1

Universities as Agents of Change: Green Academy to Ecological University

STEPHEN MARTIN, CHRISTOPHER D. IVES AND BARRY CARNEY

Introduction

Our civilization, as we know it, is at a historical tipping point because of the environmental wreckage we are causing in the planetary biosphere. Accelerating, non-linear change in biophysical systems will determine the future of our world and will be characterized by huge discontinuities for human and natural systems, encompassing widespread natural disasters, mass migration and civil unrest (Folke et al., 2021). In this new age – the Anthropocene – we urgently need new ways of thinking and acting (Jucker, 2020; Ison and Straw, 2020; Shephard, 2020). The turbulence currently running through our interconnected environmental, socio-economic and educational systems caused by Covid-19 creates opportunities to transform all our systems at the deepest levels.

Universities could play a significant part in this transformation process, but only if they themselves can become transformative. There is a growing and urgent need for our universities to become systemic learning organizations, if they are to play a critical part in addressing the issues we currently face (Sterling and Martin, 2019). We must amplify and accelerate a shift from the old model of the university as an 'ivory tower' towards an adaptive, innovating and co-evolutionary relationship with community and society. This transformative model must avoid the ideological effects of the standardizing global testing culture, and a rationale based solely on the needs of the economy. The traditional model must be critiqued and transformed in favour of a higher purpose role aligned to addressing the immense challenge and possibility of securing social and ecological well-being in our troubled times. As Bawden (2008) commented:

> There is a strange and inexplicable reluctance by our institutions of higher education across the entire globe, to overtly promote the fact that they are, first and foremost, agencies of human and social development. (p. 65)

Bawden (2008) also argues that 'project civilization' is profoundly fragile – predicated on the stability of planetary systems – and our universities have extraordinary knowledge and capacity to protect it. However, change in higher education tends to arise from systemic external and internal factors (Wals and Corcoran, 2012). Thus, in the context of immense societal complexity, intentional transformation of universities' institutional cultures, curricula and campuses requires

system-wide approaches (Sterling, 2021b). These must be facilitated by skilful management and cultivation of institution-wide awareness of the need for change, coupled with appropriate monitoring and evaluation (Scott and Gough, 2003; Trowler, 2010).

While curriculum reform in response to contemporary planetary challenges is beginning to take place in many universities in the UK and elsewhere in the world, it is incremental and small scale. Although inclusion of sustainability content in selected units of teaching is commonplace, examples of progress towards whole institutional reform are harder to find. Some notable exceptions include the Hawkesbury Agricultural College initiative (Bawden, 2016) in New South Wales, Australia; the 'regenerative sustainability' initiative (Marcus et al., 2015) at the University of British Columbia (UBC) in Canada; and similar initiatives at several participating universities within the UK's Green Academy programme (McCoshan and Martin, 2013), discussed later in this chapter. These illustrate how universities can actively promote and participate in the co-creation of societal transformations that go far beyond technology transfer and other economic contributions. There are early signs that these exceptions may be on a trajectory towards becoming the rule as attempts at institution-wide reform can be noted in a growing number of universities. However, urgent questions persist regarding how to reform knowledge systems at the necessary scale and pace required to address current and future planetary challenges (Fazey et al., 2020). It is evident that there is still a long way to go, yet the widening spread of sustainability-focused initiatives across universities should bolster resolve and common efforts.

Considering the rapidly closing window of opportunity for humanity to keep the planet within safe ecological limits (Intergovernmental Panel on Climate Change (IPCC), 2021; Ruckelshaus, 2020), and the dawning realization among governments, industry and civil society of the urgent need for transformative change, we explore both the nature and process of university reform required to meet pressing sustainability challenges. First, we present the need for wholesale university reform, by examining the fundamental principles of higher education considering contemporary global crises. Second, we explore the complex nature of institutional reform as applied to universities. Third, we present selected case studies to illustrate how institutional transformation can be achieved and how important barriers to change are identified. Finally, we lay out a series of recommendations and argue for the emergence of a new ecological and civic university model.

What Is the Purpose of a University in the Twenty-First Century?

The traditional view is that university education provides a basis for extending and deepening human understanding in a disciplined, ethical and illimitable manner, including of concepts such as personal growth and character development. However, within Western, neoliberal economic settings, this view has been overtaken by the prevailing commercial ideals that hold that the purpose of higher education is to advance knowledge, promote social mobility and help ensure perpetual economic growth and competitiveness. As Marks and Steuer (2008, citing Lawson, 2006) have suggested:

> This commercialisation of higher education serves a bigger purpose, though. It softens students up for the rigours of globalisation. By creating a market, young people are encouraged to think and behave like rational economic man. They

> become 'human capital', calculating the rate of return on their university investment. A degree becomes a share certificate. Commercialisation conditions students to expect no help from others, or society, and therefore never to provide help in return. Debt and economic conditioning discourage graduates from going into lower-paid caring jobs – and instead into the City, where the real 'value' is. It fashions a Britain that competes rather than cares. (p. 10)

This type of education creates citizens who remain stalwarts of the prevailing economic system and perpetuates values of individualism and transactional living. Educated to 'succeed' within existing parameters, graduates are consequently unable to lead as agents of progressive social change. Young people are increasingly concerned – and even fearful – of the future they are inheriting,[1] yet the university education they receive rarely prepares them to bring the change that they – and the planet – requires. Universities must therefore rethink their ultimate purpose.

What are universities for? Philosopher Maxwell (2020) suggests that we begin by asking: What is the fundamental problem that humans currently face? They propose two fundamental problems of learning: first, learning about the universe and about ourselves and other living things as parts of the universe; and second, learning how to create civilization. Maxwell (2020) argues that we have solved the first problem because, in the seventeenth century, we created modern science and technology, but we have yet to solve the second problem and our current global issues have arisen as a result. Science and technology have created many social benefits such as hygiene and medicine. However, without an accompanying wisdom of limits and constraints, they have also led to the creation of the global behemoths of industry and intensive agriculture, which, among other technological 'achievements', are driving increasing social inequalities and catastrophic ecological breakdown. Scharmer (2019) also questioned the role of universities in contributing to social progress and their failure to address urgent challenges of social breakdown, political unrest and massive environmental destruction. His prognosis aligns with Maxwell's, namely that there is a lack of political will and a 'knowing–doing' gap, which Scharmer calls, in his blog, 'a disconnect between our collective consciousness and our collective action'. They go on to call for both action learning that 'shifts the outer place of learning from the classroom to the real world', and whole person learning that 'shifts the inner place of learning from the head to the heart, and from the heart to the hand' (Scharmer, 2019, n.p.).

This assessment is not new. Cultural theorist and author Williams long advocated the need to reconsider the conceptual differences between education and learning (Williams (1983) in McIlroy and Westwood, 1993). Crucially, Williams saw education as part of the process of social change itself. Education must be more than 'the bottle with the message in it, bobbing on the tides and waves of history' (Williams (1983), in McIlroy and Westwood, 1993, p. 255). Plutarch is often attributed with purporting that 'education is the kindling of a flame, not the filling of a vessel'. Ironically, this argument continues some 2,000 years later as modern education fills more vessels, often drowning the recipients! In revisiting the fundamental purpose of a university for the twenty-first century, there is a need to reconsider the conceptual differences between education and learning. The difference is one of value. Learning is what is sought; education or 'official learning' is what is offered – and the latter is shaped by the perception of these needs by the educators.

Jucker (2020) offers a more recent critique of our educational systems. In their book *Can We Cope with the Complexity of Reality?*, they explore the critical issue of why craving easy answers is at the root of our problems. By reflecting on several decades of theory and practice in education for sustainability, they propose that education for a fair, open, just, equitable and environmentally sustainable world involves supporting the development of a sound understanding of complex reality and focusing on issues that urgently need to be addressed (such as overconsumption and the reinvention of democracy). Jucker (2020) differentiates intelligence from rationality, demonstrating how intelligence can be a tool for both propaganda and truth seeking, based on the ground-breaking work of Kahneman (2011) and Tversky and Kahneman (1974). Cognitive scientists divide our thinking into two categories:

1. System 1 – intuitive, automatic, fast thinking that may be prey to unconscious biases.
2. System 2 – slow, more analytical, deliberative thinking needing conscious effort.

According to this view – called dual-process theory – many of our irrational decisions come when we rely too heavily on system 1 thinking that allows unconscious biases to cloud our judgement. As Glasser (2018) notes, an overuse of system 1 thinking can lead to antibiotic (as opposed to symbiotic) relationships with our environments. Studies by the Canadian psychologist Stanovich (1993) have elucidated that these cognitive biases are often more prevalent in those with higher intelligence quotients than those with lower ones. Therefore, education systems for the twenty-first century need to not only cultivate the knowledge that underpins system 2 thinking, but also to enable such thinking to be applied at appropriate times and settings. Indeed, Shephard (2020) defines effective university education as that which develops critical thinking, as this captures more precisely the social, environmental and ethical needs of civil society in a complex and rapidly changing world. Ison and Straw (2020) recount a predominance of first-order change makers – that is, the resulting change remains contained within the existing parameters of the system – compared to second-order change makers – that is, the change is made or sought at the systemic level. To address twenty-first-century challenges, universities must be institutions that develop both knowledge and wisdom.

In our view, there are some fundamental flaws in our educational systems based on their failure to transform learners into active conceptualizers capable of critical reflection and to create lifelong learners adept at taking responsibility for their own learning. As we highlight later in the chapter, this was made clear through the experiential innovations of Hawkesbury Agricultural College over three decades ago (Ison and Straw, 2020). Current higher education systems often fail to cultivate deliberative, critical thinking applied to pressing contemporary challenges because they commonly fail to discern the relevant learning styles and preferences of individuals. Many of those who teach in universities find it almost impossible to change from a didactic form of teaching (often characterized as 'death by PowerPoint') towards the more adaptive and co-creative forms of learning that engage and enable learners.

President of Arizona State University (ASU) Michael Crow asserts that universities are not fit for purpose in the twenty-first century (Crow and Dabars, 2015), arguing in a speech (ASU, 2018) that universities are presently 'inadequate' for five key reasons:

1. **Universities are outcomes of their own design and its application.** Notably, they teach and research in areas such as economics based on models that are outmoded, structuring learning

around outdated notions of disciplinarity. Bawden (2016) would categorize this as 'epistemic myopia'.

2. **Universities apply inadequate system level tools**. They are reductionist in focus and fail to teach and research the wider, more complex global and social dimensions of their disciplinary traditions.
3. **Universities are inadequately representative of cultural diversity**. This is especially in relation to that seen in wider society – such as Black, Asian and minority ethnic (BAME) – and Indigenous peoples. This further narrows their contributions to knowledge creation and its wise application.
4. **Universities do not care about unsustainability and its social, environmental and economic consequences.** They have no moral sensitivity because of their obsession with reductionism.
5. **Universities are arcane**, **non-adaptive institutions.** If universities move at all, they do so at a pace which is not commensurate with the pace of change in the modern world.

ASU has made some outstanding progress in developing a more systemic and transdisciplinary approach to learning with over twenty-five interdisciplinary programmes and many global interdisciplinary research institutes. But even here Crow is critical, noting that 'it's still not nearly enough!' (ASU21), and believes universities need to change everything down to their roots with sustainability as a core value in everything they say and do. Universities are currently 'closed sequestered places not fully and pragmatically engaged with the real world' (ASU21).

Scharmer (2019) argues that as we move from one geological epoch, the Holocene, to the other, the Anthropocene, it is time to reconceive the twenty-first-century university. This is also reflected in and reinforced by the work of Fazey et al. (2020) who advocate the need to reconceptualize knowledge required for the twenty-first century as being intimately intertwined with action. Yet, the magnitude of this task is profound and requires deliberate and thoughtful attention.

In critically reflecting on the shortcomings of the modern university, we are better equipped to characterize the effective, fit-for-purpose university, epitomized as a transformative, adaptive knowledge enterprise; working in real time and at scale to tackle the grand challenges of the Anthropocene. Universities must adapt and embrace their potential to tackle these grand challenges. As Calder et al. (2002, p. 99) have suggested:

> Colleges and universities are vested by society with the task of discerning truth, imparting values, and socializing students to contribute to social progress and the advancement of knowledge. They have a profound responsibility to impart the moral vision and technical knowledge needed to ensure a high quality of life for future generations. Sustainable development is the current context in which higher education must focus its mission.

Understanding Change Processes and Institutional Reform

The role that universities must play in the transformation towards a more sustainable society is increasingly recognized in both scholarly and practitioner literature (Ramos et al., 2015). Consequentially, many universities have aligned themselves to the principles of sustainability

and sought to advance the cause of sustainability through academic, operational and wider stakeholder outreach activities (Sterling et al., 2013; Campagnucci and Spigarelli, 2020). Despite this, progress has been criticized for being piecemeal and limited to isolated pockets within universities (Cotton and Alcock, 2013), technologically opportunistic, unresponsive to the social dimension and lacking overall coordination, leadership and coherence (Ramos et al., 2015; Adams et al., 2018; Butt et al., 2014; Martin et al., 2014), leaving some of the bigger questions relating to sustainability unanswered (Martin and Jucker, 2009).

When seeking to transform an organization towards sustainability, we are faced with a wide range of 'wicked' problems (Martin and Murray, 2010) that include uncertainty, multiple stakeholders, multiple perspectives and competing values. In systems thinking, these are often described as messy problems which have unbounded characteristics (Martin and Murray, 2010). Part of the challenge of institutional transformation is that it must address organizational culture, which includes systems of beliefs, values, attitudes and customs held by groups of people and within which individuals and disciplinary teams operate. However, organizational culture is an elusive concept, and this area of change is rarely addressed in any systemic manner (Martin and Murray, 2010). By exploring the ways in which we understand how values and culture develop, we can begin to find ways of exploring solutions for the wicked problem of sustainability. Just as there are hundreds of definitions of sustainable development, there are hundreds of definitions of culture. All of which is unhelpful, because it might lead us to think of culture and sustainability as a 'thing' or a 'state' which belongs to an organization. Neither of these are static concepts, but a dynamic that everyone is creating, affirming and expressing. Any approach to sustainability within an organization needs to focus on facilitating change in organizational paradigms and not just structures, systems and processes. Hence, we argue that there is a need to investigate how to shape and modify culture for different higher education outcomes. As Sterling (2021a) advocates:

> The operative shared paradigm – its embedded assumptions, beliefs, and values – shapes, influences, and limits debate and practice. It moulds 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. (p. 8)

We have used a Culture Web Model as a way of identifying some of the key characteristics of organizational culture (Martin and Murray, 2010) (Figure 1.1). The centre of the web is dominated by an organization's paradigm. Seel (2000) draws upon the cultural web and defines organization culture as

> the emergent result of the continuing negotiations about values, meanings, and proprieties between the members of that and with its environment. (p. 2)

The six arms of the web are seen as manifestations of the organization's culture and values. Most change programmes concentrate on the arms of the web, such as the organizational structures and processes. Experience shows that these approaches do not lead to sustained change (Martin and Murray, 2010).

Programmes with the specific purpose of organizational change are in the minority but are not altogether absent. There are also limited robust longitudinal evaluations of the processes

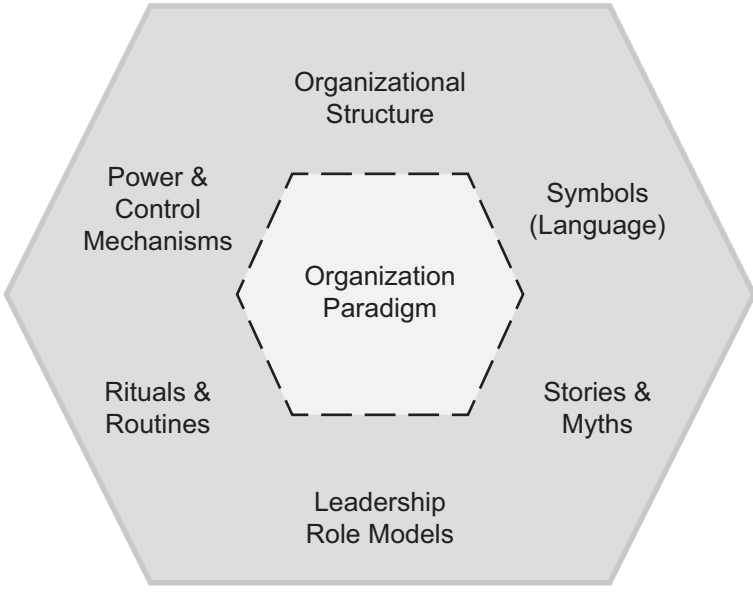

FIGURE 1.1 Culture Web Model (adapted from Martin and Murray (2010)).

of reform, and how these relate to the depth and magnitude of the change. Further knowledge of transformative praxis at the systems level is clearly called for. The following three case studies contribute to this sparse but vital area and provide faceted evidence on how institutional reform of educational entities might be enacted. The first is the case of Hawkesbury Agricultural College and its pioneering 'Systems Agriculture' degree programme that abandoned the pre-existing curricula for an experiential, holistically framed model. Second, the UK Green Academy initiative – launched in 2011 – intended to leverage sustainability from a position of curriculum 'add-on' to become a widespread operational approach. Third, the University of British Colombia expands upon aspects of the Green Academy and provides insights into long-standing sustainability progress that is embedded into campus and culture. We examine each of these through the lens of the Culture Web Model to identify key factors in their success as well as attributes that may have limited their wider impact.

Hawkesbury Agricultural College

An example of the kind of education required was experimented with by Bawden (2016) and colleagues at Hawkesbury College in New South Wales. Hawkesbury College pioneered an agricultural education programme that positioned systemic praxes centrally in learning (Bawden, 2016). A three-year 'Systems Agriculture' (SA) degree programme, which provided a certified qualification comparable to a level six bachelor's degree, ran from 1980 to 1995. It sought to educate through holistic processes grounded in experiential contexts. Hawkesbury's Systems Agriculture approach was, and continues to be, widely celebrated for its contextually embedded education. Bawden and colleagues created innovative ways of learning that avoided the issues of traditional pedagogical models. The key for them was to shift the place of learning from the

campus to the community. They knew that students learn better by doing. Therefore, they created action-learning programmes in rural communities where the student becomes the change agent, and the teacher the coach who facilitates the learner's potential.

Developing action learning at scale requires quite different learning infrastructures, including classrooms that are not primarily about content delivery but about reflection on action. This requires a different type of faculty that can hold the space for student-centred forms of learning. These new forms of learning and assessment were based on delegating more power and responsibility to the students by initiating a progression process based on a competency assessment framework, co-constructed with the students.

The curriculum objectives included autonomy in and for learning, systems agriculture and effective communication across systems thinking, knowing and doing. Importantly the design process featured the Kolb (1984) experiential learning model and its emphasis on conceptualization as the successor leading from the reflection step of the cycle. While many students tried to follow the Kolb sequence: experience → reflect → conceptualize → act, the majority missed out the conceptualization step because they were less effective at reflection. Bawden and others at Hawkesbury also found that students began to understand that they all had different learning styles that were not accommodated by the prevailing education system – crucially they recognized this was a failure of the education system, not of themselves.

Hawkesbury College's SA course designed real-world pedagogies that were inherently systemic (Bawden, 2016). Agriculture was both a study of, and study from within, its systems and subsystems – that is, it was not viewed as a standalone discipline. As such, Hawkesbury College set out to inspire multilevel systemic experimentation and exploration, and nurture graduates with demonstrable systemic understandings and competencies. The sustained success of the Hawkesbury SA programme was dependent upon widespread organizational change. During its operational phases, there were several instances where shifts away from the pre-existing culture occurred. We summarize the prominent features from this case and position them on the Culture Web Model in Figure 1.2:

1. Staff and student interactions broke away from 'conventional' structures and routine dynamics.
2. The curriculum and mechanisms for knowledge creation/transfer where radically overhauled.
3. Learning was an outcome of facilitation and processes of co-inquiry, rather than conventional didactic instruction. Sense-making and critical understandings occurred as emergent, 'lived-learning stories' which were contextual, (inter)personal and grounded in the field.

However, the wider organizational value- and culture-shifts were protected by the dominance of the prevailing agricultural, social and higher educational institutional paradigm. This restricted the expansion of the SA model, and the programme was ended in 1995.

UK Green Academy Change Process

A deliberate attempt to shift higher education culture for sustainability in the UK is evident in the Green Academy change process (2017). Launched in 2011 by the Higher Education Academy (HEA), this was a small-scale intervention intended to have a large amount of leverage by creating change agents and building capacity in institutions for effecting institutional change – that is, to have a catalytic effect within the universities. An important consideration was not just

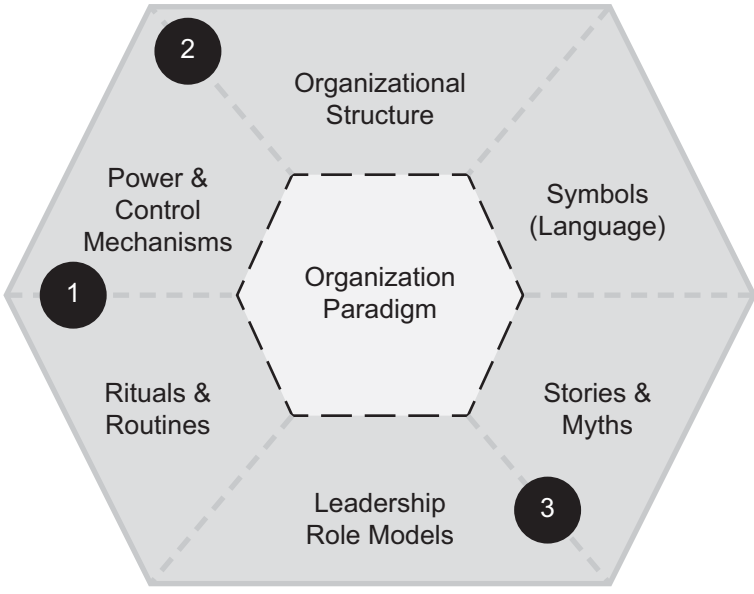

FIGURE 1.2 Significant cultural components of the Hawkesbury case study, mapped onto the 'Culture Web' (adapted from Martin and Murray (2010)).

to focus on those change agents likely to be enthusiasts in the process, but to engage with a wider sample of senior university managers (Pro Vice-Chancellors or equivalent), staff and students.

The evaluation had both formative and summative aspects. In summative terms, the evaluation aimed to provide an objective view of the Green Academy's effectiveness. At the same time, it provided an opportunity to inform development of the Green Academy approach through the drafting of case studies and a report that provided feedback to the institutions that were involved (McCoshan and Martin, 2012, 2017). The seven universities that participated were: Nottingham, Keele, Worcester, Canterbury Christ Church, Bristol, Southampton and Wales Trinity Saint David.

The Green Academy teams addressed how to make sustainability part of institutional strategy. For all teams, there were two common features of any pre-existing approaches to 'sustainability': (1) the articulation and knowledge of sustainability curricula provision was extremely scattered and rare beyond academic disciplines traditionally interested in the subject – such as geography and environmental sciences; and (2) sustainability-related activity was often estates-led and environmentally focused.

It was clear from the evaluations of the Green Academy initiative that positive outcomes of participating universities came via embedding education for sustainable development (ESD) into the entire curriculum – that is, beyond the 'traditional' disciplines, with champions or leaders of change processes not confined to 'typical' fields or departments. The Green Academy teams concentrated their efforts on widening approaches to include economic and social aspects as one way to engage disciplines that had not placed sustainability high on their agenda. They analysed current provision patterns and identified opportunities for engaging with staff in academic disciplines beyond the 'usual suspects'. Although some teams conducted surveys, while others conducted audits, systematic approaches were still the exception rather

than the rule. In all cases, the programme '[gave] a boost to be more explicit about education for sustainable development in the strategic plan' (McCoshan and Martin, 2017, p. 6). In one institution, the initiative developed around sustainability was seen by senior management as being 'incredibly valuable to delivering the strategic plan as a whole' (p. 6), including, for example, the development of local community partnerships. A few institutions in particular identified sustainability as a unique selling point. Where wider institutional changes were taking place, sustainability was used as a 'glue' to bind new structures. Some identified profound institutional changes, as one team leader noted: 'in mid-2010, I wouldn't have dreamt a chapter [on sustainability] in the strategic plan was possible' (p. 6).

Because of the Green Academy, institutions progressed sustainability agendas more quickly, in different ways, across a broader front and on a bigger scale than would otherwise have been possible. The process enabled participants to engage strategically with their institutions, embedding sustainability within strategic planning where before it had either been absent or confined to a narrower environmental definition. Individuals in the teams gained confidence to engage with senior managers and implement action plans to stimulate curriculum developments. The programme heightened awareness of students' roles and raised awareness of sustainability, in some cases supporting the development of a comprehensive sustainability narrative involving presentations, institutional newsletters and high-profile celebratory events within institutions.

The evidence also suggests that systematic mapping of sustainability in the curriculum had not yet become widespread, and related to this, targets for embedding sustainability remained underdeveloped. With respect to mapping, this situation meant that several institutions had relied on informal intelligence about what was going on to identify opportunities. This approach is quite understandable since the focus had been on getting activity started. Indeed, with reference to the Culture Web Model, this highlights the need to move beyond formal organizational structures and into 'informal' levels – that is, the realm of values and cultures. Moving the change process forwards would require more systemic approaches to support the integration of sustainability into institutional strategic plans. This is important in setting targets and monitoring progress, and especially where embedding sustainability in the curriculum does not take the form of electives. Where a more bottom–up approach has been adopted, mapping and targeting has a more significant role to play in understanding what local ESD activity is taking place. As one informant put it, 'clear targets and deliverables are key to mature engagement' (McCoshan and Martin, 2017, p. 11).

The institutions demonstrated considerable progress across all areas. One particular benefit of the Green Academy pilot was to help provide a more cohesive approach to ESD that had previously been fragmented. Nevertheless, the teams identified ways to engage disciplines wherein sustainability had not been placed highly on their agenda. As Martin et al. (2014) reported, the seven Green Academy teams were unified in their identification of five focal areas important for catalysing change, namely:

1. embedding sustainability into the curriculum
2. changing the institutional strategy
3. developing the institutional narrative
4. engaging management
5. engaging students.

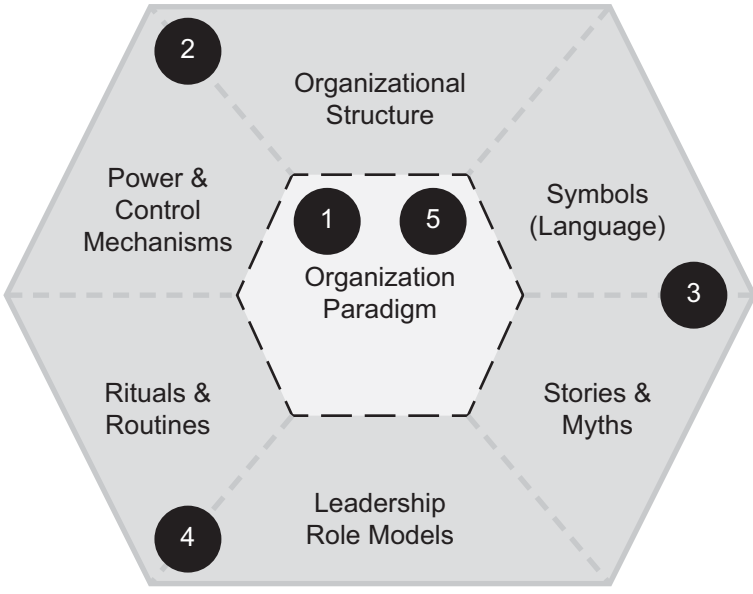

FIGURE 1.3 Significant cultural components of the Green Academy case study, mapped onto the 'Culture Web' (adapted from Martin and Murray (2010)).

These five dimensions can be positioned on the Culture Web Model (Figure 1.3). Using this heuristic, it becomes clear that a combination of actions were applied to bring change, including both practical interventions and less tangible but deeper actions to affect values and culture. Should multipronged approaches play more central and overt roles in enabling effective and long-lasting organizational change?

University of British Columbia

The University of British Columbia (UBC) has taken an alternative approach. One of the authors (SM) spent three weeks in 2016 and an additional period in 2017 at the university exploring the progress made.

The UBC has nearly 50,000 students and a cultural heritage based on its campus being located on unceded traditional first nation territory. The Musqueam peoples have been stewards of this land, including much of the land now occupied by the City of Vancouver, for over 9,000 years. The university collaborates with them to ensure that they are partners in the pursuit of sustainability. The UBC was one of the signatories of the Talloires[2] declaration in the 1990s and so has a long history of accomplishments in the field of sustainability. Uniquely, it has a twenty-year strategy agreed by the university council up until 2034 – although it is a little imprecise in terms of targets beyond 2020 (UBC 2021).

At its Vancouver campus, sustainability is conceived as 'simultaneous improvements in human and environmental wellbeing, not just reductions in damage or harm' (UBC, 2014a, p. 1). This is called 'regenerative sustainability', and the strategy claims that by 2035 this vision of sustainability will be embedded across the university through teaching, learning, research, partnerships, operations, infrastructure and the UBC community.

The sustainability journey that the UBC has taken has several significant differences compared to the Green Academy, as well as several long-term challenges. The university has made some serious investment decisions in terms of campus developments that signify its commitment to regenerative sustainability, notably its living lab. This building is an impressive example of what the university call 'a net positive operation' since its design aims to not only reduce its impact on the environment but also improve the lives of its occupants and its community. The building houses the Centre for Interactive Research on Sustainability (CIRS; Marcus et al., 2015) along with the twelve administrative staff that support the university-wide developments in sustainability. CIRS offers a new concept in building design whereby its 'Meccano-like' components and systems can all be replaced as newer, more innovative sustainability designs are developed which offer higher performing technologies.

The UBC's sustainability and learning attributes also offer a distinctive range of thematic strands and concepts based on well-known sustainability frameworks and world views. These can include references to new or historical social practices and cultural traditions derived from Indigenous and Aboriginal peoples, such as the Musqueam peoples. A central part of the university's wide-ranging teaching and learning strategy is the idea that a student graduating from the university should have a rigorous grounding and demonstrable set of competencies that are reflected in four principal attributes (Marcus et al., 2015): holistic systems thinking, sustainability knowledge, awareness and integration, and acting for positive change. These attributes were developed by the University Sustainability Initiative (USI) Fellows (Marcus et al., 2015), a small team of self-selected academics from different disciplinary traditions. The fellows were provided with sustainability learning pathway grants to trial innovative ways of developing approaches to sustainability learning within their respective faculties. The desired attributes and the pathways described in the USI teaching and learning documentation is illuminated with examples, but it is too early to say how far these have been adopted across the university. So far, the USI have identified 636 sustainability-related courses and forty-eight sustainability related programmes across the university, but challenges remain with respect to identifying the proportion of overall university provision this represents and evaluating student learning outcomes and competencies.

Some of the most innovative curriculum development at the UBC is delivered via student engagement activities – some of which may or may not comprise part of the formal undergraduate curriculum. These engagements can be categorized in several ways and include:

1. **Scholars' programmes** – offering applied work experience both on and off campus, in partnership with the City of Vancouver (the Green City scholars' programme; UBC, 2014b).
2. **Sustainability resources** – providing support to student groups and sustainability ambassadors. The Sustainability Education Resources Centre (UBC, 2014c) offers advice on sustainability co-curricular programmes and supports sustainability events around the campus, such as sustainable food schemes, car sharing and food growing on the student union roof allotment.
3. **Enablement** – facilitating the operation of sustainability projects. The Social Ecological Economic Development Studies (SEEDS) programme has, over the past fifteen years, pioneered over a 1,000 on-campus projects, shaped by a cooperative, staff–student model (SEEDS, 2021).

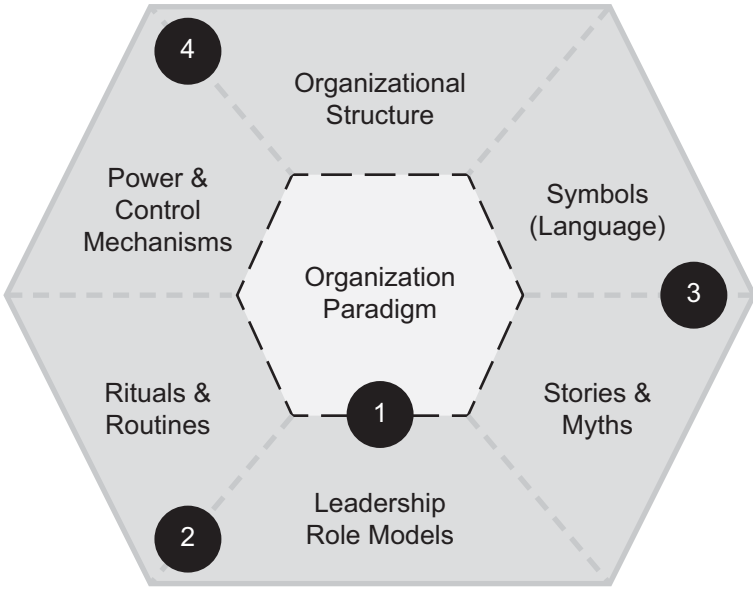

FIGURE 1.4 Significant cultural components of the UBC case study, mapped onto the 'Culture Web' (adapted from Martin and Murray (2010)).

Here, we can begin to see how change-seeking and change-making initiatives operate and are interwoven at the level of organizational values and cultures. Below, we extract examples of the UBC's effective initiatives and overlay them onto the 'Culture Web' (see Figure 1.4):

1. Intentionally defining and positioning the four principal attributes (mentioned earlier) centrally within teaching and learning strategies, delivering graduates who are agents of positive change.
2. Supporting projects rooted in the community and expanding the remit of 'formal education'.
3. Embedding new, positive narratives into campus and curricula (e.g. the SEEDS initiative).
4. Providing top–down structural support, including staff/student resources, opportunities to proactively create and pursue new initiatives as well as physical places (buildings, campus locations) which embody this change.

The Ecological and Civic University

Seeking to build on the successes reflected in these case studies and bring forward the vital lessons from any shortcomings, we advocate that a new model of human and social transformation based on the twin concepts of a 'civic' university and 'ecological' university – as defined by Barnett (2011) – would embed a university's life within its local community and ecosystem, so that students, local communities and the environment benefit from the research and learning activities hosted by the university.

A civic/ecological university is one that focuses on both its interconnectedness with the world and the interconnectedness of the world. Its tangible learning outcomes being

towards developing students as global citizens with a care or concern for the world and their contribution via civic engagement towards the realization of a more environmentally and socially just sustainable world. This characterization also encompasses the idea of a networked university – which engages actively both locally and globally to bring about a better world (Barnett, 2011).

Active engagement and mutual learning, paired with participatory processes, would create an environment that promotes critical, systemic and future-oriented thinking. Recent examples of such engagement can be seen in the creation of citywide citizens' assemblies to develop climate emergency and net-zero carbon plans, facilitated by civically minded universities, as exemplified in the UK by the cities of Bristol, Lancaster and Leeds (e.g. Leeds City Council, 2019). Another good example is the two universities of Nottingham establishing the Universities for Nottingham (UfN, 2020) Civic Agreement with the 'people and place of Nottingham and Nottinghamshire', which has been signed by key institutions in the city: the agreement, released in 2020, is an action plan for exploring how a university partnership might generate solutions to major local challenges. It seeks to change student, staff and campus behaviours to supply benefits across Nottinghamshire. Within the UfN coalition, both universities share a concern and responsibility for the well-being of their locality. The UfN Civic Agreement recognizes systemic co-dependencies and the universities' inextricable links with the socio-political conditions of the city. Here, as with the Hawkesbury case, transformational processes are viewed as being inherently multidimensional and requiring systemic solutions. Such place-based, embedded initiatives are mirrored in the 'Green Scholars' programme at the UBC and the University of Cape Town's new master's programme in Sustainable Urban Practice that establish 'urban integrators' – that is, graduates who can span the divide between academia and practice to address urban sustainability challenges. These make a compelling case for transforming universities as a means of changing the way we see and create a sustainable and liveable world. As was true for the three case studies, today's pioneering initiatives are charting new territory. They depend upon the creation and sustenance of entirely new structures, thinking and action.

With valuable yet limited hindsight, and a blurred, complexity-laden foresight, how might we position the stepping stones towards the truly transformative universities that our times demand? How can we move swiftly and wisely towards ecological and civic universities? Where do our accomplishments converge to address today's grand challenges? What does a right alignment of organization, values and cultures entail?

Where Next for Our Universities?

The Covid-19 pandemic has had a major operational and economic impact on all the UK's universities that has initiated further institutional reflection on how they can reduce their carbon footprint and enhance campus biodiversity and well-being. This may offer another potential transformational trajectory for them, which could initiate support for the idea of civic universities in a post-Covid world (University Partnerships Programme (UPP), 2019). In an ageing and increasingly digital society, universities play a critical role in facilitating lifelong learning and will be crucial in helping to deal with challenges. They also are increasingly involved in activities that makes life meaningful and pleasurable for local people, which includes art, culture and a broader definition of education. Most institutions are increasing their online presence – whether

reactively in the case of the Covid pandemic or more proactively considering an increasingly digitalized world. More than ever, this amplifies the role and importance of 'place'.

Universities, alongside national health services and local authorities, are key anchor institutions in their localities. The Netherlands is making noteworthy contributions to this positioning and its inherent responsibilities. There, the national policy agenda for higher education and research identifies knowledge valorization – that is, the creation of economic and social value from knowledge and social benefit – as a key priority. The ambition is that, by 2025, research universities and universities of applied sciences will form part of localized sustainable ecosystems alongside the secondary education sector, research institutes, government departments, local and regional authorities, companies, hospitals, community centres and sports clubs. This is the dawn of the 'Ecological University'. The overall performance of universities' contribution to this agenda is monitored through a process of performance agreements by the Dutch Government – now called Quality Agreements. The government can withhold funding if the plans do not meet the criteria.

The separate ministries with responsibility for higher education and for city development have recently announced joint funding for 'city deals' specifically to support collaboration between universities and municipalities. Most Dutch universities and their municipalities are participating in the programme. The rationale for such an approach is clear. It is important for a city's or region's capacity for innovation that it has a strong relationship with knowledge institutes and that researchers, lecturers and students participate in solving social problems. Not only does this strengthen the problem-solving ability of the place, but it also contributes to the training of the students of the future – who will contribute to shaping society – and gives them a better understanding of social and environmental issues. Using the society as a rich learning environment for students is therefore an important theme. The idea is that students formulate the relevant research questions together with researchers and the field (businesses, government, social institutions and citizens' initiatives); conduct further research into urban problems; and evaluate whether assumed problem-solving approaches are effective.

This embedded and applied approach reflects that of the Hawksbury initiative discussed earlier and is a central, guiding purpose of the London Interdisciplinary School (LIS, 2020), a new learning institution in the UK. It is the first university in fifty years to be given degree-awarding powers – for its BASc (Bachelor of Arts and Sciences) degree in Interdisciplinary Problems and Methods – that signifies a potential cultural sidestep away from the degrees and learning pathways provided by existing HEIs. The emergence of alternative HEIs reflects a traction-gaining consciousness regarding the fundamental flaws of the dominant educational paradigm and the need for adaptive, co-creative and engaged forms of learning. With the current tagline 'For those who want to shape the world, not just fit in', LIS aims to cross traditional subject boundaries and facilitate graduates who are problem-solvers capable of tackling complex, real-world problems: to develop second-order change makers. The founders, faculty, first enrolling cohorts and wider stakeholders of LIS perceive complex problems as requiring interdisciplinary solutions and recognize that wicked problems like sustainability cannot be solved through single-disciplinary approaches. To this end, this new HEI aims to equip its students with the ability to move across subject boundaries and synthesize core pillars of knowledge alongside the application of knowledge to tackling the problem at hand. As per the proposed civic/ecological university, complex problems are to be designed into learning processes, and solutions envisaged as emerging from new thinking, and via the promotion and exploration of diversity and interdisciplinarity. Internship programmes

aim to bridge the knowing–doing gaps which conventional university systems are criticized for perpetuating (or not rectifying, at the least). With the first cohort enrolling in 2021, successes of the LIS and other emerging alternative institutions are yet to be confirmed. However, the modernization of organizational values – in keeping with modern/future challenges – as well as the encapsulation of systems-first and transformations-focused educational models are surely positive explorations in the requisite direction.

Modern science and technology have given humanity the power to cause extreme global destruction: wisdom has become a serious social necessity (Maxwell, 2014) alongside the need to reconceptualize knowledge required for the twenty-first century as being intimately intertwined with action (Fazey et al., 2020). In terms of the cultures and values that underpin and inform our behaviours, the abilities to perceive and reflect critically on these conditions are crucial. Finding interdisciplinary, intercultural and system-wide solutions is essential.

Conclusions

The Anthropocene is tarred by straining biophysical limits, roaring natural disasters, buckling ecosystems and intensifying unrest. In this chapter, we have discussed the urgent need for new ways of thinking and acting, with universities and education playing a central role in ensuring positive global transformations. As we argue, the essential criterion for universities to transcend existing operational binds and become pioneering agencies of societal progress is also the crux point:

> To become leading agents of change, universities must themselves become transformative.

To replace the operational norms for universities – for example, a predominant focus on unsustainable economic and technological contributions – and evolve from incremental, piecemeal methods, we have asked: 'How might transformative praxis and deep-rooted cultures of sustainability nurture whole-system awareness and graduates fit for future citizenship?' Drawing upon several case studies and examples, we perceive that 'whole institution' approaches require skilful management; strategic emphasis on institution-wide communication – with new, cohesive, fit-for-purpose narratives; wholesale awareness of the need for change; wholesale commitment to that change; curriculum designed as transformative, problem-oriented learning processes; the creation and implementation of novel monitoring and evaluation processes; and a greater understanding of the central importance of organizational values and cultures.

Acknowledging the ever-growing complexities that underpin university life and the processes of deliberate change making, we have highlighted that sustainability and systemic competencies cannot just be built into taught content or written into the pages of the next year's prospectus; they need building into the entirety of university operations and must become embedded within organizational values and cultures. The ecological university that we advocate creates an environment of critical, systemic and future-oriented thinking. If existing positive examples – some of which we have included within, and have helped inspire this chapter – are accelerated, enhanced and appended by well-aligned efforts of other HEIs, a compelling case emerges for transforming universities as a means of transforming the world.

If we are to transform our universities to meet the principles advocated by a growing number of influential authors, practitioners and leaders, then we need to co-create with students and communities a new and adaptive Ecological University. In our view, this can be achieved only through a process of deliberative co-creation involving students, academics and the communities that the university serves. Learners must become adaptive ecosystem leaders and as such become context- and place-based change makers. They will need the competencies to convene a diverse group of stakeholders and partners, and the journey must move from a silo to a system view, from 'ego-system to eco-system' awareness (Scharmer and Kaufer, 2013).

Creating the sustainable and ethical space for such a journey is at the heart of all major leadership challenges today. It is a capacity that is largely missing in organizations and insufficiently developed in our universities. Universities could offer real-world platforms and ecosystem partnerships in the cities and regions that they are embedded in and enhance that capacity by providing relevant 'out of classroom' learning laboratories for student participation and learning by doing. As Glasser and Hirsh (2016) state:

> The existing, formal education system is built on creating first-order change, essentially doing more or less of different forms of what we are already doing. However, to engender deep meaning and a contextualized understanding of the interconnected sustainability challenges facing humanity, second-order change must also be enacted … this requires transformative system structure changes, which entail reimagining formal education so that it creates a robust foundation for improving quality of life for all. (p. 126)

Strategies of gradual adoption and accretion simply will not suffice if education is to play a significant role in shaping a liveable and desirable future: 'The global transformation of higher education towards sustainable development has yet to occur' (UN Educational, Scientific and Cultural Organization (UNESCO), 2014, p. 31). Education has significant regenerative potential that has obvious consequences for the organization of educational institutions, curricula and pedagogical practices. However, at present, it is insufficiently focused on supporting the creation of peaceful, civilized and sustainable societies (UNESCO, 2021). We need to generate transformational change in all educational provision to facilitate transformative societal change. This must seek to generate second-order learning and change in both educational systems and learners to shift conventional perspectives and practices sufficiently and urgently.

KEY INSIGHTS AND LESSONS LEARNT

1. Universities cannot be transformational agents for change without undergoing radical change themselves to focus on sustainability-first, not economy-first perspectives.
2. Wholesale transformational change requires whole institutional buy-in and operational change throughout all functions, not bolt-on, marginal, fragmented solutions.
3. Senior leadership and those involved in institutional governance need to believe and lead on the sustainability agenda to enable the bold, wholesale and radical change necessary.

Notes

1 https://www.forceofnature.xyz/research.

2 The Talloires Declaration (TD) is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities. It has been signed by over 500 university leaders in over fifty countries (http://ulsf.org/talloires-declaration).

References

Adams, R., Martin, S., and Boom, K. (2018). 'Conceptualizing of a University Sustainability Culture: An Enabling Framework'. *Journal of Cleaner Production*, 171, pp. 434–45.

Arizona State University (ASU) (2018). 'ASU Charter'. YouTube Video. https://www.youtube.com/watch?v=-3Bgu92K9JI. Accessed 1 October 2021.

Barnett, R. (2011). 'The Coming of the Ecological University'. *Oxford Review of Education*, 37 (4), pp. 439–55. doi: https://doi.org/10.1080/03054985.2011.595550.

Bawden, R. (2008). 'The Educative Purpose of Higher Education for Human and Social Development in the Context of Globalization', in Global University Network (ed.), *GUNI: Higher Education in the World 3*. London: Palgrave Macmillan, pp. 65–73.

Bawden, R. (2016). 'Transforming Systems: The Hawkesbury Initiatives in Systemic Development'. *South African Review of Sociology*, 47 (1), pp. 99–116. doi: 10.1080/21528586.2015.1131192.

Butt, L., More, E., and Avery, G. C. (2014). 'The Myth of the "Green Student": Student Involvement in Australian University Sustainability Programmes'. *Studies in Higher Education*, 39 (5), pp. 786–804. doi: 10.1080/03075079.2012.754861.

Calder, W., Clugston, R. M., and Corcoran, P. B. (eds) (2002). 'Introduction: Higher Education for Sustainable Development'. *Higher Education Policy*, 15, pp. 99–113.

Campagnucci, L., and Spigarelli, F. (2020). 'The Third Mission of the University: A Systematic Literature Review on Potentials and Constraints'. *Technological Forecasting & Social Change*, 161, pp. 1–31.

Cotton, D. R. E., and Alcock, I. (2013). 'Commitment to Environmental Sustainability in the UK Student Population'. *Studies in Higher Education*, 38 (10), pp. 1453–71.

Crow, M. M., and Dabars, W. B. (2015). *Designing the New American University*. Baltimore: Johns Hopkins University Press.

Fazey, I., Schapke, N., Caniglia, G., Hodgson, A., Kendrick, I., Lyon, C., Page, G., Patterson, J., Riedy, C., Strasser, T., Verveen, S., Adams, D., Goldstein, B., Klaes, M., Leicester, G., Linyard, A., McCurdy, A., Ryan, P., and Young, H. R. (2020). 'Transforming Knowledge Systems for Life on Earth: Visions of Future Systems and How to Get There'. *Energy Research & Social Science*, 70. doi: https://doi.org/10.1016/j.erss.2020.101724.

Folke, C., Polasky, S., Rockström, J., Galaz, V., Scheffer, M., Henrik, O., and Walker, B. H. (2021). 'Our Future in the Anthropocene Biosphere'. *Ambio*, 50, pp. 834–69. doi: https://doi.org/10.1007/s13280-021-01544-8.

Glasser, H., and Hirsch, J. (2016). 'Towards the Development of Robust Sustainability Competencies'. *Sustainability: The Journal of Record*, 9 (3), pp. 121–34.

Glasser, H. (2018). 'Toward Robust Foundations for Sustainable Well-Being Societies: Learning to Change by Changing How We Learn', in Justin W. Cook (ed.), *Sustainability, Human Well-Being, and the Future of Education*. New York: Palgrave Macmillan, pp. 31–89.

Intergovernmental Panel on Climate Change (IPCC) (2021). 'Climate Change 2021: The Physical Science Basis'. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds). Cambridge: Cambridge University Press.

Ison, R., and Straw, E. (2020). *The Hidden Power of Systems Thinking*. London: Routledge.

Jucker, R. (2020). *Can We Cope with the Complexity of Reality? Why Craving Easy Answers Is at the Root of Our Problems*. Newcastle upon Tyne, UK: Cambridge Scholars Publishing.

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

Kolb, D. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Upper Saddle River, NJ: Prentice Hall.

Lawson, N. (2006). 'Market Logic Turns a Degree into a Share Certificate'. *Guardian*, 10 August.

Leeds Climate Change Citizens Jury (2019). 'Home Page'. https://www.leedsclimate.org.uk/sites/default/files/REPORT%20V1.1%20FINAL_0.pdf. Accessed 3 October 2021.

London Interdisciplinary School (LIS) (2020). 'Home Page'. https://www.londoninterdisciplinaryschool.org.

Marcus, J., Coops, C., Ellis, S., and Robinson, J. (2015). 'Embedding Sustainability Learning Pathways across the University'. *Current Opinion in Environmental Sustainability,* 16, 13. doi: http://dx.doi.org/10.1016/j.cosust.2015.07.012.

Marks, N., and Steuer, N. (2008). 'University Challenge: Towards a wellbeing Approach to Quality in Higher Education'. New Economics Foundation. https://neweconomics.org/2008/06/university-challenge.

Martin, S., and Jucker, R. (2009). 'Educating Earth Literate Leaders', in B. Chalkley, M. Haigh and D. Higgitt (eds), *Education for Sustainable Development: Papers in Honour of the United Nations Decade of Education for Sustainable Development (2005–2014)*. London: Routledge.

Martin, S., and Murray, P. (2010). 'The Role of Wicked Problems, Values in Personal and Organisational Change'. *Learning and Teaching in Higher Education*, 5, pp. 163–9.

Martin, S. Dillon, J., Higgins, P., Peters, C., and Scott, W. (2013). 'Divergent Evolution in Education for Sustainable Development Policy in the United Kingdom: Current Status, Best Practice, and Opportunities for the Future'. *Sustainability*, 5, pp. 1522–44.

Martin, S., McCoshan, A., and McEwen, L. (2014). 'Embedding Sustainability into the Higher Education Curriculum: Lessons from the UK's Green Academy Change Programme'. Paper Presented at the Online World Sustainability Forum, 1–30 November 2014.

Maxwell, N. (2014). *How Universities Can Help Create a Wiser World: The Urgent Need for an Academic Revolution.* Exeter, UK: Societas.

Maxwell, N. (2020). *Our Fundamental Problem: A Revolutionary Approach to Philosophy.* Montreal: McGill University Press.

McCoshan, A., and Martin, S. (2012). 'Evaluation of the Impact of the Green Academy Programme'. Higher Education Academy Report. https://efsandquality.glos.ac.uk/toolkit/Evaluation_of_the_Green_Academy.pdf.

McCoshan, A., and Martin, S. (2013). 'From Strategy to Implementation: The Second Evaluation of the Green Academy Programme'. Higher Education Academy Report. https://www.heacademy.ac.uk/resources/detail/sustainability/green-academy: The Higher Education Academy. Accessed 3 October 2021.

McCoshan, A., and Martin, S. (2017). 'From Strategy to Implementation: The Second Evaluation of the Green Academy Programme'. Higher Education Academy Report. https://www.iau-hesd.net/sites/default/files/documents/2nd_green_academy_evaluation_2014_final_0.pdf.

McIlroy, J., and Westwood, S. (eds) (1993). 'Adult Education and Social Change', in *Border Country: Raymond Williams in Adult Education*. Lectures and Reminiscences in Honour of Tony McLean, WEA Southern District, 1983. London: NIACE, pp. 255–64.

Ramos, T. B., Caeiro, S., van Hoof, B., Lozano, R., Huisingh, D., and Ceulemans, K. (2015). 'Experiences from the Implementation of Sustainable Development in Higher Education Institutions: Environmental Management for Sustainable Universities'. *Journal of Cleaner Production,* 106, pp. 3–10. doi: https://doi.org/10.1016/j.jclepro.2015.05.110.

Ruckelshaus, M. H., Jackson, S. T., Mooney, H. A., Jacobs, K. L., Kassam, K. A. S., Arroyo, M. T., Báldi, A., Bartuska, A. M., Boyd, J., Joppa, L. N., and Kovács-Hostyánszki, A. (2020). 'The IPBES Global Assessment: Pathways to Action'. *Trends in Ecology & Evolution*, 35 (5), pp. 407–14.

Scharmer, O. (2019). Vertical Literacy: Reimagining the 21st-Century University. Field of the Future Blog. https://medium.com/presencing-institute-blog/vertical-literacy-12-principles-for-reinventing-the-21st-century-university-39c2948192ee.

Scharmer, O., and Kaufer, K. (2013). *Leading from the Emerging Future: From Ego-System to Eco-System Economies*. Oakland, CA: Berrett-Koehler.

Scott, W., and Gough, S. (2003). *Key Issues in Sustainable Development and Learning: A Critical Review*. London: Routledge Falmer.

Seel, R. (2000). 'Culture and Complexity: New Insights on Organisational Change'. *Organisations & People*, 2 (2), pp. 2–9.

Shephard, K. (2020). *The Sustainable University: Seeking Intellectual Independence in Aotearoa,* New Zealand. Berlin: Springer.

Social Ecological Economic Development Studies (SEEDS) (2021). http://bit.ly/SEEDSProjectLibrary. Accessed 1 October 2021.

Stanovich. K. (1993). 'Dysrationalia: A New Specific Learning Disability'. Journal of Learning Difficulties, 26 (8), pp. 501–15.

Sterling, S. (2021a). 'The Pedagogy of Transition: Educating for the Future We Want'. https://greattransition.org/gti-forum/pedagogy-transition. Accessed 10 January 2022.

Sterling, S. (2021b). 'Concern, Conception, and Consequence: Re-thinking the Paradigm of Higher Education in Dangerous Times'. *Frontiers in Sustainability*, 23 December, 2:743806. doi: 10.3389/frsus.2021.74380.

Sterling, S., and Martin, S. (2019). 'On Track for a Sustainable University?' *IAU Horizons*, 24, pp. 26–8.

Sterling, S., Maxey, L., and Luna, H. (2013). *The Sustainable University: Progress and Prospects*. Earthscan Reader Series. London: Routledge.

Trowler, V. (2010). 'Student Engagement Literature Review York'. Higher Education Academy Report. https://s3.eu-west-2.amazonaws.com/assets.creode.advancehe-document-manager/documents/hea/private/studentengagementliteraturereview_1_1568037028.pdf. Accessed 1 October 2021.

Tversky, A., and Kahneman, D. (1974). 'Judgement under Uncertainty: Heuristics and Biases'. *Science*, 185, 1124–31.

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2014). 'Shaping the Future We Want: UN Decade of Education for Sustainable Development, 2005–14'. http://reliefweb.int/sites/reliefweb.int/files/resources/Shaping%20the%20Future%20We%20Want.pdf. Accessed 26 September 2021.

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2021). 'International Commission on the Futures of Education'. https://unesdoc.unesco.org/search/N-EXPLORE-ad01beeb-cdfd-48be-87f4-a9f6ce9ec018. Accessed 26 September 2021.

University of British Columbia (UBC) (2014a). '20 Year Sustainability Strategy'. https://sustain.ubc.ca/news/20-year-sustainability-strategy. Accessed 26 September 2021.

University of British Columbia (UBC) (2014b). 'Scholars Programme'. https://www.sustain.ubc.ca/teaching-applied-learning/ubc-sustainability-scholars-program. Accessed 26 September 2021.

University of British Columbia (UBC) (2014c). 'Sustainability Education Resources Centre'. https://sustain.ubc.ca/events/sustainability-education-resource-centre-open-house. Accessed 26 September 2021.

University of British Columbia (UBC) (2021). 'UBC's 20-Year Sustainability Strategy'. https://sustain.ubc.ca/sites/sustain.ubc.ca/files/uploads/pdfs/Conversations2034/Handout.pdf. Accessed 26 September 2021.

University Partnerships Programme (UPP) (2019). 'Truly Civic: Strengthening the Connection between Universities and Their Places'. UPP Foundation Civic Universities Commission. https://upp-foundation.org/wp-content/uploads/2019/02/Civic-University-Commission-Final-Report.pdf.

Wals, A. E. J., and Corcoran, P. B. (2012). *Learning for Sustainability in Times of Accelerating Change*. Netherlands: Wageningen Academic Publishers.