participative, experiential and emergent realities, each of which attributes science a different role in society (e.g., Heron and Reason, 1997). In our pluralist societies, the practice of science needs to acknowledge and embrace the possibility of ontological pluralism (Wals and Peters, 2018), whilst continuing to assure legitimacy of the knowledge produced within single disciplines rooted in explicit and self-referential ontological systems.

TABLE 1 | Simplified views associated with different ways of practicing science.

	Logical positivist	Social constructivist	Experiential/emergent
Purpose	Scientific practice allows to discover truths in the real world. It largely serves to understand the world's components and cause-effect relations between them.	Science is a social institution that produces knowledge and technologies, which reflect and reinforce prevailing values and power structures.	Science structures inquiry and allows learning. Inquiry relies on interaction in practice and reflection.
Science and Situation	We can discover universally applicable laws that apply to natural phenomena across different situations.	Science is culturally conditioned and depends on language. Scientific concepts are in the imaginary realm, no single definition of truth. Speech-act theory asserts the role of language in change.	Practiced in a world of contingency, complexity and contradiction. Subjectivity of the researcher, personal experience, intentionality and normativity are all relevant and should be reflected upon.
Methods	All knowledge is based on data of experience and can be scientifically verified.	Methods such as discourse analysis can help the interpretative scientist to identify prevailing patterns of thought as well as marginalized voices.	Scientific method comprises formulating hypotheses, testing in action, observation and reflection cycles in practice, assuming non-linear causality.
Prevalence	This view prevails in the natural sciences, and in society at large.	This view prevails in the interpretative sciences and in some intellectual circles concerned with equity.	Increasingly prevalent view as addressing complexity and interdependencies is seen as necessary for survival.
Roots	Aguste Comte, Rudolf Carnap, Gustav Bergmann. Karl Popper's description of the empirical method, and reasoned, logical attempts of verification and falsification.	Searly, Austin, Jacques Derrida, Michel Foucault, Pierre Bourdieu. Thomas Kuhn's description of science as a social institution with strong gate keepers.	American pragmatism, systems theory, etc. Philosophers of science and cognition, as well as cognitive psychologists with an interactionist stance on knowledge.

SESSION 2. THE ROLE OF TOOLS AND REPRESENTATIONS IN SHAPING OR BREACHING PARADIGMS

This session serves to explore the question of the extent to which methods, tools and representations shape bodies of knowledge in disciplines—what aspects of reality are revealed or suggested, which may be distorted or concealed? Does the reliance on a specific set of tools promote or hinder breaches in paradigms?

The long evolution of humanity has been marked by the creation of ever more powerful tools that help us to develop representations of states and processes that are not directly amenable to detection with our senses because of issues of scale, distance or the level of abstraction. Modern science was born with the creation of special instruments for exploring Nature: telescope, microscope, air-pump, and mathematical techniques like decimal fractions and logarithms (Shapin and Schaffer, 1985). Now tools are often the focus of the scientific endeavour, like the particle accelerators at CERN or continental-scale radio telescopes. Normal science depends on a stock of standard tools, which can be so sophisticated as to require special expertise for their use, such as mathematical methods like statistics, computer simulation models and big-data. Then there arise social problems and conflicts between tool-users and tool-providers (Ravetz, 1971). Issues of competence and integrity are also encountered. Because tools cannot be tested like scientific claims (they may be inappropriate but never simply “wrong”), controlling their quality is even less straightforward (Ravetz, 2003). The crisis of “irreproducibility” in many research fields is partly a result of widespread misuse or abuse of mathematical tools (Bishop, 2019).

Another set of problems arises from those tools that represent objects and not merely manipulate them. This is most easily seen

in connection with statistics, where the mean of a data-set, or even its variance, tend to be treated as just another objectively given data point. In the sciences of complex systems, measurable processes that serve as proxies for their underlying causes are again prone to be taken as the real causes. There is no easy cure for such systematic misinterpretation of the empirical basis of science; awareness and criticism are the only protection against the error and vacuity that can result from misunderstood tools and representations.

One case study on tools and representations was based on the discussion of a PhD project on the fundamental properties of light-matter interactions by Ricardo Rojas-Aedo. The research sets out to reconcile formerly apparent contradictions between semi-classical and purely quantum physical interpretations thanks to the sustained development of technologies associated with ultrashort pulsed lasers. The temporal resolution achieved with these lasers makes it possible to study the interaction of materials with the wavy electromagnetic fields that make up light as a series of consecutive ultrashort constant fields, in a limit where the quantum concept of photons becomes meaningless. This approach therefore allows to open questions about the partly contradictory assumptions of classical physics and quantum mechanics and the nature of the study process itself.

SESSION 3. INSTRUMENTAL SCIENCE AND INTERDISCIPLINARITY: THE DILEMMA OF RIGOR OR RELEVANCE

This session is concerned with the tension between abstract “textbook science” and situated knowledge and the role of instrumental research that helps to relate insights from diverse disciplines to each other in relation to a practical problem (Krohn, 2010). The term “applied science” reflects a conception

that presents practical tasks as derivative, merely making use of some knowledge that is handed down by its creators.

Schön (1983) describes the nature of this complementarity and its relation to problem solving in practice by distinguishing the high ground of research-based theory and technique and the indeterminate swampy lowland of messy realities in open unpredictable systems with confusing ever-changing problems that defy any clean rule-based technical solution, let alone adhere to the strict boundaries between the canons of the disciplines. Both professionals and researchers thus face the “rigor vs relevance” dilemma, exacerbated by unfortunate associations of more “prestige” to the latter. Moreover, already in the 1980s some scholars (Rein and White, 1980) not only noticed the separation of research and practice in many knowledge fields but that research has often been captured by its own agenda.

The need for science to embrace interdisciplinarity for increased salience and for adequate lenses of analysis and action repertoires is discussed by Gibbons et al. (1994), Nowotny et al. (2003), and Krohn (2010). Boix-Mansilla (2010) notes that while interdisciplinarity features prominently on mission statements of universities are research proposals, cognitive processes central to interdisciplinary integration are not fully understood.

A case study on Educational sciences and practice by Bo Raber demonstrated a design-based research approach (Bakker, 2018) to develop learning materials for collaborative conceptual systems mapping in relation to practical sustainability challenges (similar to Newell and Proust, 2018) in diverse school settings. This iterative design process with empirical testing allows relevance to be constructed in collaborative approaches that involve researchers and practitioners—including in this case teachers and pupils—because the resulting methods design and the transfer guidelines are the product of a “reflective conversation with the situation” (Schön, 1983).

SESSION 4. SCIENCE IN SOCIETY: EMBRACING COMPLEXITY, CONTRADICTIONS AND VALUES IN RESPONSIBLE RESEARCH DESIGN

This session explores the urgent current challenges to the maintenance of quality in science. One main challenge is that the activity of research is now embedded in a more complex and dynamic context than can be captured by our inherited notions of traditional research approaches within the disciplines. Moreover, societies are increasingly pluralist with different groups defending different sets of values and understandings of the world. Questions for discussions include “what new quality criteria might look like, which better take account of the complex and dynamic social, environmental and technological context that research is embedded in?” Subsequently the session discusses “How can the design of research be brought up to date in view of these new requirements to quality control?”

For the effective conduct of science, the traditional scientific ideal of “Truth” is to be enhanced with Quality (a complex idea), Integrity (in the face of corrupting pressures), and Responsibility (to society and Nature) in science. Roots of social norms

of science (Merton, 1973) and the social contract of science (Guston, 2000) are explored. The concepts of quality, and quality assurance, are familiar to most, yet what contributes to quality will depend on the subject, the people involved, and the items being compared. It is a complex idea, with aspects that are pragmatic, technical and ethical. Attempts to systematically define quality according to standards (e.g., ISO 10005), have often resulted in the evaluation of administrative characteristics (“box-ticking”) (Gill et al., 2010). These authors argue that the ill-defined nature of quality is something that should be embraced, as it enables all concerned parties to participate in discussion regarding its meaning and relevance to the particular case.

In science, the most common tool for quality assurance is that of peer review. This process makes science almost unique, with the assessment performed by accredited practitioners rather than by users or external critics (Funtowicz and Ravetz, 2015). While internal peer review is likely to detect major errors and fraud, critics point out the process can be inconsistent, biased, and abused (e.g., Wennerås and Wold, 1997; Smith, 2006). Critics of the current disciplinary peer review process do not propose to remove it altogether, but argue for its expansion (Funtowicz and Ravetz, 1992). This is proposed not to cross boundaries between scientific disciplines, but to allow for proper public scrutiny. With the continued loss of public trust in science, there have been persistent calls for greater connectivity between science and society (Wals and Peters, 2018), urging science to become a more open and democratic activity welcoming public engagement.

Reframing conceptions of science in view of these challenges include developments of the concept of “Post Normal Science” (PNS) (Funtowicz and Ravetz, 1993), citizen science and transformative sustainability science. Post normal science is focused on demonstrating the inadequacies of the inherited sense of science by invoking the supremely uncomfortable proclamation “facts uncertain, values in dispute.” It emphasises quality (a complex attribute!) in the form of extended peer review of a community that is touched by consequences of the research as the touchstone of genuine science. In some forms of citizen science, citizen volunteers engage not only in collecting data but also in framing the research questions, choosing methods and defining acceptable evidence, this can also help the consideration of local contingencies in international research projects (Shirk et al., 2012; Haklay, 2015). Similarly, transformative sustainability science can include transdisciplinary approaches in which research is on tap and practice is on top in a similar manner (Schneidewind and Singer-Brodowski, 2013; Wiek and Lang, 2015; Grunwald, 2016; König, 2018). Such collaborative research practices suggest a shift from appropriating citizens’ contributions as in “research as mining,” to “research as co-learning” and “research as activism” rooted in socially critical transformative and transgressive traditions (Dillon and Wals, 2006; Wals and Peters, 2018).

Thus even when participatory research is not an option within a discipline, we do encourage researchers to view their projects not as stand-alone problems, but to consider them in the framework of dynamic systems, which in addition to scientific and technological components also include the social and ecological. Ensuring that the quality of the project

can be judged not just by a select few peers, but by the wider audience, will require considering the complexities arising through the dynamics of such systems, and addressing apparent contradictions as seen from various viewpoints, within them. Especially the question of framing and purpose of research deserve considerations of other groups than just epistemic groups.

A case study on citizen science for sustainable water governance by Karl Pickar explored the potential of citizen science as an approach to scientific inquiry that fosters stakeholder engagement, social learning and as well as more detailed, place-based and diversified data collection to allow a better understanding of the contingency of environmental problems and design of more locally adapted measures. Challenges of engaging non-experts in scientific research and implications for the notion of “quality” in science can be explored based on such examples.

SESSION 5. SCIENCE AND PROGRESS IN THE FACE OF EXISTENTIAL CHALLENGES

This session serves to create discussions of diverse understandings of the relation of science, technology, intention, action and progress and human futures. Thomas Kuhn in his book on the structure of scientific revolutions challenged the assumptions of the cumulative nature of science. In his scheme, cumulative progress occurs only in “normal science,” the puzzle-solving activity of articulating an unquestioned paradigm; really just one step on from the textbook exercises on which students are trained. Real, revolutionary progress can happen only when this routine puzzle-solving doesn’t work, in the discoveries of “anomalies” that can’t be resolved, for instance if Nature itself makes prior scientific achievements seem problematic. Progress in that sense may thus an evolution not of how much we know, but of what we wish to know.

In America, the focus was on practice, and the leading philosophers called themselves “pragmatists.” For them, the (never-ending) search for Truth in science was less important than its usefulness. Their two most influential thinkers were also distinguished scientists outside the traditional theoretical group; William James was a psychologist and John Dewey an educationalist. For them, Knowledge is the foundation for beliefs that guide us to get what we need and want. All knowledge is justified to audiences, and knowledge can thus be equated with “justified belief.” The quest for certainty should be replaced with a demand for imagination, for a better world, including for example changes required for more just and equitable democracies. According to John Dewey we should also ask ourselves whether we are asking the right questions of which aspects of our understanding of the world may need to change, in order to serve us better.

Interdisciplinary research approaches exploring the relation between science, knowledge, technology and prevailing social norms, structure and practices have developed helpful heuristics to explore such questions. For example, Socio-technical Imaginaries (STIs) are ‘collectively held, institutionally stabilised,

and publicly performed visions of desirable futures, animated by shared understanding of social life and social order attainable through, and supportive of, advances in science and technology (Jasanoff and Kim, 2015). STIs cut through the binary way of thinking in terms of agency and structures by focussing on the nature of their relationship and the hybridity of the term opens windows on co-produced realities.

But how can we learn to approach the future as open, with or without resorting to more structured modes of scientific inquiry, rather than simply an extrapolation from our present views and needs? A promising tool is scenario development, where participants are confronted with diverse and possibly contradictory perspectives (Swart et al., 2004; Ramirez and Wilkinson, 2016; Drenth et al., 2018). More recent transdisciplinary research on alternative futures relating to sustainability challenges clearly confirms that approaches such as participatory processes to develop sets of scenarios can serve as a frame for participants to consider futures as open. They can then escape from just arguing from their own experience, when confronted with diverse and possibly contradictory perspectives (Swart et al., 2004; Ramirez and Wilkinson, 2016; Drenth et al., 2018). Moreover, scenario approaches also have the potential to build competences strongly associated with sustainability, including the capacity to take part in *systemic sustainability dialogues* that foster a participatory creation of systemic knowledge and coping strategies in “wicked problem” situations. It accomplishes this by applying systems thinking in the development of scenario narratives, thereby recognizing interdependencies, and anticipating different futures and pathways.

CONCLUSIONS ON PRACTICAL IMPLICATIONS AND LESSONS LEARNED

In sum, the ambition of this doctoral school course is to open a space for critical reflection on one’s own research in order to reframe merits and limitations of the approach through dialogue with others who have an entirely different ontological understanding of the world (with different basic assumptions of what elements the world is made of, and how they interact). Learning often happens by challenging boundaries of (material and social) learning environments (Brown et al., 1989), thus the cross-faculty setup is particularly important for its success. Learners—including teachers along with students—need to be challenged by the experiences and perceptions of others in a dialectical manner. Embracing complexity, conflict, uncertainty and ignorance starts with the acknowledgement of plural rationalities and contradictory behaviors that can be discovered to be useful resources within diverse groups, organizations or networks.

Quality attributes of this course can thus be seen to include the diversity of understandings from a diversity of theories and methods, including the natural, social and practice-based sciences and humanities. Evaluation of learning in the course is qualitative and is based the competence fields of the pedagogic framework in **Figure 1**. This section presents a synthesis of

observations from class discussions in 4 years of running the course, analysis of the final reports participants submitted in which they synthesise main insights gained from the readings and class discussions for each session and for the course as a whole in relation to their PhD research, short evaluative conversations with participants after completion, feedback on the course by students received in e-mails, as well as statements made in a short feedback survey questionnaire that was administered electronically after the most recent edition that ran from March to May 2020.

Main lessons learnt in the course relating to the competences for reflexive research depicted in **Figure 1** include:

1. Acknowledging values and contradictions in research:

Several students were also surprised at the wide range of understandings of roles of researchers and quasi contradictory meanings of responsibility depending on which field of research you are engaged in.

Challenges of communication across different disciplines were discovered to be unexpectedly challenging: Absence of “common languages” (indeed, “fragmentation is huge!”), barriers to dialogues: course was an eye-opener in terms of how “entrenched” everyone (incl. myself) is in their own terminologies and concepts (even within same disciplines!)—how difficult it is to explain own research to others—and to be able to understand and relate to other research (confirming increasing difficulties in peer review)—how can science contribute to societal debates and processes, if researchers among themselves have problems in having dialogues about what they do, how and why?

“It was fascinating to see how difficult it actually was to generate understanding across researchers from different faculties, when talking about our Ph.D. projects! Many of us did not really manage, and only got questions on our research once the facilitator paraphrased and reiterated some things we said in different terms and with different questions.”

“Challenges of Transdisciplinary Research Design were clearly highlighted to me in the seminar in terms of ongoing exchanges with societal actors to ensure saliency and “validity”, notably via feedback on interpretations, results – scientific “quality” then possibly also emerging from “being close to society/actors”, including experiments with methods, while ensuring some coherence and consistency.”

From the very cross-cultural setting of the University of Luxembourg the organisers noted with surprise how consistently participants from Latin American universities, the continent of Paulo Freire, excel in reflexivity and have a concern for justice. Western science was more than once associated with colonialism, past and present. And they have been taught similar courses and have substantial acquaintance with theories of knowledge regardless of their subject of study—be it theoretical physics or social sciences. The theory of Post-Normal Science is becoming well established there; this provides a basis for the critical awareness of science that this course attempts to foster (Giatti, 2019).

2. Disciplining complexity?

Several participants noted on the surprise that upon closer reflection the purpose of research is not self-evident, but itself contested, especially if viewed from another discipline and field. Discussions clearly highlighted some of the merits and limitations of, respectively, transformative research (challenge-driven, practice-oriented—never neutral, openly normative, quality standards are tricky) and “positivist” science (belief in objectivity, clear fixed quality standards, but rarely reflexive). Participants appreciated hearing how other fields of science see their role in society and how they choose research questions. Illuminating questions were: what is deemed necessary, what is a good question in the light of the existing paradigm, what is ignored, and which questions are deliberately left unasked.

“The main insight for me was to see how deep fragmentation runs in sciences, how very difficult it is to actually have dialogues between different scientists, how difficult it is for everyone to make own assumptions explicit and to question them, see problems from different perspectives, how much more reflexivity and spaces for dialogues are required to actually be able to practise interdisciplinary (how little reflexive researchers are in general about their own research and discipline/field), how important reflexivity is! A huge challenge for universities and researchers!”

3. Dependency on methods and tools

Statements by participants noted that it was very enlightening to inquire into how scientific knowledge has been “shaped” by the invention of specific technologies, and vice versa, and gone hand-in-hand with wider societal developments—how science, technologies, society have “co-produced” (STS) each other—thus seeing own research as part of wider human-environment-technology systems, and as inevitably “situated”

“This ... brought me to reflecting seriously about quality and saliency (for societal challenges) how they can be “achieved” through approaches such as the triangulation of methods.”

“The importance of openly addressing ambiguities, blind spot, etc. of own research is now clear.”

4. Understanding contingency

Further, the course was appreciated by several participants to provide perspective and the structural reasons for “the fate of their research projects.” These were in terms of initial hopes and aspirations to shed light on vexing societal problems that often get truncated to fit into the tight shoe of a discipline...

“It was interesting to me to see the difference between investing effort in definitions versus investing efforts in understanding—where real understanding often was only achieved in relation to a specific situation.”

5. Open futures

It is also clear that some topics were more successfully and in depth assimilated than others. No participants ventured forth to discuss the relation of their research to understandings of

progress and open futures and uncertainties. Accordingly, we will revise readings and approach to this Pandora's box and reflect how to scaffold this part of the course in a more reassuring way. In the end it is also about building emotional certainty in the face of uncertainty and making this goal more explicit. The last year teaching in the virtual realm during the pandemic was certainly not conducive towards achieving this—learning in this domain will likely largely depend on the quality of relation between peers and the mentor such that the course is perceived as a safe space.

More general feedback also on matters of practical implementation included that the volume of assigned reading was too high. There were also a large number of general positive statements two of which that are deemed representative of many voices are included below.

“(It) was the only opportunity offered throughout my PhD to truly critically reflect on my research, and about what an engagement of ‘producing knowledge with scientific methods’ may actually mean for myself as a researcher and for society at large.”

“This course was one of the most satisfying, challenging, and fulfilling I’ve ever participated in.”

Implications for Organization of the Course in Future and Adaptive Trials in Diverse Settings

- Explicitly invite participants to present their research in “lay language” to others—explaining why the research is (potentially) important for society, their own purposes they pursue (motivation), as a basis for dialogues (including “extended peer communities”).
- Include reflections on the history of their own discipline/field (origins, mission, core understandings) and how their thesis relates to that history (might be a way to get to underlying assumptions, which can be very difficult).
- Add one assignment initially for participants to develop a personal intellectual development path that brought them to their current research topic, questions and approach. As suggested in Kemp and Nurius (2015).
- We will in future based on this analysis hold a scenario workshop in which participants are invited to describe perceived salience of intentions and quality of expected outcomes in three different scenario worlds developed as part of other research projects of our team in Luxembourg.
- In particular the one course run during the Covid-19 related Lock down that was confined to dialogues in the virtual realm showed that digital dialogues might need more/different scaffolding opportunities for participants to truly engage with what they say about each other's research, and not only what is said about shared literature, or what the convener of the course says.
- More opportunities to meet each other as people also in different contexts (go for a drink!) as well as researchers and get to know the cultural diversity as well as the scientific disciplines.

It should also be noted that the course considers transformative learning to be a life-long iterative process (Sterling, 2004), doors which may be opened through collaborative engagement in projects that integrate education, diverse research paradigms and civic engagement (Gough and Scott, 2007). In the five sessions, these doors cannot be opened, but at least can be made visible and explicit.

Furthermore, the goal is to equip researchers and in a next step, to invite them to return back to their respective research groups and present these debates within their closed circles of peers to act as change agents and multipliers across faculties and research groups in universities who choose to institute this course. Critical analysis of participant's research projects serves as the basis to clarify how disciplined research approaches may simultaneously reveal, suggest, distort and conceal different facets of realities by focusing on particular systems, scales of analysis, fineness of perception, and time spans. Ultimately, the goal would be to get all research groups across the university to explore jointly with their doctoral researchers the dependence of knowledge fields on their respective methods and tools, as well as on their conceptual foundations and prevailing assumptions.

In sum, these foundations equip one to reflect more competently on the merits and limitations of one's own research, and its relation to its social contract and ethics. Such reflexivity and dialogues across specialised fields may enable a more critical approach to disciplinary assumptions, and a better understanding of the challenges of truly interdisciplinary, or even transdisciplinary, research design. This reflexivity is required to address more complex societal challenges, and to reflect on the quality attributes within diverse fields of research in the turbulent times of the twenty-first century.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

AK wrote the manuscript while incorporating the individual contributions. JR helped develop the framework covered by the course, assisted with writing the manuscript, in particular the Introduction and Sessions 2 and 5. BR assisted with writing the manuscript, in particular the example of his own research and the pedagogical framework and principles. JS assisted with the course organization, and for the purpose of the manuscript with discussing Sessions 3 and 4 and general manuscript preparation. RR-A assisted with proof-reading the manuscript. KH assisted with formulating the discussion section. KP prepared the example based on his own research, assisted with proof-reading the manuscript.

All authors contributed to the article and approved the submitted version.

FUNDING

The development and organisation of the course described in this paper was supported and funded by the University of Luxembourg, as was the open access publication fee.

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ACKNOWLEDGMENTS

We thank all participants in the course from 2016, when first offered, to date. In particular we acknowledge Anne Begue and her team from the transversal skills courses at University level for a great learning environment. The University of Luxembourg has financed all needs to run the seminar, and the FHSE the teaching contributions by JR.

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Concern, Conception, and Consequence: Re-thinking the Paradigm of Higher Education in Dangerous Times

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OPEN ACCESS

Edited by:

Kim Ceulemans,
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Reviewed by:

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Materials Science and
Technology, Switzerland
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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 19 July 2021

Accepted: 03 December 2021

Published: 23 December 2021

Citation:

Sterling S (2021) Concern,
Conception, and Consequence:
Re-thinking the Paradigm of Higher
Education in Dangerous Times.
Front. Sustain. 2:743806.
doi: 10.3389/frsus.2021.743806

Discussion of the role of universities in relation to broad issues of sustainability has been current for some decades, although predominantly at the margins of debate and policy. Yet a recent rapid rise of concern—catalyzed by mounting evidence of climate crisis, biodiversity loss, pandemic disease and further systemic issues—is focusing renewed attention on the adequacy of the response of higher education to unprecedented times of urgency, uncertainty and threat. Whilst it is now widely acknowledged that the fate of the planet and of humanity hangs in the balance, there still remains an astonishing disconnect between pressing signs of global change, and the relatively closed world of higher education. A trend toward greening universities' operations is positive, but fails to engage or galvanize the cultural and value shift toward a holistic and ecological *zeitgeist* that is now necessary to generate widespread institutional systemic change. This paper delves into deep causal factors that have historically impeded the ability of universities to respond fully and effectively to present and probable future realities, pointing to the foundations of Western thought such as reductionism, objectivism, dualism, individualism, anthropocentrism, rationalism, instrumentalism and technocentrism that shape mainstream education policy and practice, overlain and reinforced in more recent times by neo-liberal conceptions of the purpose of universities in a modern economy. It is argued that these elements of our culturally shared worldview constrain our ability to perceive and respond deeply, fully and wisely to the global predicament, but also maintain destructive patterns of development. Whilst there is increasing acceptance that education must “transform” in order to—in turn—be transformative in effect, there is less clarity about the guiding assumptions and ideas that inform mainstream policy and practice, and about the philosophic value bases that can facilitate transformative educational thinking, policy and practice. A framework of three broad and complementary components of paradigm—Concern, Conception, and Consequence—is employed to outline the shape of the systemic paradigmatic shift that universities need to urgently navigate in order to maximize their ability to respond fully to contemporary socio-economic and ecological conditions and trajectories.

Keywords: higher education, sustainability, paradigm, system failure, ecological worldview, systemism, transformative learning, regenerative education

"I believe that (the) massive aggregation of threats to man and his ecological systems arises out of errors in our habits of thought at deep and partly unconscious levels."

-Bateson (1972)

".... why is higher education so averse to risk and difficult to change? Because the change sought is a deep cultural shift."

-Cortese (2003)

INTRODUCTION

The paramount challenge of our times is to secure a liveable future for humanity and the natural world. Now is the epochal moment in human history—whereby the net impact that universities have in the next few years will either help assure the future, or contribute to social, economic and environmental collapse sometime this century (Figueres and Carnac, 2020; Weyhenmeyer and Steffen, 2020).

There is mounting authoritative evidence of deep systemic global crises that show every sign of radically diminishing the quality of life and prospects of present and future generations, and at worst, may harbingers the end of human tenure on the planet sometime this century. The whole world is now living in dangerous times. A state of socio-ecological *sustainability* or maintained comprehensive well-being requires a prior state of socio-ecological *security* or stability, and this in turn, requires a prior state of socio-ecological *survival*. Yet we cannot be sure that any of these nesting conditions will be manifested into the future.

In her book on our "dark age" and the possibility of avoiding cultural and social collapse through renewal, Jacobs (2005) underlies the crucial role of education:

A vigorous culture capable of making corrective, stabilizing changes depends heavily on its educated people, and especially on their critical capacities and depth of understanding.

But time is short. Given this context, the overriding questions are these:

- how can universities urgently transform their ethos, policies and practices to function in service of the survival and well-being of humanity and the planet, at a time of growing instability and existential threat?
- how do we avoid universities adopting a reformist position in response to the multiple global crises, rather than the transformist response that the crises require?
- how can second and third- order learning within entire university systems be set in train that will engender their ability to make a critical contribution to human, biotic and planetary survival and flourishing?

These pressing questions center on what I have termed "response-ability" (Sterling and Martin, 2019). This refers to the ability and capacity of educational systems and institutions to respond markedly and proportionately to a precarious socio-economic and ecological mix which has been brewing for decades and which now threatens our shared future as well as that of our fellow species in the other-than-human world.

In this paper, I argue that education bears some historic and current responsibility for our current state of global unsustainability, that this largely arises from its perpetuation

of the dominant Western modernist paradigm or worldview, and that this now needs to be transformed urgently toward systemism, that is, a holistic, relational or ecological basis. As our actions and practice arise from the way we view the world, it is now essential that—as far as possible—we exercise critical reflexivity. This involves recognizing and "examining our own assumptions, decisions, actions, interactions, and the assumptions underpinning organizational policies and practices and the intended and potentially unintended impact" (Cunliffe, 2016). Further, such reflexivity is "is about having 'a heart,' it is not a technique but a way of being in relation with others that brings with it moral and ethical considerations" (Cunliffe, 2016).

At a deep level this means achieving "epistemic consciousness" or worldview awareness at individual, societal and institutional scales (Bawden, 1987). Our multiple predicaments are not simply external but arise, are manifested, and maintained at root from the limited and maladapted way we collectively view the world (Laszlo, 1989; Meadows et al., 1992; Capra and Luisi, 2014). More than 30 years ago, Maturana and Varela (1987) wrote:

...the chance of surviving with dignity on this planet hinges on the acquisition of a new mind. This new mind must be wrought, among other things, from a radically different epistemology which will inform relevant actions.

Therefore, it is only by consciously and determinedly changing our worldview at this critical juncture of the human story that we can precipitate wise and sufficient action to secure the future.

Below, a thought-model outlining three transformative shifts toward a postmodern ecological paradigm in higher education is proposed, encapsulated in three component parts, Concern, Conception and Consequence.

The paper does not look at the details of educational policy and practice that an ecological paradigm gives rise to (which I and others have covered extensively, for example Sterling, 2012, 2013; Assadourian, 2017; Armon et al., 2019; Wright and Hill, 2021, and which are elaborated in other papers in this Research Topic). Neither does the paper attempt to do much more than touch on the process of transformational institutional change as this is a whole further inquiry. Rather, it focuses on the essence of the shift that contemporary socio-ecological conditions now require.

My method has developed from very long involvement and research in education, particularly with respect to the challenge of orienting educational systems toward embracing sustainability fully. From this experience—including thorough engagement in related discourse over this time—I have developed an approach which is partly based on empirical observation, and partly based on deep reflection, and on philosophical and normative reasoning. In this approach I have been influenced by deliberative inquiry and by appreciative inquiry. But as a relational thinker, I was impressed years ago by Gregory Bateson's distinction between *deductive* and *inductive* thinking on the one hand, and *abductive* thinking on the other. Abductive reasoning is a way of developing new ideas from incomplete evidence and suggesting explanations and ways forward. For Bateson (1980), this approach led to his famous phrase regarding "the pattern that connects" phenomena. Indeed, the attempt to "find pattern"

is an appropriate description of the analysis, synthesis and development of the argument and associated models that are put forward here. They are “thought models,” and they are hypothetical and essentially propositional.

They are offered to help those work in higher education think through the essential problem which spurred this Research Topic, whereby the *Frontiers in Sustainability* Call for Papers on the “transformational role of academic institutions” underlined the need to re-imagine the societal role and responsibility of Universities. The Call notes that this will bear on “deep and rich epistemic roots”. As the paper offers propositional arguments, it is up to the reader to weigh their validity in relation to their own experience, and more importantly, how far they are useful and helpful.

Whilst the models were first developed in my doctoral thesis (Sterling, 2003), in this paper, the implications of the dimensions of paradigm, of levels of knowing, and of aspects of educational culture are brought together and specifically elaborated and discussed in relation to higher education—with a focus on the possibility of systemic institutional change in the context of renewed and urgent debate on this issue.

TRANSFORMING EDUCATIONAL SYSTEMS

The transformation of education and educational systems is receiving increasing and necessary attention in the growing debate on the role of education in relation to securing the future.

UNESCO has set up an International Commission on the Futures of Education (ICFE) to “rethink education in a world of increasing complexity, uncertainty, inequalities, risks and possibilities” (ICFE, 2021). Their interim report of March 2021 (ICFE, 2021) states that:

The ways that the planet has been transformed by human activity have profound implications for the purposes of education and organization of learning in the future. For too long, education has been based on a growth-focused modernist development paradigm. Moving toward a new ecologically oriented understanding of humanity that integrates our ways of relating to Earth, requires an urgent rethinking of education in the 2050 horizon.

This is an eloquent and promising statement, yet curiously, this well-intentioned document is very light on exploration of the cultural and paradigmatic norms that inform current thinking and practice, and on the ecologically based alternatives that would help the “urgent rethinking” that it advocates. In the absence of a convincing critique, and of a robust case for an alternative pathway, there is a real danger that “business as usual” will prevail.

UNESCO is also the agency behind the current international policy document on Education for Sustainable Development (ESD). This *Roadmap: ESD for 2030* (UNESCO, 2020) strongly endorses global progress to date on Education for Sustainable Development (ESD), and reflects both urgency and the need for transformative change in educational systems if the Sustainable

Development Goals (SDGs) are to be met. Resonant with the International Commission on the Futures of Education (above), the document states that “Education must transform itself” (UNESCO, 2020).

Earlier, in 2016, UNESCO devoted its annual Global Education Monitoring (GEM) report to *Education for People and Planet*. Subtitled “Creating sustainable futures for all,” a key message of the report was that, “education needs a major transformation to fulfill (its) potential and meet the current challenges facing humanity and the planet” (UNESCO, 2016).

The rhetoric is strong and well-expressed in these documents, but there is a deep problem which has handicapped UNESCO’s work for years. That is, its policy papers never adequately explore why the values and assumptions that shape mainstream educational policy *are as they are* (Silova et al., 2018): Why in practice sustainability education is—so often—not recognized or interpreted with narrow focus. Or otherwise rendered “safe.”

Another issue is UNESCO’s continuing reference (as reflected in their “Roadmap”) to the need “integrate” sustainability or ESD into education. As I have argued (Sterling, 2004):

The effect of patterns of *unsustainability* on our current and future prospects is so pressing that the response of higher education should not be predicated only on the “integration of sustainability” into higher education, because this invites a limited, adaptive, response. Rather, I will argue, *we need to see the relationship the other way round—that is, the necessary transformation of higher education toward the integrative and more whole state implied by a systemic view of sustainability in education and society, however difficult this may be to realize.*

Now, years later, the case for such re-thinking and re-making of educational systems is even more urgent.

The two current and influential initiatives—the International Commission on the Futures of Education, and UNESCO’s Roadmap—are of course important and very welcome. They indicate an incipient second-order learning in the international education community, comprising recognition that first-order “business as usual” education that has been dominant for decades is no longer viable, tenable or ethically defensible. Yet, by concentrating attention on Policy and Practice, and largely bypassing Purpose and Paradigm, the UNESCO initiatives’ case for the substantial transformation of educational systems—and thereby its prospect in terms of impact—are seriously weakened.

Rather, we need to attempt to consciously “step outside the usual frame of reference” (Ison and Russell, 2000) and exercise individual and collective reflexivity as an “ongoing process of inquiry” (Moore et al., 2018) in order to see and acknowledge the operative power of the dominant paradigm. As I have written previously (Sterling, 2013):

Higher education still largely reflects the Western intellectual legacy from whence it came, rooted in the memes of the prevalent education epistemology—reductionism, objectivism, materialism, dualism and determinism underlain by a mechanistic metaphor—refracted from the wider cultural milieu and exerting an influence on purpose, policy and provision, as well as in educational discourse.

These habits of thought reside in the subterranean layers of the university culture and manifest in the educational landscape above the surface: hierarchical governance, single disciplines, separate departments, abstract and bounded knowledge, belief in value-free knowing and a reluctance to engage with ethical matters in the curriculum, privileging of cognitive/intellectual and technical knowing over affective and practical knowing, prevalence of instrumental rationality, transmissive pedagogy, linearly arranged learning spaces, valuing of analysis over synthesis and an emphasis on first-order or maintenance learning which leaves basic values unexamined and unchanged both individually and institutionally.

The writer on system designs of education, Banathy (1991), argues that the dominant paradigm cannot, “possibly cope with the complexity, mutual causality, purpose, intention, uncertainty, ambiguity, and ever accelerating dynamic changes that characterize our systems and larger society environment.” Some 30 years later, the veracity of this view is becoming ever more evident. My own research led me to posit a transformative paradigm of *sustainable education* (Sterling, 2001, 2009) proposed as a cultural shift built on individual and institutional learning informed by ecological and systemic thinking and values. There is therefore a most important distinction between “sustainability education” which often represents a change in pedagogy and curricula, and “sustainable education” which represents a transition of educational culture as a whole. The latter promises a liberatory escape from the bedrocks of the prevalent education episteme (reductionism, objectivism, materialism, and dualism) overlain by the impoverishing effect of neo-liberal thinking, and maintained by a collective psyche that exerts an unexamined influence over purpose, policy, and provision and associated educational discourse.

These constraining influences combine to effect a kind of inertia in educational systems. This can be illuminated by the ideas of system failure. This in turn further evokes questions of worldview/paradigm and the promise of transformative learning within educational systems.

SYSTEM FAILURE, LEARNING LEVELS AND WORLDVIEW

Historically, high level international documents and reports—from the UN Conference on the Human Environment 1972 to the present—have repeatedly endorsed education’s role vis-à-vis sustainability and ensuring well-being. Yet at both national and institutional levels the ensuing debate has largely taken place on the margins of mainstream discourse and educational policy—with little tangible and substantial effect on either over the last two decades. By and large, higher education remains maladapted to the global conditions that are now determining the future (Assadourian, 2017). Our learning system is not itself learning (Sterling, 2009, 2017).

However, in very recent years—galvanized by incontrovertible evidence of multiple global crises, and challenged by the UN Sustainable Development Goals (SDGs)—the scale of change required is beginning to be recognized in higher education,

at least by some of the world’s more progressive universities and networks although it is mostly affecting research agendas rather than teaching and curricula. However, the discourse around higher education and the SDGs tends to center on process and implementation, rather than adopt a critically reflexive stance toward the assumptions and norms that frame the SDGs (Wulf, 2020; Sterling, 2021; Wals, 2021). Yet the SDGs have led to a significant wave of interest, response and innovation across the higher education sector (see for example https://blogs.upm.es/education4sdg/?mc_cid=a1c356dbb6&mc_eid=127096ab79) and <https://www.iau-hesd.net/contenu/4648-iau-global-cluster-hesd.html>) and some of this work is exceptional.

But this is a late and yet partial dawn: education’s part in helping secure the possibility of a more sustainable future has for years been predominantly the domain of enthusiasts and the newly concerned—among them of course, vocal students who currently recognize in increasing numbers that their future is very much at stake (see for example <https://fridaysforfuture.org/> and <https://www.teachthefuture.uk/>). Meanwhile however, as David Orr suggests, most senior managements, “calmly regard the transition ahead as fine-tuning of more of the same” (Orr, 2016). This limited response represents first-order learning, and it falls well short of the “deep cultural shift” (to use Cortese’s words, above) (2003) that is now urgently needed.

We can invoke here the notion of “system failure.” According to Peters (1999) failure can be considered to be of four types: objectives not met; undesirable side effects; designed failures; and, inappropriate objectives. Criticism of education—particularly in political debate—often centers on the first meaning, but given the incontrovertible imperative of educating for socio-ecological survival and well-being, education largely “fails” in terms of the other aspects of system failure: undesirable side-effects include widespread ecological/sustainability illiteracy and its consequences, many participants and actors in the system are dis-engaged or stressed through the design of the system, and most seriously, the purposes or objectives of education whether at national or institutional level largely fail to take into full account the urgency of global challenges. Jacobs (2005) critiques a narrowing of purposive horizons in universities from the mid-twentieth century onwards—from embodying education *per se* toward what she terms “credentialling” in the service of the economy. At a deeper level, Orr (2021) points out that, “The planetary crisis cannot be attributed to the uneducated, but rather to the highly degreed....The important problems are those of education not those *in* education.”

I argue (Sterling, 2004) that the root of this system failure is our shared worldview or social paradigm—anthropocentric, materialist, dualist, positivist, reductionist, objectivist, rationalist, individualist, to name some key complementary characteristics. Here, I follow Gregory Bateson’s iconoclastic critique of the Western mindset as possessing “*errors in our habits of thought at deep and partly unconscious levels*,” an “epistemological error” characterized by both a *perception of* and *belief in* separateness which, while it works to a degree, is ultimately destructive (Bateson, 1972). Our dominant mechanistic worldview or epistemology (McGilchrist, 2009; Capra and Luisi, 2014;

Smitsman et al., 2019)—held partly at non-conscious levels—has given rise to and maintains an unsustainable and degenerative relationship with the ecosphere, and this same epistemology is dominant in and perpetuated by Western educational systems. The deleterious consequences of this worldview have been compounded by the ideologically oriented neoliberal economic paradigm that has dominated political, social and economic policy since the late 1970's and which has ushered in, “not only the greatest inequality and ecological destruction humankind has ever known, but also failed to promote psychosocial well-being” (Costanza et al., 2020).

As education is a subsystem of society, then by an inexorable logic, education has largely been part of the overall system failure in the relationship between society and the ecosphere (Silova et al., 2018). Also see extensive discussion at <https://greattransition.org/gti-forum/pedagogy-transition>.

This presents a profound paradox and irony: the agency that is charged with the provision of education and learning in service of the future—i.e., the education system and its component parts including higher education—is part of the unsustainability problem it needs to address. The education system itself might be characterized as a “wicked problem.” Yet education is seen as a critically important part of building a safe future (UNESCO, 2020; ICFE, 2021).

Whilst the term “system failure” is not employed by UNESCO, the emphasis on the need for fundamental change in educational systems is now strong. This is central to its recent and current policy documents, and specifically its current “roadmap” to address the SDGs by 2030 through education:

To ensure individuals are able to understand sustainability challenges, to be aware of their relevance to the surrounding realities, and take action for change, to trigger structural transformations in today's economic and social systems by promoting alternative values and contextualized methods, to address the new opportunities and risks on sustainable development posed by emerging technologies, education needs to transform itself (UNESCO, 2020).

In this paper, I follow systems thinking practice by offering a holistic analysis and model at a high level of abstraction—a “big picture” method which helps deal with complexity by providing “a wider context for thinking processes” (Chapman, 2002). Chapman argues that it is the lack of such holistic perspectives that contribute to systems failure. Consequently, in this paper, and through offering a number of “thought models,” I offer holistic/systemic perspectives that I argue are necessary if education is to “transform itself” as UNESCO makes clear is now urgent.

Gregory Bateson (1972) made a seminal distinction between different *levels of learning*, which has had a profound effect on learning theory, and can help us move beyond repeated system failure in education. The language of transformation directly implies learning within the system such that *the system itself is changed*. This is second-order learning, and beyond that, third-order learning (epistemic/transformational learning) can occur. Ison and Russell (2000) note that:

In order to achieve (this) it is necessary to *step outside the usual frame of reference* and take a meta-perspective. First-order change is change within the system, or more of the same (*my italics*).

Rather, we need to unlock deep systemic change, and thereby unlock the potential of higher education toward securing a more sustainable world—and rapidly. Arguably, as the systemic crises bite, our shared “epistemological error” of separation is becoming ever more apparent (even if it is not labeled as such). The realization of profound human and biotic/biospheric interdependence is breaking the illusion of separation and disassociation and giving rise to “a relational, ecological or participative consciousness appropriate to the deeply interconnected world that we have created” (Sterling, 2007). The emergence of the ecological worldview may be seen as evidence of a deep learning process of social change including unlearning (Moore et al., 2018).

This process now appears to be accelerating toward a kind of cultural *zeitgeist* (Dash, 2019) which may, or *may not*, prevail. It entails a shift of emphasis from relationships largely based on separation, linearity, control, manipulation, growth and excessive competition toward those based on context, holism, circularity, participation, appreciation, collaboration, limits, equity, peace and social and ecological justice. It is otherwise referred to as “participative” (Reason and Bradbury, 2001) “co-evolutionary” (Norgaard, 1994), and as the “postmodern ecological worldview” (Zweers, 2000). Alternatively, it is described as a Gaian or “living systems” (Elgin, 1994) view of the world, which accords with many non-Western indigenous perspectives and long-held traditions (Smitsman et al., 2019). Fundamentally, it is challenging us to rediscover our humanity and our place on the planet whilst there is still time.

In this emerging context, the appropriate and necessary response is that higher education institutions move toward becoming—primarily—systemic learning organizations whereby transformative and iterative learning occurs *within* education systems and amongst policymakers and practitioners as well as students. The university then becomes over time an adaptive, innovating institution engaged in a continual co-evolutionary learning process with community and society, shifting from a “delivery” role to one of critical engagement (Fear et al., 2006; Martin and Sterling, 2019).

Banathy (1991) suggests this signals a change of purpose and role from education focusing on maintaining the existing state and operating as a somewhat closed system, toward helping reshape society, “through co-evolutionary interactions, as a future-creating, innovative and open system.”

This maybe said to be a transformative shift of essence from reductionism toward *systemism* [relationism, or relationality (Lange et al., 2021)] as a fundamental principle of educational thinking, policy and practice. *Systemism* is a belief or view that a systems view of the world is an appropriate metaphor for understanding the world, our interrelationship with it and acting in it. This is a “fundamental change of metaphors from seeing the world as a machine, to understanding it as a network” (Capra and Luisi, 2014). It is a shift which is now gaining much

more attention in discourse, and it marks the emergence of the ecological or living systems view of the world.

FINDING THE KEY

My professional work as an educator began over 40 years ago—with an early conviction that education and learning had a critical role in addressing (what were then seen solely as) environmental issues.

In all those years, I've been more or less perplexed as to why education has not responded proportionately to the great real-world issues that would affect the lives of those who were being educated. Why, as Lautensach (2020), there has been and remains a “chronic consensual blindness and inertia” in higher education. But I've also been questioning how far, and why, education has too often been more of a contributory than a remedial influence in the generation and growth of these issues—in part, responsible for the global conditions of unsustainability that universities are now being required to address. My work culminated in a doctoral thesis (quite late in my career) on whole systems thinking, paradigm change and education (Sterling, 2003) which to some extent informs this paper.

This research over some decades has sought to develop insight into understanding why mainstream educational discourse, policy and practice manifests as it does, and into its adequacy for our times of existential threat. Secondly, I have explored the alternative bases on which education that is commensurate with the current profound need for cultural change toward a safe future can be realized.

The deeper level which has been central to my work has been that of *paradigm*. As systems thinking leader Donella Meadows writes (1999) the most powerful lever of change is, “The mindset or paradigm out of which the system—its goals, power structure, rules, its culture—arises.” Paradigm refers to the underlying set of perceptions, assumptions, values, and concepts which have internal consistency—that at individual level may be seen as equivalent with worldview, and similarly at societal level, with its prevailing cultural belief and value system (Capra and Luisi, 2014). In educational terms, a dominant paradigm affects how educational realities—purpose, policy, practice—are viewed and, therefore also, how they are shaped and manifested.

Insight here provides a key to unlocking answers to fundamental questions such as why education discourse is framed in a particular way, why certain values and practices are upheld and others discounted, and why philosophical and practical alternatives are marginalized even when evidence is in their favor: Why mainstream thinking, policies and *modi operandi* prevailing in many universities constitute *resilient systems* which are resistant to the significant change that the sustainable futures agenda requires. And, importantly, why universities—in the business of teaching and learning—are not, with few exceptions, themselves systemic learning organizations. Examination and reflection at this fundamental level of paradigm is also essential to the articulation of viable, tenable and convincing alternatives that can challenge and transcend outmoded “business as usual” frameworks that still

hold powerful sway and within which most discourse, policy and practice lies (Laszlo, 2019; Wright and Hill, 2021).

THE TRIANG MODEL

In this paper, I propose an essentially simple yet potent triadic model intended to help those involved in higher education achieve some critical reflexivity with regard to the three fundamental shifts that are entailed in realignment. That is, moving from the dominant education paradigm (characterized by mechanistic control-oriented thinking, reductionism, instrumentalism, managerialism, standardization, the global testing culture (Smith, 2016) and neo-liberal conception and purpose) toward a more systemic, ecological, dynamic learning paradigm commensurate with - and necessary to work effectively within - current global conditions of uncertainty, complexity, emergence and threat.

It is important to note that it is not a matter of *superseding* the old (yet still current) paradigm – this is neither possible nor desirable. Rather, the holistic paradigm needs to be seen as *subsuming* the mechanistic paradigm (as in the relation between Whole and Part), whereby the latter's methods become tools for conscious use where appropriate, rather than remain unexamined habits of thought and practice. This accords with Wilber's evolutionary view of paradigm change, where a larger and new framing arises from a growing realization of the mismatch (or “incoherence” Bohm, 1992) between conventional and long-accepted ways of seeing/knowing/doing and pressing external realities (Wilber, 1996).

Years of shared practical experience have taught me that making this shift is extraordinarily difficult, particularly in institutions. As Homer-Dixon (2006) suggests, “we often invest enormous mental energy to maintain a perspective on the world that's at variance with reality.” So the challenge for those who are or might become change agents cannot be underestimated (Moore et al., 2018). There seems to be an element of lock-in and non-learning operating here, even as the encompassing conditions of complexity, systemicity, uncertainty and unsustainability become ever more evident in wider society (most recently evidenced by the Covid pandemic). At individual level, the maintenance of deep-seated worldviews tends to prevail despite evidence that they may no longer be adequate for changed conditions. It may be that Chapman's view (2002, p. 14) is true of many, who, he suggests:

...will not change their mode of thinking or operating within the world until their existing modes are proved beyond doubt, through direct experience, to be failing.

Whilst Bawden and Allenby (2017) worry that:

...it is entirely possible that in our slavish, non-reflexive commitment to the objectivist positivist epistemologies, atomist reductionist ontologies and individualistic neoliberal axiologies of the so-called Enlightenment epoch, we have fallen into an epistemic trap from which we are incapable of escape.

Yet current and worsening global trajectories make worldview change necessary and urgent. There are signs that it is taking effect. Metaphorical cracks are appearing as “business as usual” norms appear increasingly untenable in the current tightening conditions of multiple local and global crises. It may not be a cultural epiphany, but it seems clear that a late awakening and movement is underway (see for example https://www.eauc.org.uk/climate_commission).

In education, the change involves second- and perhaps third-order learning within university communities where increasing numbers of academics, professional staffs and students are seeking change, aware that the future is under threat. Meadows (1999) suggests that whilst paradigm change is the most powerful tool in whole system change, it is the hardest shift to achieve - and yet at individual level “it can happen in a millisecond. All it takes is click in the mind... a new way of seeing.”

The rest of the paper is an attempt to outline some of the grounding and broad implications of such systemic change.

A framework which can help illuminate and help realize this shift is (what I have named in this paper) the ‘Triang Model’ (triangular). It is a device that - through different interpretations - helps clarify the nature of paradigm. I first developed this model through my doctoral research (Sterling, 2003) <http://www.bath.ac.uk/cree/sterling/sterlingthesis.pdf> and have worked on its implications and possible utility since. Whilst the theory is elaborated in depth in Sterling (2007) and has been taken up by others (see for example Cook, 2019), this paper represents the first attempt to adapt the model to the context of the challenge to universities to adapt rapidly to the new conditions of global crisis and instability. I maintain that it may help deep recognition of and reflection on paradigm.

Before going further, note that I am using the term “epistemology” in the broad sense reflected in Bateson and Bateson’s (1988) definition of epistemology being about “the necessary limits and other characteristics of the processes of knowing, thinking and deciding”. I use “epistemology” here then, to mean or describe the operative way of knowing, thinking and valuing that frames people’s perception of and interaction with the world - their episteme - rather than the narrower sense normally employed in research. Hence, Milbrath (1994) describes worldviews as “epistemological structures for interpreting reality that ground their picture of “reality” in their own construction.” In brief, and to underline the point, the operational epistemology or “knowledge system” of the dominant techno-scientific worldview which influences us all, is essentially positivist, dualist, objectivist and reductionist, and based upon the root metaphor of mechanism.

The Triang Model can be seen as sets of three fundamental and interrelated dimensions (represented in Table 1). These can be interpreted variously. So reading down and across simultaneously, the interpretations may be seen as different expressions of (any) paradigm operating at individual or group level.

For the purposes of this paper, and with respect to universities, the triad can be interpreted or translated as the domains of *Concern*, *Conception* and *Consequence*, suggested here as

TABLE 1 | Triang model: dimensions and interpretations of paradigm.

Seeing domain	Knowing domain	Doing domain
Perception	Conception	Practice
Affective dimension	Cognitive dimension	Intentional (design) dimension
Epistemology (+axiology)	Ontology	Methodology
Ethos	Eidos	Praxis
Concern (purpose)	Conception (operation)	Consequence (effect/impact)

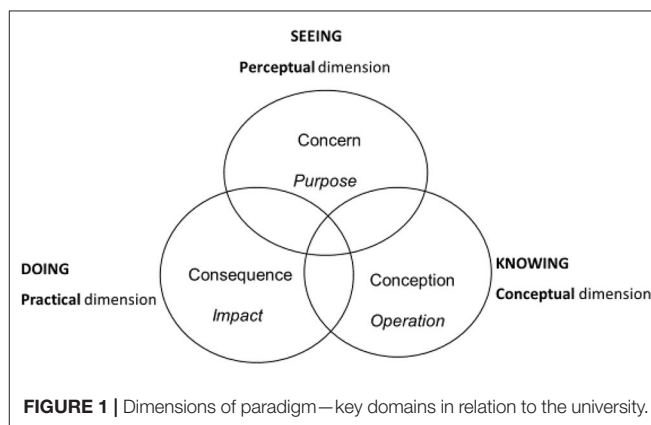


FIGURE 1 | Dimensions of paradigm—key domains in relation to the university.

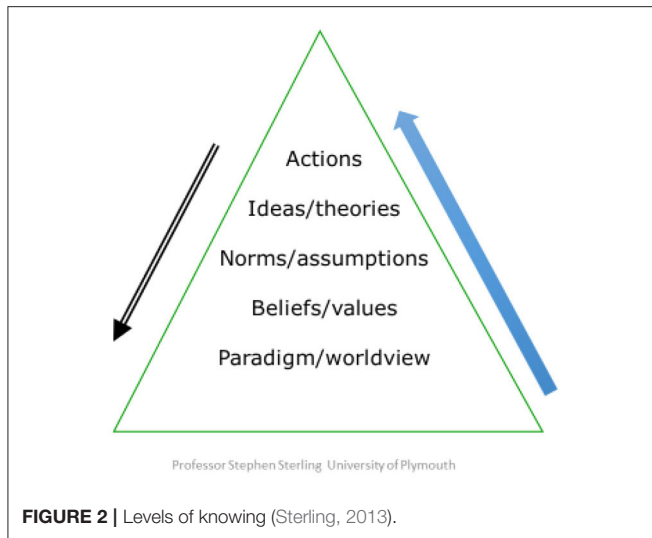
representing the essential architecture or pillars of the university’s Purpose, Operation and Effect (Table 1; Figure 1).

Before elaborating how this apparently minimal model can help us chart a course toward a more holistic and ecological educational paradigm, it is necessary to review the fundamental influence of paradigm.

THE POWER OF PARADIGM ON LEVELS OF KNOWING

The prevailing educational paradigm may be seen as a subsystem of the dominant cultural worldview which it reflects and within which it is embedded. This raises an important question regarding the relationship between the two system levels: While the possibility of change in the educational paradigm is certainly limited by the encompassing cultural and political milieu, meaningful movement toward holistic policy and practice is not hopelessly blocked or frozen - particularly at institutional level, yet it is likely to be constrained. Not least, the effectiveness of such movement is dependent on the prior awareness and understanding of change agents as regards the operative paradigm, and their possession of sufficient imagination, will and agency to move beyond it.

Through my doctoral research (Sterling, 2003), I first developed a hierarchical thought model depicting what I termed “systemic levels of knowing” based on a systems view of thought (Bohm, 1992). This suggests a number of layered levels of human knowing, whereby foundational levels shape and inform more immediate and everyday levels (upward arrow - see Figure 2). Conversely, a weaker relationship may be assumed whereby



experience in the world can partially affect foundational levels of perception and knowing (downward arrow). This “downward” affect, however, can at times be strong, for example, through transformational experience which radically revises worldview.

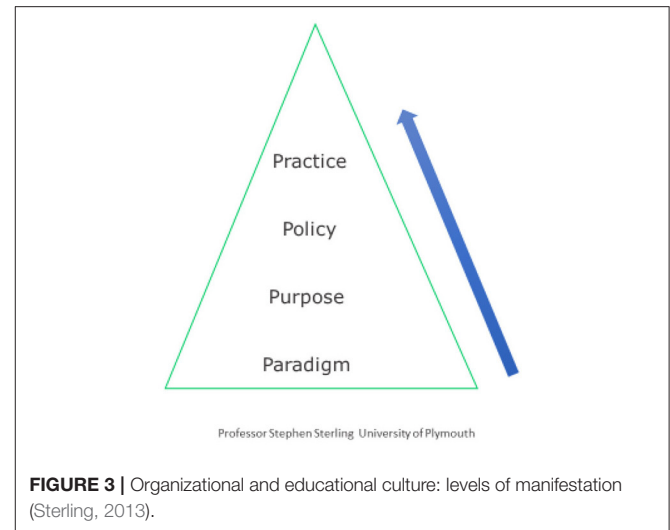
The model provides a simple map that invites the exercise of critical reflexivity – a quality that is key to transformative learning and action. With this model in mind, greater consciousness of how deeper perceptions and conceptions can inform everyday thoughts and actions may be developed. Further, it invites clear reflection on the nature and possibility of *alternatives* at this foundational level, and the validity of philosophic bases and assumptions that accompany and legitimate such alternatives.

Assuming its validity, the model appears applicable to each person, but also to institutions and entire societies which share any prevailing worldview. A critical point is that, while we are operating in the world of everyday experience, decisions and actions (top of diagram), we are not always aware of deeper levels of perception, assumptions, values and concepts that affect our mindset and behaviors (whether at individual or at group scale).

There is no simple determinism at work here: it is well-known that we sometimes take actions that belie our deeper values, nevertheless there is an overall logical pattern of norms operating between the levels, which form a coherent whole. That is, the whole framework may be seen as an operational paradigm. A second key point is that diversity and difference of interpretation at the more immediate or upper level of knowing (for example in different academic disciplines) can disguise the fact that the underlying worldview may be widely shared. In educational terms, a quote by Lawton (1989) is illustrative:

Every statement that a teacher makes in a classroom is value-laden, connected with ideas about the purpose of education, probably connected with more general values and beliefs, and maybe with the purpose of life. So it is with educational planners and curriculum developers, whether they realize it or not.

A third key point is that, whether the subject is an individual, or group or institution, significant change is easier and more



likely at immediate and practical levels rather than at deeper levels of knowing. Put simply, a strong challenge to how we see the world – the worldview – is a challenge to beliefs, identity, and sense of reality and is therefore likely to be resisted. This helps explain why educational systems and universities are resilient systems, why the response to the sustainability agenda tends to be superficial and partial, and why the profound significance of the sustainability agenda is so often not fully comprehended, or misunderstood.

If we then interpret and overlay the systems “Levels of knowing” framework in terms of educational systems, the following model is suggested, which (in English at least) reflects four nesting “P”s – Paradigm, Purpose, Policy, and Practice (Figure 3). This layered relationship is not directly causal or simple, but again, we can suggest an overall pattern whereby deeper levels of educational culture influence conception and action at more immediate levels.

The deep significance of this layering is that *the operative shared paradigm – its embedded assumptions, beliefs and values – shapes, influences and limits debate and practice*. It molds the culture of debate and practice as regards what are seen as norms, and conversely, what is seen as marginal, unimportant or irrelevant. The paradigm has added potency where it is unconsciously held or unexamined, and I believe this is often the case institutionally, and amongst individual actors within higher education. As Chapman argues (2002):

Most people are not aware of how they think. This is not because they are unintelligent, it is because their mode of thinking has evolved over many years, has served them well and does not need to be examined or questioned.

Attention in education is usually concentrated on the upper levels of manifestation – policy, research, curriculum and pedagogy, whilst *purpose* is often assumed or seen as self-evident, and *paradigm* unexamined and ignored. In other words, most institutions operate within a culture of what Gregory Bateson

(1972) called Learning 1, or first order learning where policy and practice operates within a given and largely unexamined set of parameters, assumptions and values (Glasser and Hirsch, 2016).

These models help illustrate the challenge of “transformation” as currently advocated by UNESCO and others. Following Meadows’s (1999) theory of paradigm change, if we can re-evaluate and re-think the foundational paradigm, then it follows that Purpose, Policy and Practice in higher education – and perhaps across any individual institution – will be affected toward a more ecological orientation. The next section elaborates and further explains the Triang Model as a tool for helping this process.

CONCERN, CONCEPTION, AND CONSEQUENCE

This triadic model attempts to distill out - from the complexity and “mess” of organizational change - three paradigmatic dimensions or components that can act both as lenses on current patterns, and as navigational signposts to alternatives. It is offered to help stimulate thought and reflection.

It important to note that these three dimensions are interrelated and mutually affecting (see **Figure 1**).

CONCERN

This is the “Seeing Domain.” It relates to Perception and perceptual boundaries, and at individual level subsumes the affective and feeling dimension. In terms of the institution, it applies to how a university sees itself and in relation to the world and planet. It subsumes the institution’s ethos and dominant assumptions, its culture, its sense of purpose, what it “stands for,” and what it values. In systems terms, this is the institution’s “system of concern” or “system of interest,” or “horizon of attention” (Bell and Morse, 2003). It is important to note that the system of concern is evidenced by what a university *actually does*, as opposed to what it *says* its purpose is – a critical distinction made by the systems theorist Stafford Beer (see https://en.wikipedia.org/wiki/The_purpose_of_a_system_is_what_it_does).

Ironically, despite the expansionist globalization and the internationalization agenda in higher education in recent years, the system of concern for many universities has become narrowly drawn and strikingly similar worldwide. Concerned primarily with income, financial sustainability, status and positioning, ranking and reputation in a competitive market, most institutions have - for some years - lost “the capacity to engage in critical reflection and advance ways of thinking and acting that go beyond their immediate mandates” (Escrigas, 2016). Further, she writes, universities need to “learn to read reality,” and “understand the wider impacts of their actions and the costs of what they are *not* doing at a time when societal transition is urgently needed.”

The common system of concern has suffered from a narrowing that has been considerably aggravated by the utilitarian effects of the marketization and commodification of

the sector. Further, the notion of higher education as a *public and common good* has been eroded, whilst the ethical norms of the university have become subsumed in serving the economy and growth (UNESCO, 2015).

The challenge here is to go the other way – an ethically-oriented extension of vision, involving conscious re-purposing, and *expanding* the system of concern to take *full account of context*: of the current precarious state of the world, of planetary limits (Rockström, 2009) of future scenarios, prospects and possibilities, and questioning deeply the role and responsibility of the university, and of each of its subsystems, in relation to securing socio-ecological well-being into the future as far as this is possible. Escrigas (2016) remarks, “an expanded perspective provides space to consider additional ways to understand reality and to generate innovative solutions to persistent problems,” as well as “embrace a way of connecting different types of knowledge, acknowledging their existence and giving them equal value.”

CONCEPTION

This is the “Knowing Domain” and at individual level is the cognitive dimension. In terms of the institution, it relates to overall pattern: how things are conceived, manifested and organized. It covers how knowledge is regarded, and therefore not only embraces the organization of research and curriculum, but how universities are structured (such as separate disciplines and departments), campus management, and governance.

In this domain, the mechanistic and reductionist legacy of the Western intellectual tradition still holds sway, overlain and reinforced in the last few decades by New Public Management control models, commodification, neo-liberal conceptions of useful (marketable) knowledge, and, more recently, the increasing power global EdTech (Williamson and Hogan, 2020).

The challenge here is changing the pattern: toward connection - or re-connection – dismantling (or at least eroding) the barriers, silos and compartmentalisation, and instead: building distributed leadership; a participative and transparent collective culture; inclusivity and cross-institutional collegiality; co-inquiry and inter- and trans-disciplinarity; valuing the arts and humanities in association with sciences; affective, cognitive and conative learning being seen as complementary and of equal value; and facilitating emergence and positive synergies through ensuring as far as possible that the university is dynamic, integrated, coherent yet diverse, highly communicative, fluid, open and permeable in relation to its community and wider environment.

In other words, its structures and view of knowledge should be *congruent* with real-world complexity and dynamics - the complex socio-ecological systems within which the university is unavoidably embedded as a subsystem, and which it affects and is affected by. This includes the multiple systemic wicked problems in which it is unavoidably connected. This call echoes the shift from the pursuit of knowledge toward wisdom that Maxwell (2020) has advocated for many years.

CONSEQUENCE

This is the “Doing domain” and relates to Practice. It covers organizational and student learning and pedagogy, research and the work of the university and its effects intended or otherwise on staff, on students, on the community, the wider world, the biosphere and other planetary systems. It relates to the engagement that the university has with its community and environment, its investments, the effects of its research, the values, competencies and skills of its graduates, and the impact of all this on social and ecological systems [which must be seen as inextricably linked (Olsson et al., 2017)].

The challenge here is re-orientation and integration *within planetary boundaries*. The urgent global need now is one of restoration and regeneration of natural systems, local economies, communities, and civic life. Universities need to ensure their net effect or impact is supportive of this movement, is regenerative and builds positive synergies consistent with developing sustainable systems, through participatory and exploratory pedagogies, and engaged real-world research. Contemporary conditions of uncertainty, complexity, threat and the blurring of boundaries require a fundamental shift *from* narrowly-drawn purposes and indicators of success, control, the illusion of certainty and predictability, standardization, delivery and top-down intervention *toward* engaged participation, and a co-evolutionary relationship with society marked by openness to diversity, process and the embrace of emergence and change in the cause of human and ecological well-being.

The three interrelated shifts envisioned here are implied by - and also manifest - an ecological/relational paradigm or worldview based on an extended epistemology, on participative knowing and social inquiry, on and real-world engagement (Reason and Bradbury, 2001; Bawden, 2006).

RE-THINKING HIGHER EDUCATION

Universities have unrivaled capacity to shape the values, knowledge, skills and research that are crucial to a society in transition to a low carbon and safe future, and many are making critically important contributions toward this end.

Yet the *net* effect of higher education is still negative, resulting from decades marked by narrowly drawn systems of interest (Concern), siloed and hierarchical structures, and fragmented view of knowledge (Conception), and a limited view of what the impact of a university, and of its graduates, should and can be (Consequence). Because these three dimensions reflect the three constituents of paradigm, there is an internal *logical consistency* between them as regards the ways that universities see themselves and currently operate. Current international concern to transform education (UNESCO, 2016; ICFE, 2021) requires envisioning and articulating an alternative paradigm which is also logically consistent, is achievable and has net benefit to socio-ecological wellbeing. My work has attempted to make the case for, and elucidate, an ecological/systemic paradigm which can inspire system re-design and thereby inform educational thinking, purpose, policymaking and practice.

Using the Triang model - and maintaining a high level of abstraction and few keywords - we can suggest the need for a paradigm movement in higher education from the dominant paradigm toward an ecological (relational) framework as follows, through the conscious practice of institutional critical reflexivity and organizational learning (Table 2):

Quite clearly, this model is conceived at a very high level of abstraction, but with the metaphor of “roadmap” in common currency, it offers a broad navigational tool to help determine and evaluate the direction of travel from mechanism/reductionism toward systemism/holism. I fully recognize that this is not a simple or one-off journey but rather will involve partial movement over time. The feedback loop to the left of the diagram indicates this will often be a cyclical process.

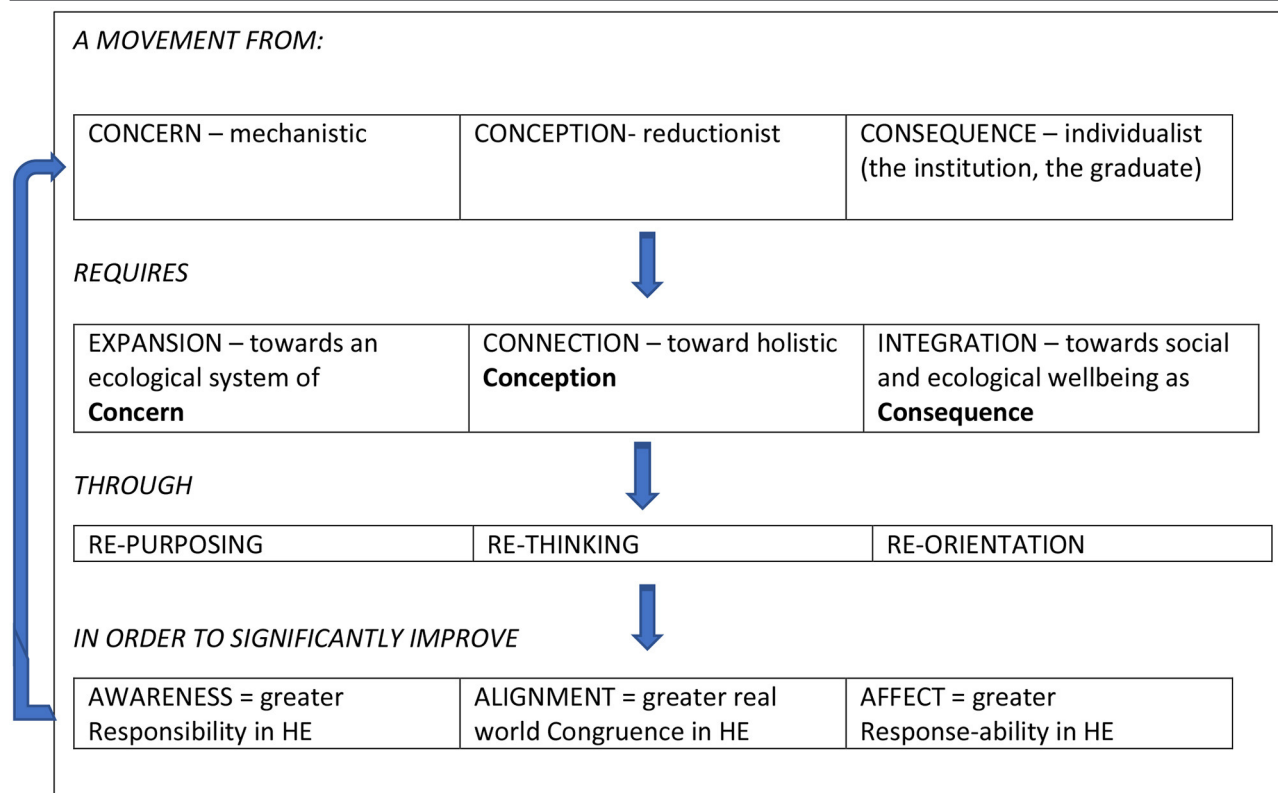
The key to traversing this roadmap sufficiently and effectively is *systemic learning* - by individuals, institutions and communities - through inclusivity and collaboration together with a measure of humility and willingness to learn. This is challenging and difficult territory - progress depending on, “creating a kind of temporary psychological safety in order for people to do the necessary work of unlearning, crossing scales, confronting diversity, and acknowledging positive and negative dynamics, but it also relies on making people uncomfortable enough to prepare them to move through these contested, unknowable systems with courage, resilience, and grace” (Moore et al., 2018).

In the context of multiple and pressing global crises, the necessary response by universities is to move toward becoming *critical learning systems* (Bawden, 1997, 2006) as their prime *raison d’être* and *modus operandi*. This beckons a way of being that would revolutionize research, teaching and learning, and community engagement as “an enduring, ever-unfolding and enfolding process of experiential learning” in the pursuit of a liveable future (Bawden, 2006).

As I have recently argued (Sterling, 2021):

An ecological re-imagining of education requires reclaiming authentic education by drawing from progressive, liberal, critical, emancipatory, and holistic educational antecedents. In the best traditions, universities are seen as sites and guardians of critical scholarship, creativity, empowerment, and contribution to the common good. Resurgent educational institutions can—in tandem with movements in wider society—build resilient communities, ecologies, and localized economies. This kind of transition education is beginning to happen—a living learning process essential for generating the collective intelligence for survival, security, and well-being of social-ecological systems (Luksha et al., 2018).

There are emerging signs in some parts of the sector of a willingness and energy to re-think policy and practice. Beyond whole institutional strategies reflected in a small but increasing number of universities internationally, there is growing interest in “critical engagement” and the civic role of institutions driven by committed staffs and students in both research and teaching (Facer, 2021), and growing examples of innovative projects sprouting within institutions which allow facilitative

TABLE 2 | The university—moving toward an ecological paradigm.

space (see “Practices” at <https://greattransition.org/gti-forum/pedagogy-transition>).

These movements are evidenced by greater recognition of the need to educate for thriving and resilient socio-ecological systems, involving such approaches as anticipative education, service learning in the community, action research, participative and experiential pedagogies, co-creative and cooperative inquiry, transdisciplinary and interdisciplinary engagement, the nurturing of sustainability competencies, an open-ended and provisional approach to knowledge, valuing the arts, a valuing of place, futures work and the proper embrace of multiple perspectives including alternative, non-Western knowledge traditions and hitherto marginalized voices.

The future is unknown and cannot be taught, but must be consciously made, which is why higher education needs to be creative, explorative, experiential, innovative, and always critically reflexive. It is about growing and manifesting a *collective culture of critical commitment*. Clearly, this is necessarily both *inner* work – a shift toward participative consciousness and responsibility – and *outer* work, a shift of culture toward collaboration and regeneration.

Whilst progress is inevitably uneven, increasing numbers of international academic networks and initiatives reflect sustainability concerns and priorities. Further, interest is growing rapidly in supporting regenerative sustainability which goes beyond harm reduction (moving from “doing less badly”) toward actions that improve human

well-being in harmony with restoring natural systems (Luksha et al., 2018; Facer, 2021; Robinson, 2021). This emergence of “regenerative education” may be seen as part of a wider movement now asserting, articulating and practicing a regenerative culture of restoration and renewal across many aspects of human activity (Wahl, 2017, see https://www.thefuturescentre.org/wp-content/uploads/2020/11/Future-of-Sustainability-2020_Time-to-transform.pdf).

Small and independent institutions such as Schumacher College in Devon, UK, are playing a key role in this work (Luksha et al., 2018; Sterling et al., 2018, and see <https://ecoversities.org/>; <https://campus-transition.org/en/our-project/> and <https://gaiauniversity.org/>) but there are increasing exemplars arising in the mainstream (see https://www.eauc.org.uk/global_alliance). Whether these kinds of shifts are sufficiently widespread, systemically embedded and deeply rooted to catalyze the wholesale shift now urgently needed cannot yet be known. But it augurs well and aligns higher education to the wider social learning and cultural shift which, while incipient, now appears to be taking effect globally.

CONCLUSION

An explosion of awareness of the great issues of our time in the last few years, spurred by accelerating evidence of ecological degeneration, economic instability and social upheaval, has led to a growing critique of “business as usual”

as a prime causative factor, and to consequent calls for the “transformation” of established practices across many sectors. Education policy and practice is no exception in this call, which is increasingly affecting the mainstream. Universities are called upon to re-think, and re-design, their Concern (purpose), Conception (operation) and Consequence (impact) based upon a systemic or ecological/relational learning paradigm, if they are to make the substantial positive difference to the chances of global survival and well-being that they are uniquely capable of. Thereby lies hope, but are sufficient universities worldwide reading the signs of the times sufficiently?

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DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Re-purposing Universities: The Path to Purpose

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OPEN ACCESS

Edited by:

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University of Gävle, Sweden

Reviewed by:

Sergey Zhironkin,
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Specialty section:

This article was submitted to
Sustainable Organizations,
a section of the journal
Frontiers in Sustainability

Received: 21 August 2021

Accepted: 30 November 2021

Published: 05 January 2022

Citation:

Hurth V and Stewart IS (2022)
Re-purposing Universities: The Path to
Purpose. *Front. Sustain.* 2:762271.
doi: 10.3389/frsus.2021.762271

As the extent of damage to environmental systems from our business-as-usual activity becomes ever more alarming, Universities as core social institutions are under pressure to help society lead the transition to a sustainable future. Their response to the issues, that they themselves have helped reveal, has, however, been widely criticised for being wholly inadequate. Universities can be observed to engage with sustainability issues in *ad-hoc* ways, with the scale of attention and commitment dependant mainly on the level of pressure exerted by stakeholders that works to overcome aspects of inherent inertia. Sustainability initiatives can therefore be regarded mainly as bolt-ons. This mirrors how other sectors, including businesses, have tended to respond. As the environmental and social crisis mounts and the window for adaptive change to ensure long-term wellbeing for all narrows, the pressure for deeper systemic change builds. It is in this context that transformation to a “purpose-driven organisation” has emerged as a systemic approach to change, enabling an organisation to align deeply and rapidly with society’s long-term best interest and hence a sustainable future. Nowhere has this concept been taken forward more obviously than in the business sector. As business leadership towards purpose becomes more apparent, so the lack of action in this area by universities appears starker. In this paper we clarify what it means to be a purpose-driven organisation, why and how it represents a deep holistic response to unsustainability, and what core questions emerging from the business world university leaders can ask themselves to begin the practical journey to transform their institutions into purpose-driven universities.

Keywords: wellbeing, economy, purpose, change, sustainability, universities, mission, transformation

INTRODUCTION

“I believe what we do, and by “we” I mean humanity as a whole over the next five years, could well determine the future of humanity. This is a critical time.”¹

This blunt warning that humanity is at crisis point, delivered in June 2021 by the former UK Chief Scientist Sir David King, reflects the scientific consensus that climatic and ecological breakdown is happening at a scale and intensity that ultimately threatens the wellbeing of all life on earth. This

¹Sir David King—interview with the University of Cambridge Judge Business School in June 2021 <https://www.jbs.cam.ac.uk/insight/2021/the-climate-emergency/> Accessed 1 July 2020.

sits alongside dire warnings of the fragmentation and break down of social fabric globally, from extremely low trust in institutions and science to extreme inequalities “lethal partisanship” of political ideologies. All organisations need to respond to these emergencies that threaten the long-term wellbeing of all people and planet, but the role of universities would seem to be especially crucial. After all, it was research from the global academic community that helped identify and track the decline in the planet’s natural support systems (Rockström et al., 2009; Dearing et al., 2014) and continues to expose a pattern of severe social challenges which both affect and are affected by environmental system breakdown (Galbraith, 2007; Turchin et al., 2018). Building on that knowledge base, the higher education sector also offers the critical learning infrastructure to support society transition away from unsustainable practises (Tilbury, 2011). And as socially-embedded institutions vital to the economic development of cities and regions, universities would appear well-positioned to motivate transformations most effectively at scale (Bhowmik et al., 2020).

These three fundamental academic missions—education, research, and societal engagement—form the basis of how universities are expected to respond to the global unsustainability challenge. However, the best way in which universities can apply their transformative potential to help society reconfigure itself rapidly and at scale remains uncertain and contested (e.g., Fazer, 2020; Vogt and Weber, 2020; Chankseliani and McCowan, 2021).

Building on their traditional “first mission” —education— universities are introducing new teaching programmes and specialisation tracks that cover sustainability issues (Nordén and Avery, 2021) and the principles and practises of Education for Sustainable Development (ESD) are gaining wider academic traction (e.g., Rieckmann, 2017). However, many universities struggle on how best to incorporate the SDGs in their operations (Leal Filho et al., 2021), how to embrace the whole-institution interdisciplinary thinking and deep system transformation that ESD truly demands (Sterling, 2004; Waas et al., 2012; Singer-Brodowski et al., 2019; Bauer et al., 2021) or rethinking education that reinforces unsustainability (Renouf et al., 2019). Instead, the accusation is that pedagogic makeovers at many universities appear skin deep, presenting incremental changes to study programmes rather than radically refocusing the educational mission on the emergency we face (Maassen et al., 2019; Fazer, 2020).

With regard to universities’ research-oriented “second mission,” discovery-led knowledge production underpins scientific understanding of the planetary crisis and, looking forwards, would seem critical for establishing a safe and just living space for humanity (Rockström et al., 2021). Research strategies in many universities are being reconfigured around these new “grand challenges” of sustainable living (e.g., Tyndale et al., 2021), facilitated by interdisciplinary research groups and institutes that confront cross-disciplinary concerns. But beneath the surface, the vast research superstructure often remains wedded to long-enduring, deeply-rooted academic silos in which “frontier science” remains at the heart of knowledge production and outcomes are measured by prestige and volume rather than the likely success or failure of achieving global sustainability

goals (Watermeyer, 2019). Despite calls for universities to align their research enterprise with real-world sustainability targets (Schneidewind et al., 2016), there is resistance to the perceived institutional pandering to a “trendy” sustainability rhetoric (Mittelstrass, 2020, p. 27; Crow, 2010) and just a few global institutions have commenced the organisational reform needed to span the sprawling complexity of planetary problems (Schneidewind and Singer-Brodowski, 2014; Crow and Dabars, 2015).

But it is in universities’ more recent “third mission” — the direct transfer of knowledge and technology to society (Krücken, 2003, 2020; Laredo, 2007; Zomer and Benneworth, 2011; Trencher et al., 2014; Compagnucci and Spigarelli, 2020) that their contribution to society has been most effectively expanded (Gibbons et al., 1994; Nowotny et al., 2002; Benneworth and Jongbloed, 2010). Ultimately, that third mission sets the boundaries of universities’ social licence to operate—the licence given by society to an institution to utilise commonly shared resources and transform them, ostensibly because this transformation of resources is deemed by society to improve its overall wellbeing². The idea of “the university” —and its long-standing twin academic missions of “education” and “research” —was established long before the relative democratisation of social decision-making, during times when broader societal legitimacy was not required. In modern democratic societies, however, institutions such as universities increasingly require legitimisation by society if they are to retain a licence to operate, and the third mission emerged from this context (Weymans, 2010).

The third mission is only a few decades old, and the nature of this “invisible revolution” (Etzkowitz, 1998) remains still only weakly institutionalised (Zomer and Benneworth, 2011). For many universities, its implementation has provoked “...fundamental discussions about what they are expected to accomplish for society, how they are to be made more accountable to society, and what kind of relationship they should have with core organizations and actors in society” (Maassen et al., 2019, p. 8). If the third mission is viewed as a default mechanism to better align universities with the interests of society, then its enterprising and entrepreneurial activities arguably provide the practical means by which they may transform to better serve the long-term wellbeing of society, hence the third mission is epitomised by the rise of entrepreneurial academies such as MIT and Stanford (Etzkowitz et al., 2000; Etzkowitz, 2004). However, this premise arguably rests on questionable assumptions deep within the current economic paradigm about what wellbeing is and how it is best delivered to society.

Because the third mission is intricately connected with economic organising, fundamental problems arise when seeking to advance the third mission because our current economic

²Flourishing/prosperity/ “good life” /needs fulfilment are all potential ways of capturing the essence of a eudaimonic expression of the ultimate positive human state, but wellbeing when used as a pinnacle outcome concept and not as shorthand for lower order input of mental health (e.g., health and wellbeing) is increasingly the concept used globally. Its definitions and pathways are necessarily under continual debate.

way of organising tends to be regarded as deeply complicit in the current socio-ecological crisis (Van Weenen, 2000). This western-inspired, but globally implemented “business-as-usual” neo-classical economic system emerged during, and co-evolved with, the dramatic post-war global surge in economic growth and human activity across the world, dubbed the “Great Acceleration” (Steffen et al., 2015; McNeill, 2016). It is this “human age”—or Anthropocene—that is associated with the simultaneous acceleration in biodiversity loss, climate change, pollution and destruction of natural capital (Steffen et al., 2004, 2015; Rockström et al., 2009; Griggs et al., 2013; Dearing et al., 2014). A dominant narrative, therefore, is that, in the late 20th century, esteemed independent establishments of knowledge acquisition, curation and dissemination gradually, through “mission creep,” became harnessed as “organs of the state,” increasingly utilised for solving problems of the economy (Clark, 1998; Etzkowitz, 1998; Bleiklie and Kogan, 2007; Laredo, 2007; Perkin, 2007; Zomer and Bennenworth, 2011; Davey, 2017). With the economy charged with being at the very heart of our unsustainability, the third mission can be viewed tied to the root of the unsustainability issue, as taking universities off-track with delivering in the interests of society rather than its saviour.

For some, the route to better aligning universities with society’s long-term interest is for universities to be unshackled from delivering for the economy via its third mission, and therefore again be freed to better futureproof the academic endeavour (Boulton and Lucas, 2011). For others, the remedy is to re-position even more deliberately towards the “entrepreneurial university” (Clark, 1998) but in more socially-oriented terms, as “sustainable,” “stakeholder,” “civic,” “transformative” or “compassionate” institutions (Bleiklie and Kogan, 2007; Sterling, 2013; Waddington, 2021). While some see the pursuit of sustainable development goals as being achievable through fragmentation into socially-, environmentally- and economically-oriented universities (Beynaghi et al., 2016), others see the need to distinguish a “4th mission” (Trencher et al., 2014; Riviezzo et al., 2020). Trencher et al. (2014, p. 152) calls this new mission “co-creation for sustainability”, defined whereby a university “collaborates with diverse social actors to create societal transformations with the goal of materialising sustainable development in a specific location, region or societal sub-sector.”

Some, however, go further, beyond a triple helix of missions and towards an overarching reconceptualising of the core reason of the university to exist that would guide how all other missions are achieved. Lueddeke (2020) argues for a thorough re-conceptualisation of the higher educational fundamental goals and scope to focus on developing an interconnected ecological knowledge system with a concern for the whole Earth. Utilising the concept this paper will focus on, Haski-Leventhal (2021) calls for universities to consciously become “purpose-driven” by utilising their “resources, knowledge, talent, and people to continuously and intentionally contribute to the communities and the environment in which it operates, through research, education, programmes and services” (Haski-Leventhal, 2021, p. 7). This latter proposition draws from “organisational purpose,” a concept with deep roots in management thinking (Barnard, 1938; Drucker, 1974; Freeman and Ginena, 2015), and recently

popularised in the practical business context with bespoke reports (e.g., Deloitte “2030 Purpose”), rankings (e.g., Radley Yeldar “Fit for Purpose”), guidance from most of the large consultancies (KPMG, Deloitte, Accenture etc.) and a range of popular literature (e.g., Sinek, 2011; Rozenhuler, 2020). However, confusion has reigned regarding what, precisely, “organisational purpose” means and how to achieve it. As clarity and consensus increases, and examples of purpose-driven transformation, particularly in the business sector, are ever more accessible (Deloitte, 2020; British Academy, 2021), we make a theoretical contribution by arguing that the concept of purpose has the potential to both help elucidate the current barriers and future opportunities for universities to become aligned with delivering long-term wellbeing for all (sustainability).

Core to our theoretical argument is that it is not universities’ role in the economy *per se* that is the issue but the assumptions about how the economy should be organised. The economy, after all, is the central organising system for transforming resources into wellbeing outcomes for all of society in the long term. Hence the very definition of the ultimate ends of the economy are fundamentally aligned with the definition of the goal of sustainability as conceptualised by the Brundtland report (Brundtland, 1987)—satisfaction of needs (wellbeing) for everyone, into the future—which can be considered an expression of society’s “meta-purpose.” What is of issue, however, is that in recent decades society has effectively outsourced these long-term wellbeing outcomes to a very specific and almost unquestioned way of organising—a “wellbeing machine”, market-based, resting on the optimising of self-interest of all parties and focused on measures of financial success as a proxy for wellbeing. As a system in theory optimised ultimately for society’s wellbeing, this business-as-usual system has provided a moralising agenda for drawing all other organisations into its service as a way of securing social legitimacy. As these assumptions change rapidly, and impelled by purpose as a central concept operationalising a new economic paradigm, the basic reason for a university to exist is coming into the spotlight, illuminating its role in delivering long-term wellbeing for all.

Purpose involves rejecting, in effect, of many of the fundamental economic assumptions that have become engrained in organisational worldviews, principles and behaviours, and which uphold pervasive power structures and those that benefit from them. Hence, this makes it both unintuitive and hard for organisations, including universities, to initiate and maintain the radical change agenda that purpose requires. These challenges aside, and given the requirement for rapid change, purpose appears almost singular in its potential to provide the deepest level of alignment between organisations and society’s long-term wellbeing and therefore need to be seriously considered by both university governing bodies and executive managers, as well as the broader social and legislative environment that enables them.

Hence, we argue that the solution to unleashing the ability of universities to address unsustainability lies not in avoiding their role in the economy but by them becoming more active participants in reshaping the economy’s assumptions and ways of operating towards delivering its intended promise—long-term wellbeing for all. This, we set out, involves re-envisioning

the university's reason to exist, and all resulting behaviour, as a strategic contribution to society's meta-purpose of long-term wellbeing for all people and planet and consciously achieving this in a way that protects and enhances the environmental and social systems that underpin it—in other words, becoming purpose-driven.

We start by setting out in more detail the prevailing notion that business is the engine for wellbeing generation and how this business-as-usual “wellbeing machine” has influenced the worldviews, principles and behaviours of all organisations, including universities. From there we use a modified Daly's Triangle of the economy to outline business-as-usual's inherent misalignment with sustainability and situate the concept of purpose as a paradigmatic break with business-as-usual amongst two other organisational paradigms, which form adaptive tweaks that are constrained in their ability to address sustainability. We then specifically compare universities to these three organisational logics, illuminating current university logic as firmly aligned to business-as-usual. A **Supplementary Table 1** is available that makes this case through archetypal university behaviours. We end by suggesting core questions emerging from the business world that university leaders can ask themselves to begin the journey to being purpose-driven organisation.

THE WELLBEING MACHINE AND “BUSINESS-AS-USUAL” LOGIC

Wellbeing is an umbrella term for what makes an optimal life for humans, and therefore the overarching goal of “development.” Here, it is defined based on the definition used by the British Standard in Social Value as: “*a state of being where subjective and objective psychological or physical human needs are met in varying degrees, with increased wellbeing corresponding with better states of physical and psychological health*” (British Standards Institute, 2020). Although wellbeing can be viewed as either hedonic or eudaimonic (Ryan and Deci, 2001), the more common eudaimonic approach is emphasised here, where wellbeing can be likened to the notion of flourishing or the “good life,” including being able to participate purposefully (Brand-Correa and Steinberger, 2017). This is not always correlated with hedonic wellbeing, which is individualistic and pleasure/happiness oriented.

In economics, wellbeing has been variously interpreted and abstracted through concepts of welfare or the mechanism of utility—representing various levels of distancing and proxy assumptions about the core underlying concept of wellbeing.

The phrase “long-term wellbeing for all” is a re-expression of sustainability—the goal of sustainable development as expressed by the Brundtland's definition and endorsed by the majority of the world's nations. It may, as the Brundtland report itself implied, be the closest we may get to an expression of humanity's “meta purpose” (Hurth and Whittlesea, 2017; Hurth and Vrettos, 2021). Optimally transforming and allocating resources for the wellbeing of society as a whole in the longer-term is also, importantly, a fairly stable interpretation of the object of an economy. Hence, stripped down to its fundamentals, the

economy should be a core vehicle of sustainability, and the key delivery mechanism is business.

“Businesses as human institutions are established in order to better society through the production of goods and services and the advancement of knowledge” (Freeman and Ginena, 2015, p. 12).

Business enterprises... are organs of society. They do not exist for their own sake, but to fulfil a specific social purpose and to satisfy a specific need of a society, a community or individuals. Drucker (1974, p. 39).

The “Business-As-Usual” (BAU) view is that wellbeing is optimised for society as a whole through each individual selfishly focusing subjectively on discernible personal wellbeing and selecting the best offerings from the choices available in the formal market to match this. As long as companies act competitively, and in their self-interest, and are free to offer their wares in the market place to fulfil that customer demand—and as long as people are able to freely choose from what is on offer, then, with perfect information to guide their (generally) rational decision-making, only income, or interferences from government that reduce this free-flowing supply and demand, constrains their ability to maximise their wellbeing (Sen, 1977; McFadden, 2006). Hence, there is a self-reinforcing idea that a selfish focus on financial income generation by all parts of the economic and broader societal system is the morally valid focal pursuit for delivering optimised societal wellbeing for everyone. At an organisational level, these assumptions translate to: (1) that people act (generally) self-interestedly, (2) that institutions need to focus primarily on their financial health, and (3) that market demand and market share (which feed financial indicators) are the core measure of success.

As well as society's wellbeing being fulfilled through market choices in an unconstrained market, the assumption described as “a rising tide lifts all boats” or “trickle down” justifies the in-built tendency for wealth to concentrate under these conditions (Stiglitz, 2019). Trickle-down economics accepts that those who create and run businesses may become much richer than others, but this is a necessary condition to enable money to be raised for business activities which after all create jobs, enabling poorer people to invest and spend in the market and thereby enhance their wellbeing.

Under BAU logic, there are two key ways an organisation can contribute to society's wellbeing as part of the market system, both of which have been emphasised by universities in recent years as part of their wider service to society. These are either by employing more people or by selling more of the products and services that people judge as useful to maximise their utility. As well as being a macro-level indication of financial income success of a nation, at a meso-organisational level, growth in sales is an indication that preferences are being met, because it shows that more people are choosing that company's offerings above competitors. By extension, growth is an indication that the organisation is better at providing for wellbeing in the market.

The assumptions of business-as-usual thinking that profoundly underpin actions across society and its institutions

now, have deep roots—roots that go back to Smithian (Smith, 1776) views of the market. The “free hand of the market” and related concepts, were dominant in the mid 19th century in the US and beyond, saw a fall from favour as government intervention began to address issues of concern to society at the time immediately following the First World War (Bowen, 1953), only to be re-popularised (and many argue misrepresented) and made more morally resonant in the 1970s by Friedman and others at the “Chicago School of free-market economists” (Stout, 2012). The conditions for the widespread acceptance of these assumptions was in the post-war period when the dangers of subjective, value-based whims of government (e.g., Hitler); an increasingly powerful managerial class (whose interests were seen to be aligned with government rather than investors) helped, set the scene for the dominance of free-market economic thinking that we live with today. This thinking also manifested as a concern by investors that their money should not be used either to line the pockets of managers or to divert this money to pursue the non-democratic individual values of managers (Jensen and Meckling, 1976). Rather, given the risks taken by investors, financial income should be maximised through companies, and this income should be for the primary benefit of shareholders, who should also have ultimate control rights (Friedman, 1970; Stout, 2012). Laissez-faire, profit-maximisation version of capitalism, based on neo-classical economic thinking and extended politically as neo-liberalism [which we will refer to as business-as-usual (BAU)], hence became established as the largely unquestioned way to allocate scarce resources for society. Further, socialism and social responsibility were contrarily positioned as non-market, values-based fulfilment of wellbeing outcomes by a political or managerial elite: *“the doctrine of ‘social responsibility’ involves the acceptance of the socialist view that political mechanisms, not market mechanisms, are the appropriate way to determine the allocation of scarce resources to alternative uses”* (Friedman, 1970, p. 3). In the context of the cold-war this deliberate symbolic association was even more powerful.

From these US-leaning, neo-classical roots, the BAU view of wellbeing production has been globally embedded and promulgated as a centrepiece of Western ideological dominance, to the extent that, across cultures worldwide, its underpinning philosophical and technical assumptions are dominant (Stiglitz and Pike, 2004; Gray, 2015) and affect every level of global society in some way (e.g., Freeman and Liedtka, 1991; Kilbourne et al., 1997; Firat and Dholakia, 2006). As a result, a very specific “theory of change” about how an economy can best deliver long-term wellbeing for all that has become encoded in the paradigmatic worldviews of a least two generations. This worldview situates wellbeing as the default outcome of “an automatic self-regulating system motivated by the self-interest of individuals and regulated by competition” (Bowen, 1953, p. 14)—a “wellbeing machine” that just needs to be fed and its rules adhered to.

If society views businesses as the “engine room” of the wellbeing machine (because the economy is assumed to be the most effective way, overall, to optimise social wellbeing), then it makes moral sense for universities and all other non-business institutions to support this system. Thus, universities may

accept BAU assumptions, genuinely believing this was the best contribution to society they could make. Even if not, it still makes sense for a university to be seen to feed this wellbeing machine economy, as a way to ensure their continued social legitimacy. Viewed in this light, universities have evolved to become “business-like,” and to serve the business through their third mission, expressly because it is business that society has positioned as the best means to deliver society’s wellbeing. Rather than mission creep or immoral and illogical “selling-out,” the “third mission,” therefore, simply reflects universities’ alignment to the prevailing moral landscape that positions the market as the optimal way to deliver and sustain public good. In that context, it is not only the logical, but also the morally correct response of universities to serve this system.

Over the course of the 20th century, BAU could be judged as having delivered significant improvements in human wellbeing (Pinker, 2018; Rosling, 2019), but the level abstraction and false reliance on proxy measures of wellbeing has driven a lack of accountability to the ultimate ends of wellbeing that has taken us to a point of potentially irreversible unsustainability.

Globally, financial income growth has not been decoupled from resource consumption and environmental pressures and is unlikely to become so, at least within the urgent timescales for action (Hickel and Kallis, 2020; Wiedmann et al., 2020). The global material footprint, gross domestic product (GDP) and greenhouse gases emissions have increased rapidly over time, and strongly correlate (Coscime et al., 2019). While population growth was the leading cause of increasing consumption from 1970 to 2000, the emergence of a global affluent middle class has been the stronger driver since the turn of the century (Panel, 2019; Wiedmann et al., 2020). This tight coupling between the unfolding socio-ecological crisis that fundamentally threatens long-term equitable wellbeing, and growth in financial measures that are supposed to indicate wellbeing success (e.g., GDP), sets the scene for the dramatically unfolding paradigm shift in assumptions about how resources are best transformed into long-term wellbeing for all (Fioramonti et al., 2022). By extension this puts a spotlight on all organisations, including universities, that have become complicit in upholding the current BAU assumptions and are intricately organised in ways that align with them. This, in turn, has fundamental implications about why and how universities will need to change over the next few short years, the reflexive challenges they will need to confront, and the scope of the changes they will need to make if they are to continue to be accepted and supported as legitimate public institutions.

MOVING AWAY FROM BUSINESS-AS-USUAL—ADAPTING DALY’S TRIANGLE

One of the clearest ways of visualising why the current BAU paradigm is inherently unsustainable, and which provides a simultaneous conceptual frame to reimagine it, comes from eminent ecological economist Herman Daly. His “triangle” (Daly, 1973) as adapted by Donella Meadows, depicts the myopic view of institutions that results from BAU, where both thinking

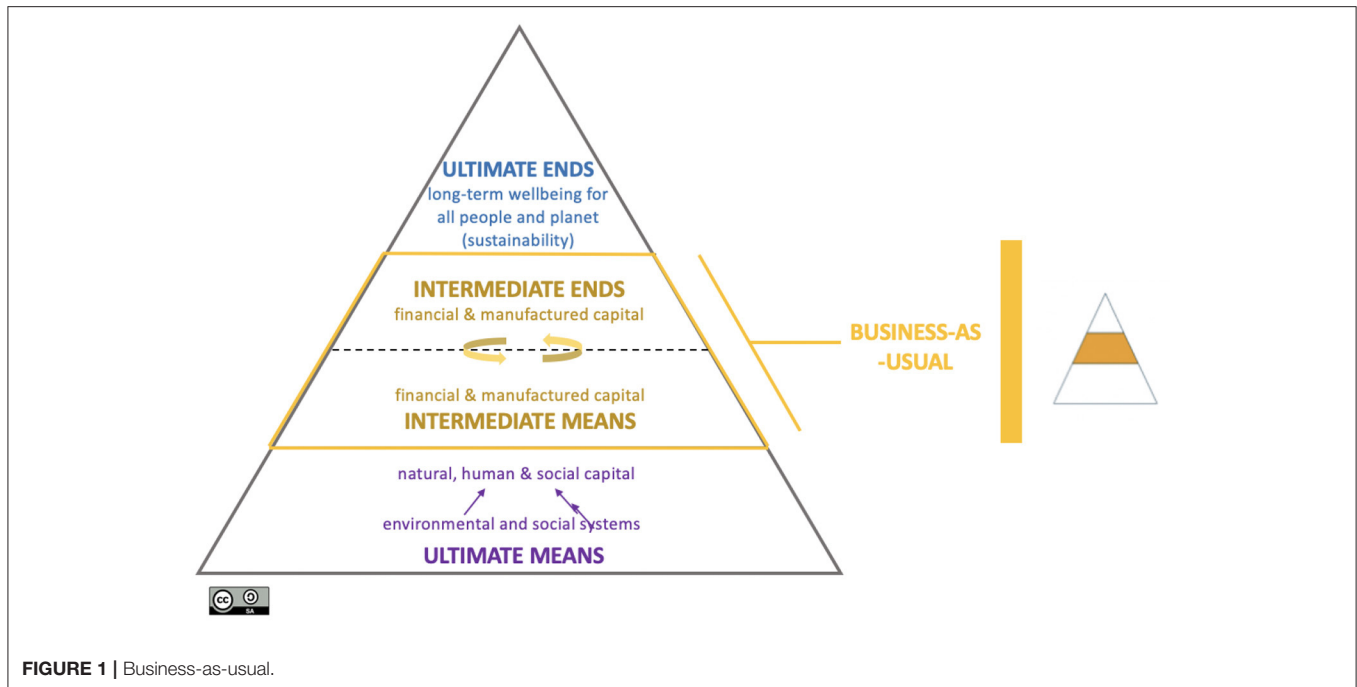


FIGURE 1 | Business-as-usual.

and action focuses on intermediate means for intermediate ends. By contrast, a sustainable economy requires both a focus on delivering the ultimate ends (wellbeing) and achieving this within the ultimate means (planetary health). Donella Meadows and her colleagues appraised this as the most effective overarching framework that could clearly encapsulate both the problem of unsustainability and the way to achieve it (Meadows, 1998). Although Daly and Meadows viewed wellbeing, delivered through a suite of universal human needs as the ultimate ends of the economy. The adapted triangle (**Figure 1**) aligns this more fully to the expression of sustainability and its three conditions—wellbeing, over time and for everyone. Furthermore, the ultimate means were originally limited to the natural capital provided by planetary resources, however the triangle in **Figure 1** is adapted to incorporate and situate the full spectrum of ultimate and intermediate capitals which an organisation utilises as inputs into its operating model (IIRC, 2020).

The modified triangle highlights how current BAU thinking relegates the ultimate ends of society as outside of the scope of economic consideration, and by extension outside of the strategic imperative of organisations. As the gravitational allure of BAU logic has drawn most parts of the wider social system into its narrow orbit, the sheer power and reach of the formal market and its actors has evidently diminished the ability of the system to be held to account, both in terms of whether it is actually achieving the wellbeing ends it claims to and whether it is doing this in a way that ensures healthy environmental and economic systems for future generations.

As evidence grows that humanity faces an ultimate means (planetary and societal system) crisis and an ultimate ends (wellbeing) crisis—and bruised by huge economic crises—faith in the BAU wellbeing machine is faltering fast. Arguments that

the current form of capitalism must be urgently reinvented are now building with force within most mainstream sectors, including civil society, academia and perhaps most prominently, business itself. World Economic Forum executives freely pass judgement that “Neoliberal economics has reached a breaking point” [WEF (World Economic Forum), 2017, p. 1] and the global trade governance institutions themselves, who have been key advocates of BAU but are now recognised by some as “a tool to identify solutions to problems created by neo-liberal globalisation” (Biermann and Pattberg, 2008, p. 279 in Jang et al., 2016).

THE PRACTICAL BACKLASH TO BAU: THE RISE OF THE WELLBEING ECONOMY

The urgent new imperative is to re-align the economy directly to its ultimate ends of wellbeing in a way that can be delivered in the long-term and for everyone. At a global governance level, this imperative began as a way of addressing the perceived dangers of focusing on GDP as the ultimate financialised expression of the BAU economic imperative, by broadening or replacing it with direct measures of the ultimate ends of the economy i.e., wellbeing (Stiglitz and Pike, 2004; Stiglitz, 2019). Countries such as Bhutan were early in replacing GDP with a measure of “Gross National Happiness” but since then a range of overarching wellbeing methodologies have been developed. In 2007, the European Commission on the Measurement of Economic Performance and Social Progress (CMPEPS) “gave a huge impulse to a discussion that had been ongoing for several years on the limits of GDP as a welfare metric” (OECD, 2020). This, in

turn, led to global measurement frameworks such as the OECD's "Better Life Index."

The pursuit of human and ecological wellbeing rather than material growth has become known as the "Wellbeing Economy" (Fioramonti et al., 2022), or in OECD's words the "Economy of Wellbeing" (Llena-Nozal et al., 2019)—the first level of *ensuring* operationalisation of long-term wellbeing for all (sustainability) through the economy. Measuring the ultimate outcomes of the economy—and whether they align with the wellbeing outcomes they claim to, represents a significant step away from faith in BAU thinking. However, realigning value creation activities across society and its institutions to effectively create long-term wellbeing for all is the more important and difficult task. To that end, organisations such as the Wellbeing Economy Alliance are bringing together global actors to share insights and advance practise (Waddock, 2021). As part of this, WeGO represents a small but growing group of governments, including Scotland, New Zealand, Iceland, Wales and Finland, who are declaring that their countries are to be governed directly for wellbeing outcomes (Wellbeing Alliance, 2021)³. According to Fioramonti et al. (2022), adoption of the Wellbeing Framework could be extended globally, holding the promise of a powerful and adaptable cultural and socio-economic narrative that offers radical change in a timely fashion.

The Wellbeing Economy utilises market mechanisms and maintains the overall private investment structures in place and hence can be considered a reinterpretation of capitalism rather than a rejection of it⁴. However, it marks a fundamental paradigm shift in the assumptions about the economy. It directly counters neo-classical assumptions about the efficacy of the "wellbeing machine" and how institutions should engage with the market to deliver wellbeing for society as a whole. By extension, the Wellbeing Economy contests the prevailing notion that an organisation is morally sanctioned to focus on capturing value for itself (be that profit for members, or financial reserves for growth). Instead, the focus and accountability of the economy are resituated very deliberately to society's ultimate wellbeing outcomes ("ends") and the contribution to health of social and environmental systems as the ultimate means by which this wellbeing can be achieved.

PURPOSE AND PURPOSE-DRIVEN ORGANISATIONAL LOGIC

The Wellbeing Economy sets the macro-level economic response to the crisis of faith in BAU but at the meso business level, solutions have come in the form of the concept of "purpose-driven organisations." Essentially, the concept of "purpose" can be considered as the way to practically operationalise the

Wellbeing Economy, by anchoring a company's primary reason to exist to wellbeing outcomes and by relegating financial considerations to an intermediate means to that meaningful end (Hurth and Vrettos, 2021).

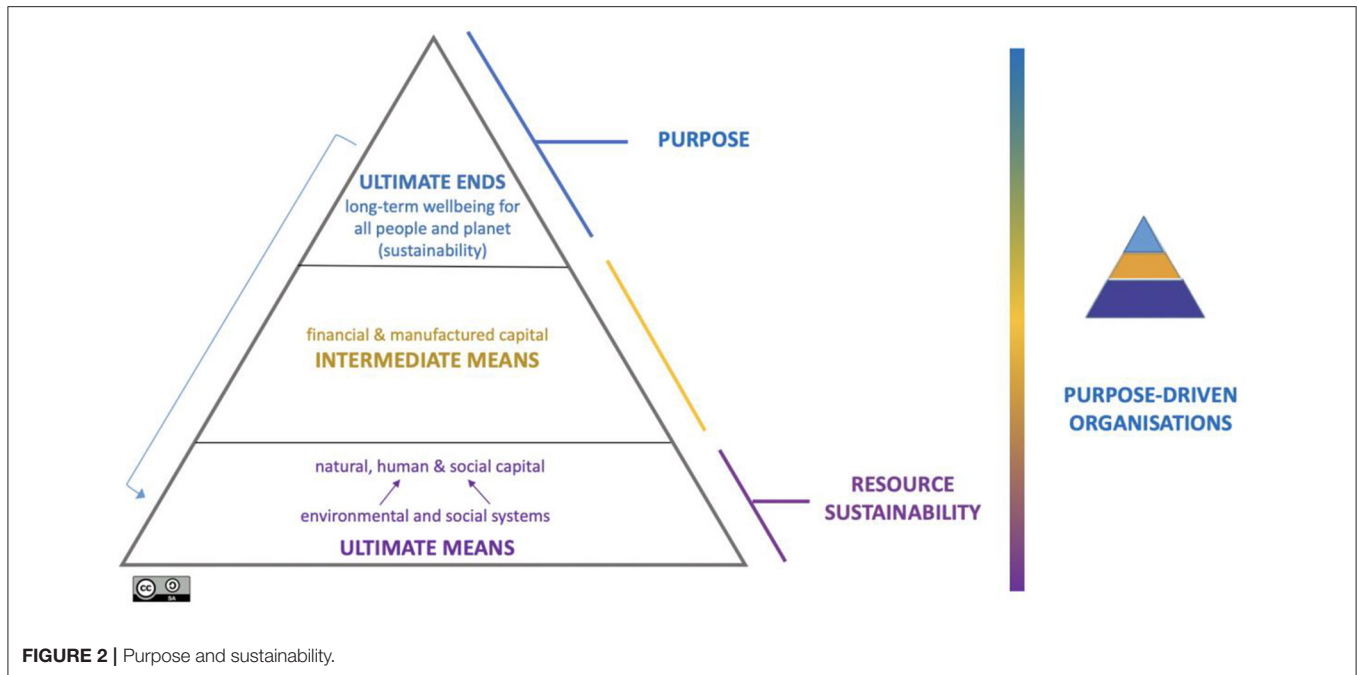
Various conceptualisations and definitions of purpose have emerged (e.g., Ellsworth, 2002; Hollensbe et al., 2014; Henderson and Van den Steen, 2015; Mayer, 2018) but two key aspects tend to unite them. The first is that purpose lies at the deepest level of an organisation's identity—its reason to exist in the first place—and in the fundamental outcomes it has been set up to produce. The second is that purpose is purposeful, in that it is about serving the fundamental wellbeing of another. At its essence, therefore, purpose is an organisation's "meaningful and enduring reason to exist" (Ebert et al., 2018). In the sense that it is meaningful and in the service of others, purpose eliminates the idea that a self-interest motivation can be a valid purpose, or that serving someone can be based on a superficial reading of their short-term desires. Hence, purpose, fully implemented, acts to strategically orient daily decision making across an organisation towards a shared, central and non-self-interested value generation goal. The British Academy investigation into the "Future of the Corporation" contend that *"the purpose of business is to solve the problems of people and planet profitably, and not profit from causing problems"* (British Academy, 2019, p. 8). If it is to be a socially legitimate and optimal then these "problems" have to be aligned with positive impacts that progress towards humanity's most consistently expressed meta-purpose of long-term wellbeing for all (Hurth and Vrettos, 2021). Further, to ensure this contribution, the purpose needs to be achieved in a way that protects and enhances the ultimate means i.e., not delivered in a way that has negative impacts on them. Additionally, purpose makes clear that profits are an important means to an end because they provide the financial resources necessary to achieve the purpose and satisfy stakeholders who support this endeavour. For that reason, organisations of all types need to produce their outcomes profitably.

Thus, in effect, purpose and the Wellbeing Economy work together to address problems of BAU by expanding the economic logic and strategic sights of organisations from near-term financial gain for the firm and its members, to deliberate impact on the ultimate ends of the economy and deliberate protection of the economic means. In this way, purpose, at least theoretically, brings into line the goals of society, organisations, the economy and sustainability. At their best, purpose-driven organisations are an expression and operationalising of a sustainable economy as they encompass the totality of Daly's triangle (Figure 2). Thus, purpose tackles head on the enduring issue of how to embed sustainability in organisations, and universities in particular (Lozano et al., 2015), by effectively situating sustainability as the "golden thread" that runs "throughout the entire university system" (Lozano et al., 2013).

Through declaring and delivering against a purpose as conceived above, organisational notions of "value," strategies to achieve it, and ideas of accountability become, through purpose, directly related achieving sustainability.

³In Wales, the Welsh Assembly has also passed a Future Generations Act and created the post of Minister for Future Generations, showing that embracing the Wellbeing Economy consciously lengthens the time horizon for this wellbeing delivery to be overtly across generations (Davidson, 2021).

⁴The definition of capitalism used here is *"an economic system characterized by private or corporate ownership of capital goods, by investments that are determined by private decision, and by prices, production, and the distribution of goods that are determined mainly by competition in a free market"* (Merriam-Webster, 2021).



Purposes can be set at a high level such as “make sustainable living commonplace (Unilever)” or at a more strategic level “Helping home-based patients become healthy and autonomous” (Buurtzorg). The travails of traditionally “for-profit maximisation” companies attempting to becoming purpose-driven are refining the notion of purpose and reveal that this assumption cannot be taken for granted even for organisations that are socially embedded and engaged. For example, whereas charities, social enterprises and public sector institutions may be assumed to already be purpose-driven, in reality the clarity and alignment needed to deliver a useful, sustainable contribution to society may be absent.

The difficulties of shifting from one set of, usually implicit, assumptions about the ultimate value an organisation exists to create, towards a very different kind of value, within a short period of time, cannot be underestimated. For many the allure of the rewards and the difficulty of the path have led to widespread evidence “purpose-washing,” where a company is creating the impression that it is purpose-driven for financial gain. In fact, purpose involves the deepest level changes to identity, stakeholder constellation, and organisational culture [Cambridge Institute for Sustainability Leadership (CISL), 2020]. Organisational culture constitutes “*the pattern of beliefs, values and learned ways of coping with experience that have developed during the course of an organization’s history, and which tend to be manifested in its material arrangements and in the behaviours of its members.*” (Brown, 1998). Many of these cultural arrangements (hardware) and behaviours (software) are likely to require “unfreezing” in a transformative process that is radical and episodic but also which needs continual maintenance given that the external system remains influenced by BAU thinking and path dependency. Hence, purpose represents a huge adjustment

for any organisation that has been part of the wider BAU culture, particularly incumbent businesses, and especially those that are shareholder owned.

As with the Wellbeing Economy, only a few short years ago, the idea of purpose-driven business would have seemed fantastical and even heretical, but is now talked about openly and positively by in the likes of *The Economist* (2019), *The Financial Times* (2021), and WEF (World Economic Forum) (2017), Schwab (2019). Perhaps because of the corporate sector’s central role in the market economy (and its unsustainability), the first signs of foundational change are showing. One especially important signal of intent came from the bastion of BAU thinking, the US Business Roundtable, when around 180 CEOs of the US’s largest companies declared that the purpose of business was no longer to maximise profits for shareholders but promote an economy that serves all Americans (US Business Roundtable, 2019). This statement added credence to the bold view of Larry Fink, CEO of BlackRock, the world’s largest and most powerful financial asset manager, who asserted a year earlier to the CEOs of all firms they invest in that “*Society is demanding that companies, both public and private, serve a social purpose*” (Fink, 2018, p. 1).

Firms that are making the shift to purpose, not unexpectedly, are also finding that that purpose is addressing a wide range of issues they were facing, from hiring and retaining the best talent and improving customer loyalty to increasing agility and productivity (Blueprint for Better Business, 2015). It is more than a happy coincidence that purpose taps into, and unleashes, the fundamental drive of humans to serve the wellbeing of others (i.e. be purpose-driven)—something which has until now been relatively ignored in organisational management in favour of a BAU financial self-interest approach (Ebert et al., 2018).

Reflecting these sentiments in practise, albeit with varying levels of authenticity and progress, it is now commonplace to see companies revealing their “purpose” or rediscovering one they had prior to BAU’s cultural dominance and undertaking the hard journey to transform the cultural hardware and software of their organisations. This means the deliberate auditing and appropriate transformation of functions, processes, structures and behaviours so that they are working to strategically optimise delivery of the purpose and not some other kind of value. It also serves to shift the innovation potential of institutions to beyond market solutions, somewhat addressing the issue of over-marketisation.

Whilst purpose-driven start-ups are commonplace and relatively straightforward, companies that have gone on a journey of transformation include companies as large, complex and established as Unilever or Natura (which was the first publicly floated company to be constituted as a Benefit Corp—a particular form of constituted company where a meaningful purpose must be encoded in its statutes). It also includes companies from sectors as problematic as fossil fuel extraction, such as DSM, the Dutch state coal mining company which shifted to sustainable nutrition, and Ørsted, the Danish multinational power company that switched from oil and gas production to being the world’s largest developer of offshore wind energy (Madsen and Ulhøi, 2021). Such shifts are now increasingly aided by large business consultancies that help organisations move from BAU to Purpose and abetted by purpose-driven rankings. Despite such rankings, because purpose is fundamentally about core intent, which is then translated into a journey of implementation, discerning the genuine purpose-driven firm from one that falls short of this transformative mark requires a framework of analysis. Two alternative firm logics have emerged from the sustainability crises which may make an organisation appear purpose-driven, when

in fact they are not (Hurth, 2021). As will be outlined later, these archetypes are just as relevant for universities as for businesses.

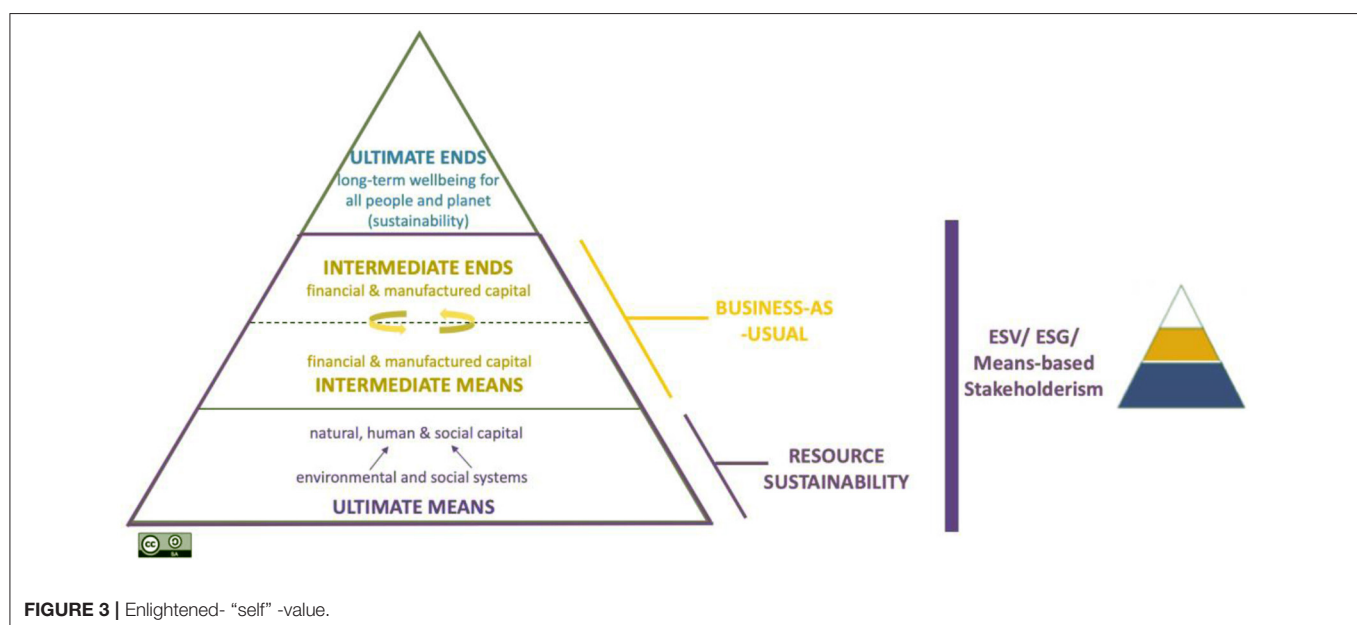
Corporate Social Responsibility (CSR) Logic

If organisations are pretending their reason to exist is to serve society, when actually this is just an image management exercise that is being cynically used to capture the support of stakeholders or to hold off negative stakeholder pressure (including regulatory pressure by government), then they are “purpose-washing.” These organisations are operating firmly as classic BAU organisations, bounded within the middle of Daly’s triangle with a focus on near-term self-interest (see **Figure 3**).

Developing a purpose to appear in line with sustainability is part of suite of *ad hoc* stakeholder pressure-reducing measures that are often referred to in the business world as ‘Corporate Social Responsibility (CSR) measures. In contrast to the more recent deeper social impact focused intent of the academic concept of “broad CSR” (Schwartz and Saia, 2012)—we use the term here in the way that CSR has generally been interpreted by businesses. As the ex-brand manager of Dove, a Unilever brand noted: “If you think about corporate social responsibility, it kind of feels very bolted on to an organisation, and it’s often one of the first things that get hit by budget cuts. It’s often one of the things that most people dismiss as not core to their business strategy. But if you have a purpose, then that is your core” (Ebert et al., 2018, p. 12).

Enlightened Shareholder/Self Value/Stakeholder View (ESV) Logic

For another category of BAU companies, profit maximisation still remains the overarching goal but there has been a genuine shift in their thinking as they confront the unsustainability data and the stakeholder pressure in a far more considered and mature way.



This category is known as “enlightened shareholder value” (Ho, 2010), but could be more broadly termed “enlightened self-value” because many companies’ imperative is survival at all costs, and because shareholders are, at least in theory, also part of the internal system. The stakeholder is “enlightened” through recognition of the deep crises of the ultimate means. For ESV organisations, the key shift is a move from short-term securing of maximised financial resources for the firm and/or its members, to longer term maximisation. ESV is often prompted by the realisation that an organisation will not be able to deliver maximised profits, or continue to survive for much longer, unless they confront the issues of unsustainability and respond adequately to stakeholders’ demands for value to be better distributed to them. The result is a deeper mindset change to strategizing and operate against longer-term, and hence more systemic, context.

For ESV organisations, therefore, decision-making begins to extend to all resources that value generation rests on, including, crucially, the sustainability of the resource base. As a result, understanding to what extent a company’s survival rests on the health of the climate, ecosystems, forests, social equality, mentally healthy workforce etc., and then acting to protect this, becomes central. An ESV approach therefore encapsulates both the middle and the bottom of Daly’s triangle (**Figure 4**) by bringing the resources that underpin value creation into its realm of thinking and action (“resource sustainability”). This new thinking leads to a company displaying a range of positive stakeholder- and sustainability-aligned actions. However, ultimately, their actions are tethered to whether or not they can be justified to ensure the firm’s long-term survival and/or optimal financial success. If not, then actions are unlikely to get support. For this reason, these organisations are limited in their sustainability innovations and cannot be considered purpose-driven because their ultimate ends are not anchored to optimising wellbeing.

UNIVERSITIES: THE PATH TO PURPOSE

Many in the academic sector would argue that universities cannot or should not be compared to businesses. But, in part, this reflects the tendency of the BAU approach to compartmentalise the economy, promoting a view that profit-(maximising) organisations are somehow fundamentally different to non-profit (maximising) ones. Profits, however, are a necessary operating condition for all organisations—the differentiating factor is what they are used for. An example of how the “profit problem” can be reframed is provided by the University of Aberdeen’s vision strategy *Aberdeen 2040*, which expresses a commitment to “generate resources for investment in education and research year on year, so that we can continue to develop the people, ideas and actions that help us to fulfil our purpose⁵.” Indeed, the above analysis of businesses can be applied to universities expressly because all organisations have become business-like in the way they are led and run and in the way they operate from the similar economic paradigmatic assumptions. Moreover, purpose is a concept that is institutionally agnostic—it sets an

orienting frame of long-term wellbeing for all that profoundly unites all organisations regardless of their constitutions. Research into purpose-driven firms shows that this unites not just the destination of organisations of different types, but also the path, motivating collaborations and innovations that transcend traditional boundaries (Cambridge Institute for Sustainability Leadership (CISL), 2020).

The BAU University

Universities may see themselves as socially-responsive, and responsible, organisations with an academic mission to improve the common good, but applying the above framework of analysis it is hard to see most universities as purpose-driven, or even on a purpose-driven journey. Instead, the weight of current evidence points to universities being locked into a CSR approach to unsustainability data, firmly entrenched within a BAU paradigm of the world.

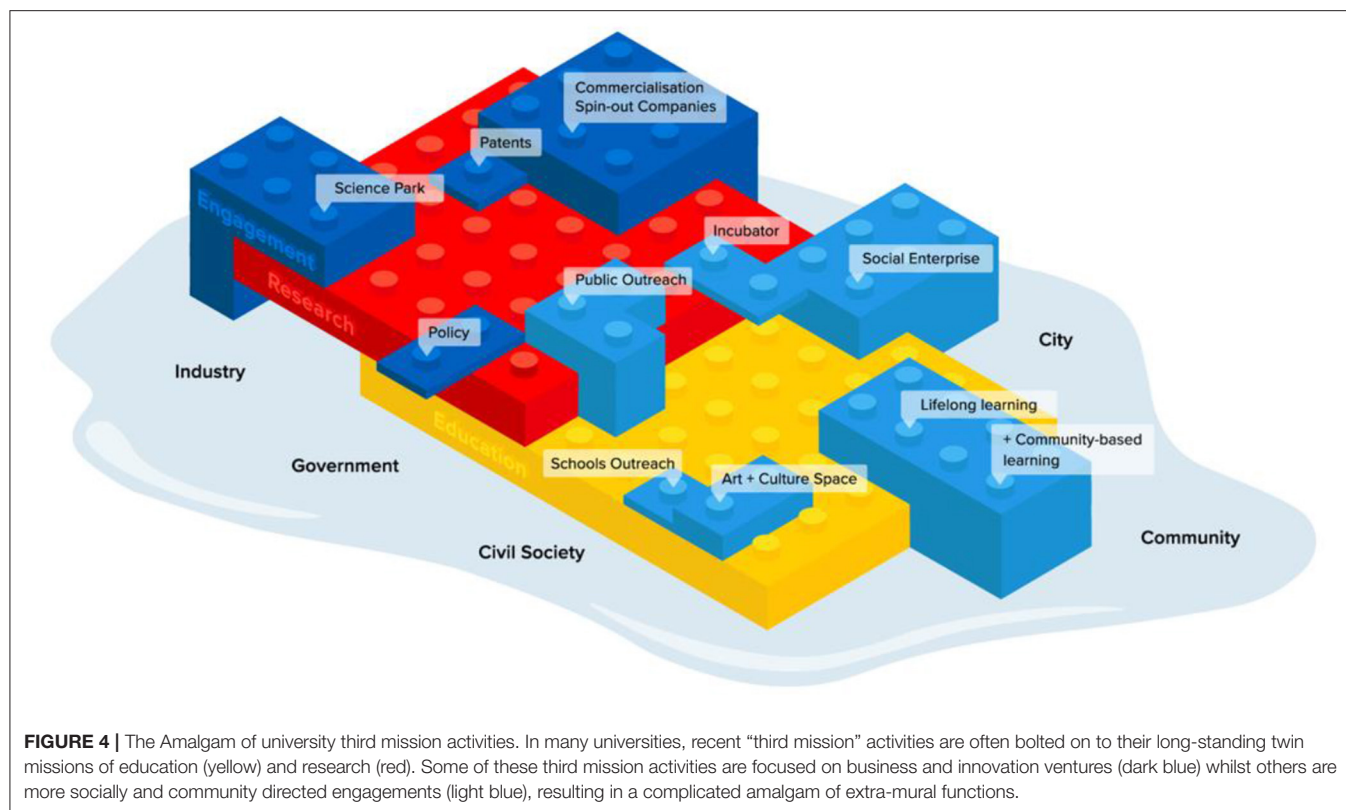
The third mission has been the core way in which universities have sought to directly address the concerns of society. The third mission, in itself, could be seen as a CSR-type activity, being bolted on to what is considered the core work of education and research. It is therefore not surprising that, despite offering the promise of new moral narratives to bridge with society (Lee et al., 2020), in many universities “the third mission” has accrued as an *ad hoc* amalgam of outward-facing academic ventures (Philpott et al., 2011; Knudsen et al., 2021) (**Figure 4**).

Some of these ventures tend to be coordinated from the top, notably strategic knowledge-transfer partnerships that strengthen links between research and industry (commercialisation, licencing of patents, spin-out companies, science and technology parks) to support regional innovation, job creation and economic competitiveness (Mathisen and Rasmussen, 2019). Others are decentralised and grafted on as a bottom-up portfolio of diverse civic initiatives, social enterprise, lifelong and community-based learning, and public outreach programmes (Bell et al., 2021). The result of this hybridisation can be a bewildering multiplicity of extra-mural activities that academics are expected to engage in (Bleiklie et al., 2011) but which appear to react to varying external demands rather than reflecting a coherent internal strategic intent.

By extension, much of the observed university responses to global sustainability imperatives has been criticised as “strategic posture” (Oliver, 1991), in which universities’ promote sustainability agendas as a form of university boosterism and stakeholder “capital,” rather than driving real change (Latter and Capstick, 2021; O’Neill and Sinden, 2021). Critically, the reality of the day-to-day, year-to-year operations of most remain tied to the competitive market place of research funding and student courses. Budgets have become increasingly performance based, and with public attention and scrutiny focused on performance and compliance, resources are concentrated in the best performing academic areas (Bleiklie et al., 2011). In this way the utilisation of intermediate means for intermediate ends appears to be the driving motivation and rationale for decisions.

Reflecting what has been termed “academic capitalism” (Slaughter and Leslie, 1997), the key performance metrics of most higher education institutions increasingly mimic those

⁵<https://www.abdn.ac.uk/2040/commitments/index.php>



of short-term profit-maximisation corporations. Institutional wellbeing comes from maintaining or expanding the customer base, namely recruiting undergraduate and taught postgraduate students, especially higher-fee-paying students from abroad. Internationalisation, marketisation and commodification of educational programmes dictate the nature and direction of global engagement. Reputational prestige, and much valued additional income, comes from enhancing externally-funded research activity, including from contract research and commercialisation initiatives. Performance in national and international research and teaching rankings and league tables, alongside metrics around the likes of graduate employability, student satisfaction and widening participation, are seen as independent measures of the quality of the academic offering, allowing “customers” to differentiate between competitors and giving confidence that the product is delivering social value in the marketplace (Watermeyer, 2019; Reed and Fazey, 2021).

In terms of Daly’s triangle, BAU universities and their strategic thinking are firmly focused on the central issue of survival over relatively short-term horizons. Their responsibility to addressing concerns of ultimate means are either: directly through their attention to reducing their own greenhouse carbon footprint; about improving energy efficiencies in their building stock, and generally greening their campuses; or by proxy through research efforts to better clarify the issues of climate change and degradation of the biosphere. In the main, they are driven *ad hoc* by where stakeholder pressure is the greatest (O’Neill and Sinden, 2021). The attention that CSR universities pay to ultimate ends is purely aspirational or based on compliance

commitments such as: widening participation for less advantaged or marginalised groups; improving student and staff satisfaction; and to strengthening equality, diversity and inclusion. In reality, these activities represent a short-term reflex to relieve stakeholder pressure and retain the licence to operate, and thus their survival. In short, across most universities, the narrow and instrumentalised BAU focus on performance as tracked by rankings, profits and graduate income would seem to come at the expense of maximising real sustainability impact (O’Neill and Sinden, 2021). The **Supplementary Table 1** to this paper outlines the archetypal impact related behaviour that would be expected from universities that are CSR, ESV or purpose-driven.

The ESV University

As universities begin to recognise the magnitude and urgency of the coupled socio-ecological crises there are signs of a genuine shift to long-term strategic thinking (e.g., Fazey et al., 2021; Tyndale et al., 2021). According to Sterling (2020), “...universities tend to be what might be called “inside out” institutions, concerned with all the normal parameters of university governance and operation, and secondarily looking to the external world. But current conditions are perhaps beginning to turn this around: some are becoming more “outside in” establishments, where massive contextual issues are precipitating a re-think on what universities can and should do...”.

This means that many universities are broadening their individual and collective horizons, even though carried out for self-interest. They are recognising that if they do not fundamentally reorient their research and teaching to focus on

the urgent task of altering how society transforms resources and impacts society then their future survival is threatened (e.g., Crow 2010; Crow and Dabars 2015). More and more institutions are formalising public engagement activities to be more attentive to local community or broader society needs (e.g., Bell et al., 2021) and skilling academics to better communicate the real-world applicability of the work (Stewart and Hurth, 2021). This approach would seem consistent with an ESV logic and the third mission, suggesting that through their external engagement with non-traditional audiences, universities are becoming more “outside in” institutions who understand society’s sustainability needs, recognise its problems and motivate solutions. Rather than being motivated by a fundamental intent to delivery for society and co-create the solutions, often universities retain a more arms-length approach to defining and accounting for their third mission activities (Loi and Di Guardo, 2015; Maassen et al., 2019), something which is symptomatic of the constraints of ESV organisational thinking.

Such actions, therefore, would not constitute a purpose-driven university. Academic external relations tend to remain less about directly satisfying public needs and more about better targeting their research messages to maintain and enhance the conventional model of business-as-usual knowledge production. To be genuinely purposeful, such external relations need to go much further, forming deep relationships with those they serve by developing a co-creative model of public engagement based on social learning and building an overtly interdisciplinary, participatory, reflexive, ethical and socially transformative academic culture (Fazey et al., 2021; Reed and Fazey, 2021).

In short, the transition to ESV will only take universities so far down the necessary innovation track. If decisions about impact are restricted by the over-arching desire to protect the university’s survival, then the potential for genuine innovation and transformation towards sustainability will be fundamentally restricted. With ESV thinking, decisions to innovate towards sustainability will only be able to be justified within the governance system to the extent that they can be judged as a threat to long-term university viability and financialised success. Therefore, within an ESV approach it is hard to see how a university could develop the true reflexivity of thinking and whole-institution approach required to help society lead itself towards a sustainability future (Maxwell, 2021; Sterling, 2021).

The Purpose-Driven University

Arguably, no university has taken the lead from business and explicitly embarked on a purpose-driven journey, although papers in this special issue provide instructive examples of the innovations that would support such a repurposing. The **Supplementary Table 1** presents indicative examples of archetypal arrangements and behaviours that might be expected in a purpose-driven university, but here we draw some general insights from the business experience.

Perhaps most critically, the experience in the business sector confirms that the move to purpose represents a significant and complex process of organisational transformation [Cambridge Institute for Sustainability Leadership (CISL), 2020]. As publicly oriented institutions, universities might seem to be in a

better position than commercial, shareholder-led corporations to embrace purpose, articulate the wellbeing outcomes they seek to address, and alter their organisational systems to deliver against them. However, many businesses, and business as a sector, appear further down the road on the journey to purpose. The emergence of genuinely purpose-driven businesses as a pivot away from unsustainable economic assumptions, under perhaps the most difficult of circumstances, means that rather than resisting closer alignment with business, purpose provides universities with a template for transformation. Universities can use this information to navigate the change, and support the co-creation of this important novel organisational form, drawing on tried and tested examples of this deep shift and adopting ideas on how to implement it [Haski-Leventhal, 2021]. Crucially, “purpose” offers a holistic conceptual framework for universities to learn from the business sector and rapidly apply their expertise and capacity for social and technological innovation at scale across society (Trencher et al., 2014). In the university context, that would involve blending the triple helix of academic missions (education, research and social engagement) under an overarching reason to exist that is a strategic contribution to the wellbeing of all people and planet in the long-term (sustainability).

A key lesson from business is that while the logical imperative to purpose may be sound and stakeholder support may be strong, the power structures and vested interest that stand to lose by such a transformation are likely to provide cultural inertia to such profound change. Furthermore, amid a wider cultural and legislative environment that has been optimised for financial income under BAU, concerted efforts are needed in order to optimise for impact around wellbeing outcomes. Daunted by this prospect, universities, like many businesses, might be tempted to continue along the BAU track; they may accommodate stakeholder demands by adopting a Corporate Social Responsibility approach. As a transitional step, some may make the difficult step to Enlightened “Self” Value models, embedding long-term stakeholder-oriented decision-making. In both these cases, there is a risk that purpose is used, disingenuously, as a way of securing financial gain via stakeholder favour. But given the scale of the planetary crisis we face, the role of BAU in creating it, the radical paradigmatic change needed to avert crises, and the central leadership role universities play, it would therefore appear that becoming “purpose-driven” is the most adequate strategic response for universities.

Based on the business experience, the starting point for that strategic response is to fully understand what a purpose-driven university is likely to look like, in terms of cultural hardware and software, and to be able to analyse the gap between where a university is now and where they want and need to be. As in business, in universities it is likely that an appetite for deep-seated radical change will be found scattered throughout the organisation, especially amongst fresh faculty and the student body, but unleashing that potential to drive purposeful change through the entire institution will require university leaders to adopt purpose as a new organisational paradigm. This paper can only present the foundational proposition of purpose, though **Supplementary Material** to this paper (see **Supplementary Table 1**) provides an overview of the types of university behaviours that are legitimately and logically

connected to the underlying organisational logics of purpose. For those university leaders—governing bodies and executive managers—asking “what are the first next steps I can take,” we offer insights informed by two empirical studies of the practises guiding purpose-driven firms [Ebert et al., 2018; Cambridge Institute for Sustainability Leadership (CISL), 2020]. These seven key reflective questions form the starting behaviours that in business have helped initiate the radical and powerful change agenda that purpose embodies:

1 What Worldviews (Including Values) do We Really have and Which do We Want to Create?

As universities appear to be largely locked into BAU thinking then this suggests the lack of embedded critical “double loop” learning reflexivity needed to break through to a new paradigm (Sterling, 2004). This is deeply ironic, given that universities ought to be places where this deep level reflexivity about fundamental philosophical questions of society’s meta purpose can be debated and solutions designed. To break this impasse will require exposure, examination and re-framing of doxic-level assumptions that have long-plagued universities, in the context of sustainability (Lozano et al., 2013; Maxwell, 2021; Sterling, 2021).

Using the insights of stakeholders (internal and external) to “hold up a mirror” for the company to understand itself is something noted by leading purpose-driven companies. University leaders will need to be clear about what stakeholder-informed process it will use to reveal, appraise and reconceptualise the individual worldviews, and associated structures, processes and behaviours that shape the university and work to move these towards worldviews aligned with the long-term wellbeing of all.

2 What is our University’s Purpose?

The organisational purpose will be the reason the university exists, expressed as a strategic contribution of the university to long-term wellbeing for all (sustainability). University governing body and executive managers will need to use wide stakeholder engagement to thoroughly understand “long-term wellbeing for all” as the resonant context, appreciate how it is threatened, and decide what their university is best placed to focus its contribution on, given its attributes and particular context. This will give the leaders the basis to make explicit what value the university primarily seeks to create (its purpose); be able to justify why this is in the interest of long-term wellbeing; clarify how it will make sure that social and environmental systems and related capitals are protected and enhanced, and how wellbeing is delivered in a way that accords with its values.

As described above, universities are arguably *the* place where deep reflection about humanity’s meta-purpose and how best to deliver on it can be focused on. Currently, the third mission only enables reflection at a myopic, abstracted level where concerns *within* the frame of BAU logic are of primary focus. With purpose, a university might question how it can enable society more broadly to reflect on these deeper questions about the meta purpose of humanity and beyond and then support operationalising this normative agenda in the economy and beyond.

3 How do We Assess What Value Our University is Currently Creating and Destroying?

In order to move from a statement of intent to a set of strategic objectives and policies for how the university as a whole can deliver the purpose, university leaders will need to understand their current and desired impacts on long-term wellbeing for all. Specifically, they will need to assess the nature of the impacts they create for social and environmental systems, and the associated capitals—the resources that wellbeing ultimately rests on and which are inputs into any organisational operating system. This means understanding direct and indirect (scope 3) impacts on wellbeing, and pathways to it, as a result of the knock-on effects of decisions. This also requires pinpointing how these impacts in turn come back to affect the university and the effects of uncertainty on its objectives (risk). Stakeholder engagement and scenario planning are useful ways to understand and predict impacts and create a consistently updated “theory of change” about how the purpose can best be achieved, forming the basis of strategic planning. The governing body can then devise strategic objectives, targets, measures and policies detailing parameters for the university to work to when devising and delivering strategy and addressing risk. These are vital to make sure that when achieving the purpose, the health of the resource base is not destroyed, and ideally is enhanced and that the manner in which the university delivers the purpose is ethical and based on sound information.

4 How can We Embed Purpose to Create the Value Intended, in the Way Intended?

The purpose, once defined, should serve as the touchstone for all decisions and can be used to help select amongst the myriad of sustainability “tools, initiatives and approaches” available to universities (Lozano, 2020). University leaders will need to make sure that decision-making at all levels is working towards achieving the purpose in the way intended and isn’t, in fact, working against it or to some other assumed university objective. This involves understanding, and strategically adapting, the university’s cultural hardware and software, including aligning rewards and incentives, recruitment, measurement and investment decision-making. Central to this will be building a “guide-and-co-create” marketing and communication culture which result in purpose-aligned products and services (what is researched, what courses exist, what consulting activities offer etc.), how they are made available and at what cost, and how they, and the university as a whole, is imbued with meaning via all related internal and external communications (Stewart and Hurth, 2021).

5 How do We Ensure Stakeholders, Including the Internal Academic Community, are Able to Support of Our Purpose?

To deliver a university purpose, the university leaders will need to have clarity about the nature of its stakeholders and how to engage with them and integrate their system wisdom into the ongoing decision-making throughout the university. They will need to be clear which are the “primary beneficiary stakeholders encompassed in the purpose,” which are the

“enabling stakeholders” that support them in doing do and which are those stakeholders affected by the organisation in ways that may not be within strategic sight. As well as deeply understanding the pathways to wellbeing for primary beneficiary stakeholders, university leaders will need to ensure that they deeply understand their dependencies on their enabling stakeholders and what value needs to be distributed to them to ensure their ongoing health. For a BAU university (CSR or ESV), stakeholder relationships are likely to have been deliberately formulated so that they primarily support financialised outcomes. Persistent and strategic effort will be needed to understand, plan for and execute changes to this stakeholder constellation so that it is purpose-outcome optimised and not financial income optimised. This process should be an open and transparent one and allow for debate and challenge, particularly from the internal academic community who are those that need to have ownership of the purpose and capacity to deliver it. Stakeholder engagement should also be based on the recognition that by authentically existing to contribute to long-term wellbeing for all, a university can be a conduit for the deep desire of stakeholders, as humans, to help with this meaningful pursuit.

6 In What Ways are We Accountable to Society and Our Stakeholders for Our Purpose and How it is Delivered?

At the heart of becoming purpose-driven is accountability to society for the legitimacy of that purpose and in delivering it, in the way intended. University leadership will need to ensure it has a quality accountability system, based on transparency, that ensures that stakeholders (internal and external) have the information and accessibility they need to be able to critically support the university in achieving its purpose, question that purpose, and to be able to make informed decisions based on how the university acts. Research on leading purpose-driven businesses suggests that purpose provides the transparent touchstone for an organisation to make and defend difficult, but necessary, decisions and arbitrate amongst stakeholders where win wins have been exhausted. Hence, a robust accountability system should bring further clarity to the purpose and what it means in practise.

7 Is Our Governance Fit for Purpose?

Centrally, the university leadership needs to alter its governance system to be able to direct the purpose, oversee it and be accountable for it. ISO 37000 is the first global guide for organisational governance that has purpose and sustainability at its heart and can be used for reference. Without governance practise that is aligned with delivering a purpose-driven organisation it is highly unlikely that university transformation will be achieved or sustained.

FINAL REMARK

All organisations, including universities, will be judged by future generations in terms of how they respond to the call for deep and rapid institutional transformation at this critical moment in time. Universities, like all other organisations—businesses, charities, and government—will require bold, vulnerable leadership and hard decisions. As the Wellbeing Economy and organisational purpose begin to transform notions of the economy and business as a driver of sustainability, rather than unsustainability, so organisational efforts and success will need to adapt. The urgency of the planetary crisis and the emerging global imperative of delivering wellbeing for all over the long-term, in a way that protects and enhances the underpinning social and environmental systems, is likely to become *the* foundational reason for universities to exist. In that context, the third mission provides the seeds of alignment of universities with the broader public good, but as currently conceived it is reinforcing a business-as-usual mindset that prioritises economic development and instrumentalises societal engagement. Using a shift to ESV as a step on the path may be wise—it will require long-term thinking to integrate research and teaching with more direct societal action, providing a more systemic and holistic approach to the relationship between universities and the local, regional and global communities they serve. However, for third mission seeds to grow into an overarching reason to exist that and authentically connects universities with society and sits above all three missions of research, education and social engagement, the old assumptions of the “Wellbeing Machine” need to be consciously shed. Instead, there needs to be whole scale alignment with the tenets of the emerging Wellbeing Economy. It seems, given the position we find ourselves in and the options available, that only by encompassing the academic three missions through the singular, long-term, motivating intent of purpose, and by learning quickly from business and other organisations about the practical challenges of purpose-driven transformation, can universities hope to play a truly central role in ensuring the wellbeing of life on earth in this critical decade.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsus.2021.762271/full#supplementary-material>

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