

Business education and its paradoxes: Linking business and biodiversity through critical pedagogy curriculum

Helen Kopnina¹  | Alice C. Hughes² |
Ruopiao (Scarlett) Zhang³  | Mike Russell⁴  |
Engelbert Fellinger⁴  | Simon M. Smith⁵  | Les Tickner¹

¹Northumbria University, Newcastle upon Tyne, UK

²School of Biological Sciences, University of Hong Kong, Hong Kong, Hong Kong

³Macau University of Science and Technology, Macau SAR, China

⁴Amsterdam University of Applied Sciences, Amsterdam, the Netherlands

⁵Oxford Brookes Business School, Oxford Brookes University, Oxford, UK

Correspondence

Helen Kopnina, Northumbria University, Newcastle upon Tyne, NE1 8ST, UK.
Email: helen.kopnina@northumbria.ac.uk

Abstract

The Kunming-Montreal Global Biodiversity Framework, launched during the United Nations Biodiversity Conference in December 2022, encourages governments, companies and investors to publish data on their nature-related risks, dependencies and impacts. These disclosures are intended to drive businesses to recognise, manage and mitigate their reliance on ecosystem goods and services. However, there is a 'biodiversity blind spot' that is evident for most organisations and business schools. Business education rarely addresses the root causes of biodiversity loss, such as the unsustainable exploitation of natural resources. As the dominant positioning of Education for Sustainable Development Goals (ESDG) presents biodiversity in anthropocentric instrumental terms inadequate for addressing ecosystem decline, we posit that a more progressive and transformative ecocentric education through ecopedagogy and ecoliteracy is needed. Both approaches include the development of critical thinking about degrowth, the circular economy and conventional stakeholder theory to include non-human stakeholders. Using comparative case studies from Northumbria University, the University of Hong Kong and Amsterdam University of Applied Sciences, we illustrate how business education can be transformed to address biodiversity loss, providing theoretical guidance and practical recommendations to academic practitioners and future business leaders.

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KEYWORDS

biodiversity, business education, ecoliteracy, ecopedagogy

Key insights**What is the main issue that the paper addresses?**

Education for Sustainable Development Goals (ESDG) sees economic growth as a solution, not a problem. Our comparative case study research aims to demonstrate that developing knowledge, skills and motivation to address biodiversity loss in managerial decision-making requires ecoliteracy and ecopedagogy, which have yet to be explicitly applied in business education.

What are the main insights that the paper provides?

Highly rated management and business education journals often equate sustainability with ESD. Biodiversity loss represents a significant gap in the scholarship of business learning and education journals. To counter the pervasive anthropocentrism and include non-human stakeholders, we recommend employing pedagogical insights from ecoliteracy and ecopedagogy, as illustrated by our case studies.

INTRODUCTION: REDEFINING SUSTAINABLE BUSINESS EDUCATION

'Biological diversity' (i.e., biodiversity) encompasses 'the variability among living organisms, including terrestrial, marine, and aquatic ecosystems, as well as the ecological complexes they form' (CBD, 2023). The root causes of biodiversity loss and extinction are growing population and accelerated economic growth associated with increased consumption of natural resources (Bansal et al., 2021; Crist et al., 2022; O'Sullivan, 2020), especially land conversion for agriculture and industrial development (OECD, 2020), as well as climate change, pollution and overharvesting (IPBES, 2019; Tollefson, 2019; IUCN, 2022). As developing economies host most of the world's biodiversity, and as the increased rates of development are linked with commodity export to high-income economies, conserving biodiversity is contingent on re-evaluating these links (Attafuah-Wadee et al., 2022; Hughes et al., 2023). Education to protect biodiversity was included in the United Nations Educational, Scientific and Cultural Organisation and the United Nations Environment Programme in The Belgrade Charter (UNESCO-UNEP, 1976), International Environmental Education Program (1975–1995) and Educating for a Sustainable Future (UNESCO, 1997).

However, Agenda 21 reoriented education towards sustainable development (UNESCO, 1992), gradually asserting itself as a dominant perspective (McBride et al., 2013). It advocated 'biodiversity' reframed as 'natural resources' and 'ecosystem services' within a broader scope of the United Nations' Sustainable Development Goals (SDGs) that focus on a 'balance' of social and economic aspects of sustainability. SDGs recognise that 'ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests' (United Nations, 2022).

Some researchers have warned about the propensity to equate education for sustainable development (ESD) with education for sustainability, failing to acknowledge the planet as a foundation for people and profit (Bobulescu, 2021; Chia, 1996; Kopnina, 2020a; Kopnina & Benkert, 2022; Skene, 2021). This positioning neglects economically 'useless' species (Ceballos et al., 2020) and predominantly teaches students economic and functional values (Adelman, 2018; Kotzé & French, 2018; Schneiderhan-Opel & Bogner, 2020; Torpman & Röcklinsberg, 2021), ignoring root causes of climate change or biodiversity loss (Piccolo et al., 2018; Washington et al., 2018). SDG 14 (*Life below water*) and SDG 15 (*Life on land*) represent biodiversity in limited functionalist, anthropocentric terms, whereby marine and terrestrial conservation emphasise a fair, balanced and sustainable use of biodiversity and fisheries across different human groups (United Nations, 2022). In education, as Dunlop and Rushton (2022, p. 1083) state, the anthropocentric positioning of environmental problems contrasts with 'stakeholder perspectives which see economic priorities as part of the problem and call for pro-environmental action', thus 'resulting in a placebo for policy'.

There is an attempt to reconcile 'economic benefit' versus 'environmental benefit', where only superficial actions are taken to minimise biodiversity impacts (Smith et al., 2023). Organisational paradox theory highlights the competing demands of various stakeholders, emphasising paradoxes as nested across levels and as knotted and interwoven across various tensions, while also considering power dynamics, uncertainty and a plurality (Berti & Cunha, 2023; Carmine & Smith, 2022). The educational setting, we argue, offers a space for if not the resolution of paradoxes of sustainable development, then their clear articulation.

One such paradox is that Education for Sustainable Development Goals (ESDG) regularly sees economic growth as a solution, not a problem (Adelman, 2018). This leads to approaches such as 'ecological intensification', enabling ecosystem loss and degradation under the banner of 'sustainability' (Hugs & Grumbine, 2023). This underscores current societal norms, which prioritise profit over the necessity to alter business for the sake of biodiversity. Business courses are 'unable to adequately prepare future managers and decision-makers to solve grand challenges' as they lack 'technical and scientific expertise, including ... tensions between biodiversity and CO₂ reduction, and land-use externalities' (Baudoin et al., 2023, p. 756).

While management scholars have long studied insights on organisational decision-making (Cyert & March, 1963) and stakeholder theory (Freeman, 2016), these typically exclude non-human stakeholders (Dmytriiev et al., 2021; Kortetmäki et al., 2023; Phillips, 2011; Starik, 1995). Concerns about biodiversity loss can be perceived from an ecocentric perspective (Naess, 1973), which emphasises intrinsic value (Washington et al., 2018) to utilitarian approaches (Mace et al., 2018; Millennium Ecosystem Assessment, 2005).

Although ecocentric views have been identified in corporations, such perspectives are uncommon, and efforts to act on them may be superficial and rarely create the structures needed to enhance sustainable governance materially (Anthony & Morrison-Saunders, 2023; Bond et al., 2021). The Global Reporting Initiative (GRI) Taskforce on Nature-related Financial Disclosures (TFND, 2023) still need to address the biodiversity crisis (Bebbington & Larrinaga, 2014; Coolsaet et al., 2020; Roberts et al., 2021). Businesses often only pay lip service to biodiversity, or ignore it (Büchling & Maroun, 2021; Corvino et al., 2021; Zhang & Noronha, 2023). This omission is reflected in business school curricula (Goodall & Oswald, 2019), where ESD is prevalent (Kopnina, 2022; Kopnina & Meijers, 2014). Therefore, we emphasise the significance of educating future leaders and expanding the impact of critical management research (Wickert et al., 2021) to mitigate biodiversity loss by challenging ESD. This leads to the fundamental research question of this study: *How can business schools adequately equip future business leaders to address biodiversity loss effectively?*

Below, we consider alternative approaches to the dominant ESGD, including ecoliteracy (Orr, 1992) and ecopedagogy (Bowers, 2004; Fassbinder et al., 2010; Kahn, 2008).

Ecopedagogy builds on the critical pedagogy of Paulo Freire (1970, 1972). It is intended to create a 'planetary consciousness' through active learning (Bowers, 2004) and a bridge between environmental and global citizenship education to address environmental concerns (Misiaszek, 2015). Ecopedagogy involves didactic strategies that can enable ecoliteracy through dialogical learning, empowerment, active citizenship, flipped classrooms (Yilmaz, 2017) and 'imaginary solutions' in management education to disrupt anthropocentric reasoning (Gasparin et al., 2020; Zahoor & Janjua, 2020).

The term ecoliteracy (ecological literacy/eco-literacy) (Roth, 1968) refers to the awareness, concern, attitude, skills and behaviour essential for the support of biological conservation and the capacity of communities to manage their local resources sustainably (Orr, 1992; Pilgrim et al., 2007). Ecoliteracy was promoted in The Belgrade Charter (UNESCO-UNEP, 1976) to focus on the environment and its associated problems, targeted at knowledge and motivation to work towards solutions to current problems and the prevention of new ones. Ecoliteracy can potentially inform business strategy with knowledge from ecology (Winn & Pogutz, 2013) and conservation biology (Panwar, Ober & Pinkse, 2023).

As ecopedagogy and ecoliteracy span multiple dimensions of educational theory and practice linking business and biodiversity, we present comparative case studies that illustrate possible ways to address the planetary ecological crisis and expand conventional stakeholder theory to incorporate non-human stakeholders into university training programmes. Our main objective is to initiate a transformative shift in business schools' curricula by incorporating consistent, tangible recognition of biodiversity value and extinction risks. The key motivation of this study is the escalating global biodiversity and extinction crisis, irrefutably driven by negligent business practices and, in part, stemming from the marginalisation of biodiversity within business school curricula.

Our research aims to demonstrate that developing knowledge, skills and motivation to address biodiversity loss in managerial decision-making requires ecoliteracy and ecopedagogy, which have yet to be explicitly applied in business education (Kopnina, 2020a, 2022). While neither exhaustive nor intended as a prescription, this analysis allows for a more straightforward examination of the diversity of theoretical and practical applications of the latter. In addition to providing avenues for deeper exploration and critical analysis of current ESG practice, this paper recommends and applies the theory and practice of ecoliteracy and ecopedagogy in the context of business and management studies.

Biodiversity and alternative business models

The Kunming-Montreal Global Biodiversity Framework (GBF) (CBD, 2023; Hughes, 2023) identifies global targets to be achieved by 2030 to safeguard and 'sustainably use' biodiversity (UNEP, 2023). These targets build on biodiversity accounting, spotlighting industrial contributions to species loss and its ecosystem repercussions (Atkins & Maroun, 2018; Jones, 2003; Zhao & Atkins, 2021). Even from the instrumental perspective, neglecting biodiversity and extinction risks can have negative impacts on society and businesses (Ceballos et al., 2020; Dempsey, 2013; Kopnina et al., 2018; Taylor et al., 2020). The 'dialogical accounting' recognises the role of states, non-governmental organisations (NGOs) and communities in shaping societal structures, and offers a more inclusive perspective (Manetti et al., 2021) beyond the instrumental 'resources' and 'ecosystem services' (Jones, 2003), which restrict corporate potential for biodiversity preservation (Busch et al., 2016; Whiteman et al., 2013).

Reflecting this inclusive perspective, environmental, social and governance (ESG) frameworks have broadened the scope to incorporate biodiversity and extinction-related investment considerations (Büchling & Maroun, 2021; Corvino et al., 2021; Milan, 2022; Roberts

et al., 2021; Weir, 2018; Zhang & Noronha, 2023). The links between business and biodiversity are reflected in recent publications in business and management journals (e.g., Anthony & Morrison-Saunders, 2023; Atkins et al., 2018; Banerjee et al., 2021; Busch et al., 2024; da Fontoura et al., 2024; Panwar, Ober & Pinkse, 2023; Panwar, Pinkse, et al., 2023; Smith et al., 2023).

The circular economy (CE) aims to dissociate economic growth from the increasing appropriation of resources and promote the reduction of wastes and ecosystem degradation (Gibbs, 2023). As biodiversity can be seen as the earth's natural CE mechanism that advances a 'balanced economic system' (Attafuah-Wadee et al., 2022), curbing biodiversity loss can generate 'huge opportunities for businesses and investments' (Ellen MacArthur Foundation, 2021). Emphasising dematerialisation, or the 'product-to-service shift', the CE proposes to move from traditional manufacturing towards leasing (Tukker, 2015). The 10-R-scale hierarchy spans absolute (infinite reuse of materials) to partial (e.g., recycling, thus downcycling) loop closure actions (Kirchherr, 2022; Potting et al., 2017).

These principles encompass redesigning, reducing and recycling, aiming to minimise waste and maximise the utilitarian lifespan of products (Potting et al., 2017). The first principle (refuse) aligns with degrowth principles (Banerjee et al., 2021; Bauwens, 2021). The concept of degrowth challenges the embedded ideology of continuous economic growth and the reliance on gross domestic product as a societal welfare measure (Kallis et al., 2018). Also, the CE rhetoric sometimes aligns with the dominant growth-oriented paradigm. Thus, when the CE is taught to students (Figure 1), its limitations are rarely discussed (Kopnina & Poldner, 2021).

Despite attention to the CE, and while engaging with the E of ESG, only a few business and management university departments explicitly connected business to biodiversity (e.g., ICCSR, 2023; World Bank, 2022). As Legrand et al. (2024) argue in the case of the hospitality industry, most businesses 'consume nature' and to strengthen nature-inclusive transformation in education, they urge hospitality management education to include the basic concepts of ecology, biodiversity and environmental science, along with their application, in curricula. The fact that such transformations in management education are uncommon may

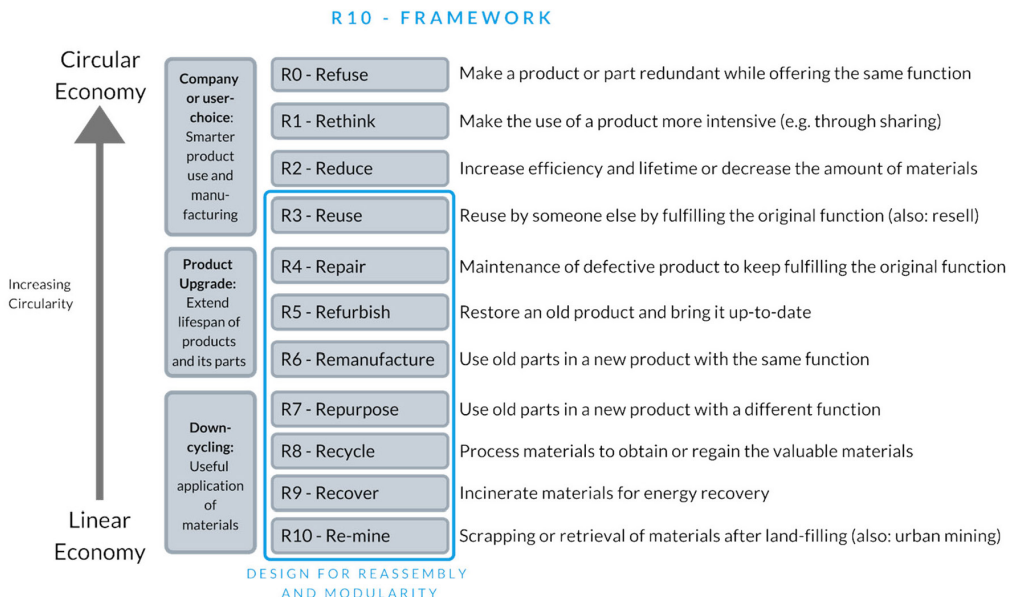


FIGURE 1 Example of the 10 Rs that inform student understanding of the circular economy. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

stem from the traditional anthropocentrism of management and business education, mixing up priorities towards environmental sustainability, social equity and welfare (Leon Perez et al., 2022; McBride et al., 2023) while ignoring associated trade-offs (Busch et al., 2024; D'Alisa et al., 2015). Additionally, the fact that there are few matches for the business, biodiversity and education nexus could be the result of selection bias: biodiversity loss has been a niche topic in business education and getting published in the selected top journals with manuscripts related to it may have been hard.

Understanding the normative business school curriculum

Surveying business school curricula revealed that corporate education and business models have parallels in disregarding biodiversity. Therefore, biodiversity loss and mitigation-centred courses are rare species in business schools. The Financial Times Research Ranking of business schools has published only 11 articles (out of a total of over 47,000 articles since 2000) relating to biodiversity loss (Goodall & Oswald, 2019). The journals produced by the prestigious Academy of Management seldom include impacts or biodiversity conservation (e.g., Goodall & Oswald, 2019). Specifically, highly rated management and business education journals, such as the *Academy of Management Learning and Education*, *British Educational Research Journal*, *Management Learning*, *Journal of Management Studies* and *Studies in Higher Education* feature articles that equate sustainability with sustainable development and ESD.

Sustainable business, business ethics and responsible business curriculum and learning literature appear to be focused on the concept and practice of 'sustainable development' (implying sustaining current industrial and economic development), which is not the same as 'sustainability' (Washington, 2015). Furthermore, ESDG marginalises extinction risks, does not consider the intrinsic value of nature and avoids discussion of the root causes of biodiversity loss (Kopnina, 2020b; Kopnina & Meijers, 2014).

CRITICAL PEDAGOGY AND SUSTAINABLE BUSINESS EDUCATION

Higher education students are often aware of environmental problems (Alm et al., 2022; Gill, 2021; Kaplowitz & Levine, 2005) but feel powerless to act (Fielding & Head, 2012; Pfeffer & Fong, 2004). To overcome the perceived gap between being concerned about the environment and acting, diverse educational approaches to enhance students' environmental action competencies while fostering intrinsic motivation through stimulating creativity, mastery, autonomy and purpose are proposed (Gill, 2021; Pink, 2011; Ryan & Deci, 2000). Considering the environmental conditions of the near future, it is critical to involve all parties involved in the educational process, including teachers, students and teacher educators (Dunlop et al., 2022).

'Education of the Oppressed' (Freire, 1970) provides resources for critical academics addressing wicked problems by using intellectual activism to improve society through their pedagogical practices (Contu, 2019). Through experiential learning, Freire's concept of problematisation—communication, followed by praxis (action-reflection)—can be incorporated, improving management education's responsiveness to real-world issues (Barros et al., 2024). Freire (1970) puts students in the position of researchers to develop critical thinking skills and examine power structures. In this way, students discover mechanisms maintaining the status quo—like greed, resource extraction and unsustainable economic growth. Incorporating design thinking offers a user-centred approach to problem-solving

(Dorst, 2011), with steps including empathising, problem definition, solution ideation, prototyping and testing (Plattner et al., 2009). The user can also be a non-human, such as an ecosystem, animal or plant. Other approaches include critical in-class discussions and debates (Kahn, 2008) and roleplay involving various non-human stakeholders (Kopnina, 2022; Kopnina & Benkert, 2022).

In response to concerns that business schools do not teach responsible management practice, more than 600 institutions in 85 countries signed up for the Principles of Responsible Management Education (PRME) project (Greenberg et al., 2017). The PRME project is committed to 'creating educational frameworks, materials, processes and environments that enable effective learning experiences for responsible leadership' (Godeman et al., 2014, p. 17). This includes carbon literacy training. The PRME project intends to lead to appropriate processes designed to increase student engagement by applying ecopedagogy. Such tools deepen understanding through discussion among classmates and a greater understanding of personal motivation, imperfect knowledge and problem-solving activities facilitated by lecturers (Jeong et al., 2021).

The discussions above highlight the indispensable function of diverse educational strategies in bridging the divide between students' environmental awareness and their actionable capabilities. These strategies accentuate the significant role of critical ecopedagogy, design thinking, engaged in-class debates and roleplaying activities in cultivating critical thinking, stimulating creativity and widening comprehension of environmental dynamics. However, a pervasive gap identified in the literature is the insufficient emphasis placed on biodiversity within these educational frameworks.

As researchers and authors at business schools, we fully acknowledge that unsustainable business practices (and, therefore, conventional business school curricula) directly or indirectly contribute to biodiversity loss. Therefore, we argue that with the development of biodiversity-activated curricula, business schools can contribute to solutions and prepare students for the complex challenges they will experience in their future roles. Thus, although we believe conventional business (and standard business schools) to be central to the problem, we also believe sustainable business curricula are at the heart of the solution.

METHODOLOGY

The case studies spotlight the application of both 'classical' (lecturing) and interactive learning approaches within undergraduate corporate sustainability and business ethics courses at the Business School of Northumbria University (NU) in the United Kingdom, the University of Hong Kong (HKU) and Amsterdam University of Applied Sciences (AUAS) in the Netherlands. The information provided below includes level (Bachelor/Master), course name, course positioning within the discussion institution, intended learning outcomes, curriculum elements, didactic design, assessment method, engagement with other disciplines and future development plans in reflection.

The authors' involvement in delivering academic courses at these institutions presents a practical advantage for this convenience sample, lending deeper insights into our examination of the dynamics between corporate activities and ecological diversity. These international studies are not 'best practice cases' but educational practices that can serve as both process and destination experiences. Building on the insights of established pedagogical models, these pedagogical methods seek to provide a pathway towards integrating biodiversity and extinction considerations at the core of business education.

Below, we present, analyse and extrapolate the lessons learned from the given courses to formulate universal suggestions for standard business curricula. Specifically, we delve into a comprehensive analysis of the case studies, examining the course syllabus and teaching

methodologies. The syllabi were examined by looking at the content, course-specific goals and pedagogical methods, including more traditional (reading, writing and exams) and active types of learning (Grauerholz & Gibson, 2006). Participant observation in the classroom, known as classroom ethnography (Watson-Gegeo, 1997), has been used. In the case of NU and AUAS, the authors of this paper were also involved as course or module leaders or lecturers; in the case of HKU, the information was shared with the authors by colleagues from the same institution.

COMPARATIVE CASE STUDIES

Northumbria University

At the Newcastle Business School, interactive learning methodologies have been applied in several corporate sustainability and business ethics courses. As the standard change models taught at Northumbria lacked emphasis on the need to change due to the recognition of biodiversity value and extinction risks, an intervention module with greater emphasis on biodiversity was established. This new module, which started in September 2023, is titled 'Strategic Leadership for Responsible Organisational Change' and is part of the undergraduate Bachelor programme. This module bolsters the students' strategic aptitude and leadership prowess, connecting various pivotal subjects such as business, environmental ethics, sustainability and economic development (Figure 2). Building upon lessons learned from previous level courses in sustainability and business ethics, the module delves into diverse dilemmas involved in environmental and corporate governance practices. It engages with contentious issues, such as development, resource use, social equality and ecological justice, international trade and the role of several principal institutions in international developmental and environmental policy.

This course utilises ecoliteracy by imparting fundamental knowledge and facts on biodiversity and ecosystems. Other prominent topics discussed as alternatives to the conventional sustainability paradigms are ecologically benign production, spotlighting degrowth, cradle-to-cradle and the CE focusing on the product-to-service shift.

The module is designed to develop a critical thinking curriculum based on some of the literature listed in the Introduction. A flipped classroom approach, with students presenting the paper, is followed by discussion questions for the audience (their classmates). These discussions form the foundation of an assessment portfolio centred around a critical analysis of responsible organisational change and leadership, focusing on biodiversity.

Plenary lectures emphasise the current state of global mammal biomass distribution, dominated by livestock—another compelling issue under the planetary boundaries concept (Rockström et al., 2009). Such lectures enlighten students about the anthropogenic impacts, highlighting the need for sustainable interventions. These interventions are discussed in the form of future scenario planning (Chambers et al., 2019; Kesson, 2020). Ecoliteracy is also developed through more playful, non-classical teaching styles. For example, in critically addressing the SDGs, the students are shown the slide of 17 SDGs, followed by another slide of the blue macaw from the animated film *Rio*. Groups of students are then asked to discuss the question: *What does a blue macaw think about the SDGs?* Students come up with a critical reflection on how the first and second goals—relieving (human) hunger and poverty—require the expansion of productive land, which can critically endanger parrots. Another critical thinking exercise for students consists of concept mapping the implications of systems theory for the SDGs (Skene, 2021), simultaneously cultivating in students a deep-seated consciousness of the extinction crisis.



FIGURE 2 Didactic design: Strategic Leadership for Responsible Organisational Change, Northumbria University.

By fostering active participation (simulations of stakeholder roleplay), students of this module are expected to procure a sophisticated understanding of the multifaceted dimensions of business operations and environmental conservation. This understanding is essential in identifying eco-efficient methods and transitioning towards a CE or degrowth.

Other didactic strategies used in the module involved the debate about the possibility of decoupling the economy from natural resource consumption. With degrowth suggesting limitations to such decoupling (Hickel & Hallegatte, 2022), these debates serve as a powerful educative tool, allowing students to delve into the concept of 'sustainable economic growth'. Another activity is the roleplay involved in the Shell game, where students assume different positions of CEOs, shareholders, the British and Dutch governments, the protestors and non-human stakeholder representatives (e.g., a polar bear). This game is characterised by critical engagement, empathy and humour (Weiss & Cattaneo, 2017).

In the presentation involving the CE's 10-R hierarchy (Figure 1), students discuss whether a specified company is greenwashing or could be regarded as a best-case study of protection or restoration of biodiversity (Kopnina, 2021). Adopting an experiential case study approach in class enables business students to discuss with academics and peers the many 'what if' biodiversity scenarios (CBD, 2018), while receiving immediate feedback and assessment.

The University of Hong Kong

The Business School at HKU provides two pivotal undergraduate courses on ESG and sustainability, one of which is titled 'ESG in Business and Finance'. Additionally, students

can choose 'minors' from other programmes, allowing them to explore biodiversity via 'common core' courses. The above 'ESG in Business and Finance' course engages students in a breadth of ESG-related subjects, particularly pertinent to study fields encompassing business, finance and policy, seeking to foster discourse around responsible environmental stewardship at the intersection of corporations and the natural world. Concepts such as Hardin's (1968) 'Tragedy of the Commons' are explored, emphasising our reliance on global commons and highlighting the necessity for mindful resource utilisation.

Moreover, the course delves into global environmental challenges, analysing greenhouse gas emissions and metrics, company reporting benchmarks and international agreements like the Kyoto Protocol and the EU's Emissions Trading programmes. These discussions emphasise the importance of transnational cooperation and corporate accountability in combating climate change. Utilising a theoretical appreciation of ESG tenets to real-world situations, the course aims to cultivate critical thinking, preparing students for informed decision-making in their future professional roles. The assessment methods for the course are diverse and include case-study analysis, project work and written reports. The pedagogical approach encourages participation and deep comprehension of ESG subjects, targeting learning outcomes that include understanding ESG principles, aptitude in applying such knowledge to practical issues, problem-solving capabilities and devising entrepreneurial ideas aligned with various conservation goals and SDGs (Figure 3).

Change is enacted through a diverse teaching strategy encompassing lectures, discussions, case analyses and debates. Subjects like global environmental challenges, carbon emissions and corporate responsibilities are deeply explored to foster a sense of corporate accountability and understanding of transnational cooperation requirements. Interactive case studies of companies like IKEA, Samsung and Patagonia fortify the practical learning component, enabling students to assess businesses' improvements critically.

A notable aspect of the course is the exploration of greenwashing—a significant challenge within corporate sustainability. A primary objective is nurturing critical thinking, especially in reconciling performance with accountability. The course highlights the importance

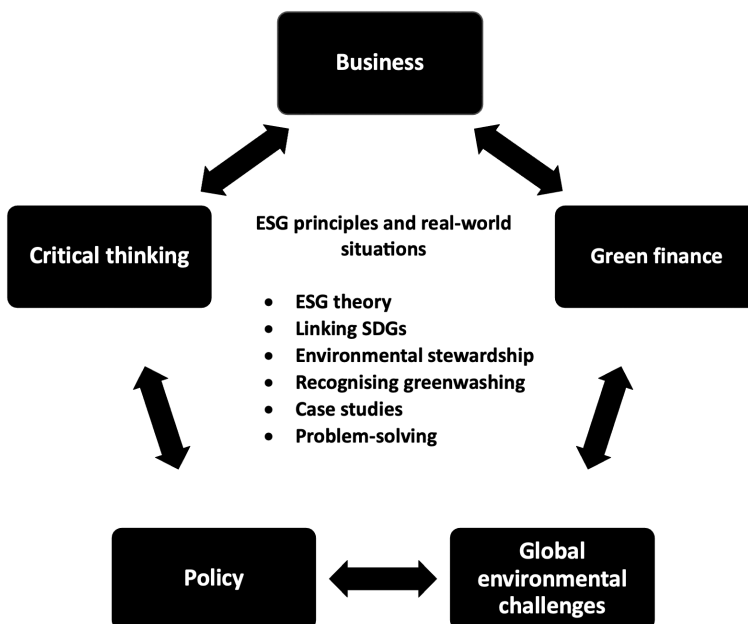


FIGURE 3 Didactic design: ESG in Business and Finance, University of Hong Kong.

of recognising greenwashing risks and introduces tools to measure ‘natural risks’. Here, the valuation of natural resources—like air and water quality and ocean health—is discussed, stressing the intrinsic importance of these resources. The curriculum may evolve beyond the well-known domains of sustainable finance, green bonds and sustainability-linked loans by introducing an ecocentric paradigm shift. This approach challenges and redefines current perceptions about value and capital, shifting the narrative from an economic focus to an integrated ecological lens.

Amsterdam University of Applied Sciences

Since 2022, AUAS has introduced the ‘Global Call to Action – Make it Happen’ minor for undergraduate students in the Faculty of Digital Media and Creative Industry. This interdisciplinary programme draws students from various fields to address grand challenges, including climate change, biodiversity preservation and CE principles. The curriculum equips students with a comprehensive understanding of sustainability, SDGs, biodiversity, circular and doughnut economies (Raworth, 2018) and the issue of greenwashing. Participants are guided through a structured design process, where they develop sustainable concepts, products or services underpinned by a solid business, marketing and financial plan.

This course integrates critical pedagogy, design thinking and sustainable business principles, allowing students to explore and engage with sustainability themes that resonate with them. Encouraging the exploration of regenerative models and creative problem-solving methods, the programme deploys a three-stage model of critical pedagogy adapted from Freire (1970, 1972). Solutions to self-identified problems are developed through the sequential and iterative phases of problematisation, dialogue and praxis, challenging students to question the status quo and consider alternative approaches and trade-offs. Design thinking is seamlessly integrated within this pedagogical model, facilitating the adoption of sustainability principles into resulting designs and business concepts (Figure 4).

The Sustainable Business Model Canvas (Osterwalder & Pigneur, 2010) provides structure. It helps students formulate their business strategies, while adaptations (Tiemann & Fichter, 2016) address sustainability concerns and incorporate triple-bottom-line reporting to monitor progress. To address biodiversity, students watch *A Life on Our Planet* and must write film reports connecting ESG and biodiversity with their business plans. The course also allows students to adopt non-human roles as stakeholders, such as becoming an animal,

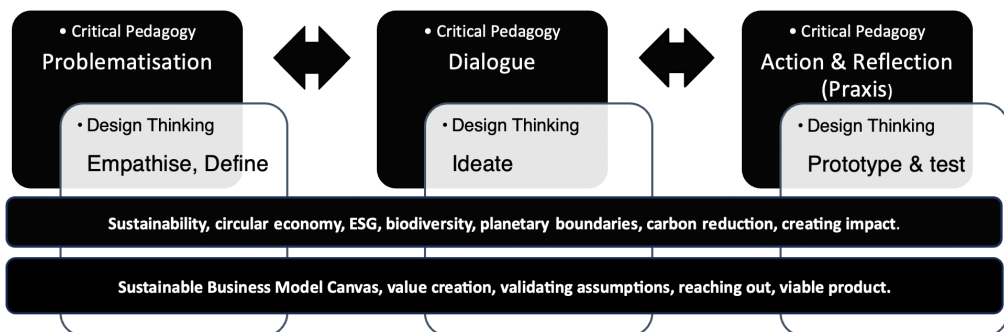


FIGURE 4 Didactic design: Minor Global Call to Action – Make it Happen, Amsterdam University of Applied Sciences. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/berj.4048)]

plant, landscape or ecosystem. Students are empowered to create sustainable concepts that tackle climate-related issues and biodiversity preservation by employing design thinking alongside the sustainable business model.

Throughout the programme, students engage in reflective assignments that contribute to a portfolio. Notable projects developed by students include consultancy methods to reduce the digital footprint of companies, solutions to minimise food waste in hospital settings, a marketplace for the reuse of building materials in construction projects, a platform catering to young people with a focus on sustainability, biodiversity, activism and climate-change solutions, eco-friendly hoodies made from reused cotton with carbon-offset tree planting and proposals aimed at enhancing biodiversity, sustainability and well-being in Amsterdam municipality.

Comparative analysis of case studies

The incorporation of ecopedagogy is marked by reaching beyond traditional environmental science to embrace comprehensive socioeconomic and cultural dimensions of ecological crises. This is evident from themes such as 'Attention to alternative economic models', 'Critical thinking' and 'Enhancing action competencies'. These themes reflect an educational intent to nurture critical and empowerment-based competencies among students. Themes like 'Addressing climate change and carbon reduction' and 'Explicit attention to biodiversity' are tied to ecoliteracy. Furthermore, the integration and overlap of ecopedagogy and ecoliteracy themes in our case studies suggest a comprehensive approach to embedding ecological consciousness into business education. It points to an educational structure where students are taught to understand ecological principles and encouraged to apply them in real-world contexts. [Table 1](#) compares how the three educational institutions address critical themes linked to ecopedagogy and ecoliteracy within their respective syllabi and indicates the mechanisms through which such themes are primarily addressed.

Discussing implications of case studies

Integrating ecoliteracy, ecopedagogy and critical pedagogy in business education reveals that educational frameworks commonly emphasise alternative economic models, the CE, waste management and sustainable business strategies aligned with a biodiversity focus. However, a closer examination reveals variations in universities' approaches to ESD curricula, shaped by their unique cultural, religious and social contexts and educational philosophies (Hopkins & McKeown, 2002; Lambrechts et al., 2013).

The module described at NU aims to integrate ethical, ecological and social justice dimensions into business education. The programme introduces students to systems thinking in corporate decisions, especially where human and non-human stakeholders have common and sometimes competing goals. Through interactive learning, such as flipped classrooms, debates and roleplay, students become engaged in topics like environmental policy and ecological justice. The interactive didactical approach stimulates lecturers to leave the comfort zone of traditional lecture-style teaching to activate and involve students.

As with other courses, the shortcomings of measuring 'success' in the development of ecocentric values after following the module require more than standard student evaluations. The evidence of learning progress may require follow-up research involving longitudinal observations and alumni research that considers the students' career path, but also social and cultural influences that might weaken the anthropocentric foundations of business education.

TABLE 1 Comparison of case studies.

Category	Northumbria University (NU)	University of Hong Kong (HKU)	Amsterdam University of Applied Sciences (AUAS)
Course name (level)	Strategic Leadership for Responsible Organisational Change (Undergraduate)	ESG in Business and Finance (Undergraduate)	Global Call to Action – Make it Happen (Undergraduate)
Learning outcomes	<p>Enhance strategic aptitude and leadership in sustainable practices</p> <p>Understand the impact of biodiversity on business decisions</p> <p>Develop skills in organisational change towards sustainability</p>	<p>Grasp ESG principles and their application in business and finance</p> <p>Analyse corporate responsibility in environmental contexts</p> <p>Cultivate problem-solving skills concerning ESG challenges</p>	<p>Comprehend sustainability, SDGs and circular economy principles</p> <p>Design sustainable products or business models</p> <p>Engage in critical pedagogy and design thinking for environmental issues</p>
Curriculum elements and didactic design	<p>Focus on interactive learning methodologies, flipped classroom</p> <p>Participant observation and case studies</p> <p>Integration of environmental ethics with business leadership</p>	<p>Traditional and interactive learning, with emphasis on case studies and lectures</p> <p>Exploration of global environmental policies and corporate accountability</p>	<p>Interdisciplinary programme encompassing digital media and creative industries</p> <p>Emphasises project-based learning and design processes</p>
Assessment methods	<p>Assessments based on critical analysis of organisational change and leadership</p> <p>Portfolio compilation from student discussions and presentations</p>	<p>Case study analysis</p> <p>Project work</p> <p>Written reports on ESG metrics and challenges</p>	<p>Business Model Canvas for structuring sustainable business strategies</p> <p>Continuous assessment through project evolution and feedback</p> <p>Portfolio about the design process, reflective assignments</p>

TABLE 1 (Continued)

Category	Northumbria University (NU)	University of Hong Kong (HKU)	Amsterdam University of Applied Sciences (AUAS)
Engagement with other disciplines	<p>Links with environmental science and ethics</p> <p>Discussions on international environmental policy</p>	<p>Incorporation of finance and policy studies</p> <p>Addressing global standard resource management and transnational cooperation</p>	<p>Integration of principles from economics (doughnut and circular economy)</p> <p>Collaborations across various faculties, researchers, SMEs and local councils</p>
Pedagogical innovation/innovative pedagogical approaches used	<p>Deviates significantly by incorporating non-traditional subjects like environmental policy and ecological justice, moving away from purely economic and managerial focus</p>	<p>Deviates from traditional paradigms by emphasising the importance of environmental stewardship within business practices, focusing on global environmental challenges and the roles of corporations in managing shared resources effectively</p>	<p>Significantly deviates by challenging anthropocentrism directly and encourages students to adopt the perspectives of non-human stakeholders</p>
Potential for transformative education	<p>High potential due to its holistic approach that integrates ethical, ecological and social justice dimensions into business education</p>	<p>Moderate potential due to its strong focus on ESG principles and fostering a sense of global corporate accountability; however, the transformative impact could be enhanced by adopting more active learning pedagogies like simulations and roleplays, which are evident in the other case studies</p>	<p>High potential due to its innovative use of design thinking and critical pedagogy to foster deep engagement with sustainability issues</p>
Future development plans	<p>Plan to continuously integrate the latest sustainability practices and ethical guidelines into the curriculum</p>	<p>The potential introduction of an ecocentric paradigm shift in economic valuation</p>	<p>Ongoing adaptation of curriculum to include new sustainability challenges and solutions</p>

Another example is HKU's ESG in Business and Finance course, which explores business, finance and policy. It is primarily anthropocentric, discussing the economic implications of environmental matters. From an ecoliteracy standpoint, the course presents a promising beginning, with learning objectives designed to develop students' critical thinking around the balance of performance and accountability. This includes training to identify the risk of greenwashing, thereby fostering a deeper understanding of environmental issues within the corporate context. However, the curriculum could benefit from the inclusion of biodiversity conservation topics, the concept of an ecological footprint, or the value and interdependence of all beings in an ecosystem (Callicott, 1994; Kopnina & Meijers, 2014). Doing so could spark a paradigm shift from a narrow economic focus to a more integrated ecological perspective. This includes holistic approaches to minimising any business's negative impacts, considering the CE in supply chains and supporting the growth of renewable power generation, ecotourism, sustainable production and standards development.

As for the course's ecopedagogy, which entails questioning traditional paradigms and advocating for a transformation towards a more sustainable future, the HKU course navigates topics such as sustainable finance. However, it seems to operate mainly within the confines of existing systems. For instance, while the curriculum rightly addresses and supports the drive for sustainable finance regulations and harmonisation, it does not explore alternative operation models beyond the current financial systems. The course provides a substantial framework for understanding the intersection of business, finance and policy with ESG considerations that can be expanded. The curriculum would benefit considerably from a more robust incorporation of ecocentrism, necessitating broadening the conventional stakeholder theory and acknowledging biodiversity's inherent value (Haigh & Griffiths, 2009). This is crucial if the reconciliation of economic advancement with environmental stewardship is to remain a central theme in business school curricula. The curriculum at AUAS shows that students are integral to the planet's current situation and have the power to change it for the better. Through critical theory, students as researchers become aware of the power dynamics that surround them, how humans dominate other species and the root causes of biodiversity loss and climate change. The programme strives to bridge the gap between theoretical learning and solving urgent real-world environmental challenges. However, the examples of student projects highlight the difficulties of innovating beyond reducing carbon footprint and less resource use towards radical and viable business concepts that could change human behaviour and systems while striving for non-human inclusion and biodiversity.

Through this analytical perspective, the success of business education for biodiversity hinges on emphasising ecological values, cultivating sustainable practices and advancing ecoliteracy. By broadening and diversifying current course offerings to incorporate natural science subjects, we can better prepare future leaders for the ecological transition. This approach—and compulsory courses on pertinent topics such as environmental ethics, social justice and diverse perspectives on nature—would contribute to a more comprehensive educational method. In essence, with the paradox outlined earlier via 'economic benefit' versus 'environmental benefit', these robust approaches can assist in pushing beyond limitations that merely 'balance' the paradox (akin to SDGs 14 and 15), which creates a juxtaposition that fails to deal with biodiversity loss (Smith et al., 2023).

The need for mandatory courses encompassing a broad spectrum of topics, including environmental ethics and social justice, while focused on biodiversity is evident. A failure in biodiversity conservation often signals a prioritisation of short-term economic gains, benefiting only a select few. This approach overlooks the broader, long-term benefits to society and the health of ecosystems. Effective implementation of ecopedagogy equips students with a profound understanding of humans' intricate relationship with the environment, empowering them to challenge established norms. Within the curricula studied, institutions addressed core curriculum themes using ecopedagogy, ecoliteracy or a blend of both (Table 2).

TABLE 2 Comparison of topics within the given educational designs.

Curriculum themes (in alphabetical order)	Institution			Addressed through	
	NU	HKU	AUAS	Ecopedagogy	Ecoliteracy
Addressing climate change and carbon reduction	X		X	X	X
Addressing root causes of biodiversity loss	X		X		X
Attention to alternative economic models	X	X	X	X	
Critical thinking	X	X	X	X	
Enhancing action competencies	X	X	X	X	
Explicit attention to biodiversity			X		X
Explicit inclusion of non-human stakeholders	X		X		X
Sustainable supply chains, logistics	X	X			X
Waste management, circularity	X	X	X		X

Actions that business schools and educators can take

Following this analysis, the courses should encourage a holistic understanding and catalyse active competencies to challenge prevailing norms, fostering an ecocentric paradigm shift. Such a shift would enhance educational outcomes and potentially trigger more sustainable societal and economic transformations towards mainstreaming biodiversity into all policy sectors by adopting multi-stakeholder participatory approaches (Redford et al., 2015). The higher education sector is crucial in formulating agreeable biodiversity-based pathways that seamlessly integrate multiple values and objectives (Pollard, 2020). The case studies indicate that introducing students to various sustainable business strategies informed by and drawn from ecology (Winn & Pogutz, 2013) and conservation biology (Panwar, Ober & Pinkse, 2023) can enhance ecoliteracy. By diversifying current course offerings, lecturers can prepare our future leaders with the interdisciplinary insight into natural sciences necessary for spearheading a sustainability transition (Fadeeva & Mochizuki, 2010). As opposed to promises of absolute decoupling, degrowth in some conceptions may be more realistic. Implementing degrowth strategies can be part of ecoliteracy for management students, even though degrowth demands sweeping societal and economic changes (Kirchherr, 2022).

Despite limitations, both circularity and degrowth need to be considered in business curricula, as both promise to ease the pressure on biodiversity while speaking the language appealing to corporate incumbents, academics and students. Stakeholder roleplays, such as the En-ROADS Climate Solutions Simulator (En-ROADS, n.d.), can also be utilised. Ecopedagogy can be enacted by the 'gamification' of biodiversity conservation questions in a business context to provide a more nuanced understanding of the actors and perspectives in environmental planning (Sandbrook et al., 2015; Yilmaz, 2017).

To realise the objectives of ecoliteracy and ecopedagogy within business education, it is vital to develop educational frameworks that are both knowledge-rich and actively engage students in addressing environmental challenges. Employing active learning strategies, such as problem-based learning (PBL), service learning and experiential learning, fosters direct engagement with real-world environmental issues (Hmelo-Silver, 2004). For example, students could collaborate with local businesses to devise sustainability strategies or conservation efforts, gaining hands-on experience and a deeper appreciation of the complexities involved in environmentally conscious business practices. Furthermore, linking learning to community action enhances the educational experience. Encouraging students to participate in local environmental advocacy or conservation efforts can be structured as a curricular

activity, with credits awarded for contributions to environmental projects like habitat restoration or local business sustainability assessments. Such practical involvement complements classroom learning and solidifies a student's societal and environmental stewardship role.

Drawing on the insights provided by these case studies, we propose a normative approach and actionable pathways for business educators to integrate biodiversity conservation into business education effectively. Foremost, we recommend that business schools collaborate with environmental and ecological faculties to develop integrated curricula that include compulsory modules on biodiversity. This collaborative approach guarantees that educators, regardless of their prior knowledge, gain the necessary exposure and resources to teach these topics effectively. Next, establishing partnerships with departments focusing on environmental studies and ecology could allow for co-teaching arrangements or creating interdisciplinary modules that blend business studies with ecological and sustainability education. Such initiatives can act as practical on-the-job training for business educators, significantly enhancing their understanding and ability to deliver biodiversity-related content comprehensively. Further, the development of targeted professional development programmes is crucial. These programmes should consist of workshops, seminars and certified courses focused on biodiversity and sustainability, designed to keep educators abreast of the latest research and effective pedagogical strategies in biodiversity conservation. Also, it is imperative to establish a resource-sharing network among business schools within the higher education system. This network would provide access to teaching materials, case studies and best practices to integrate biodiversity topics into teaching. In addition, forming partnerships with professionals and organisations such as small and medium enterprises, industries, NGOs, health care providers and local councils actively engaged in biodiversity projects can offer invaluable educational resources. These collaborations can provide real-world insights, significantly enriching classroom learning and furnishing empirical content for the curriculum. In our experience, organisations are eager to collaborate with students to get inspired, encourage divergent thinking and find different approaches to sustainable business problems. A successful collaboration can be an email away. Finally, the integration of digital tools and platforms is critical. These resources should offer up-to-date information and interactive learning experiences related to biodiversity, which is particularly beneficial for educators lacking a background in the subject area, enabling them to deliver enriched and compelling content.

CONCLUSION

Biodiversity loss lacks adequate attention, primarily due to an anthropocentric bias that often overlooks biodiversity when immediate economic benefits are not evident. This bias culminates in a paradox challenge, whereby societal advantages are compromised for economic gains. Business schools can better equip future corporate leaders to address this issue by integrating transformative, interdisciplinary methodologies into their pedagogical practice, emphasising students' critical engagement, analytical thinking and comprehensive understanding of biodiversity's vital role in business and sustainability.

If significant changes to business management are to be realised, it is essential that business curricula mainstream and integrate biodiversity as a cornerstone of sustainability education, culminating in systemic change. Without such integration, we risk perpetuating practices that exacerbate global biodiversity loss. A more forceful integration of ecological knowledge will involve continuing course evolution and increasing interdisciplinarity. Overcoming the dichotomy of prioritising the health of ecosystems, societal benefits and dominant economic interests calls for innovative educational approaches, focusing on ecopedagogy and ecoliteracy and emphasising critical thinking and proactive engagement among students. Business schools must include the cognitive aspects of ecoliteracy and

didactic elements of ecopedagogy to address the current double planetary crisis of biodiversity loss and climatic change. Ecopedagogy and ecoliteracy can deepen students' understanding of biodiversity, exploring themes including land conversion, conservation, emission reduction, ecological fragility, circularity and degrowth.

We have demonstrated the importance of embedding critical thinking about ESD and discussed the rich vein of ecopedagogical and ecoliteracy approaches deployed to this end in the studied syllabi and practice. While the sample of syllabi and practice explored in this study is limited, our case analysis aims to support the evolution of existing programmes and inform and instruct educators on integrating biodiversity themes across various teaching disciplines.

This paper aimed to offer sources of inspiration for planning educational strategies within business and management education to assist educators in situating and enhancing their theoretical approaches to sustainability and practice. These include holistic approaches to minimising the negative impacts of business, considering supply chains and the circular economy, while supporting new sectors such as renewable power generation, ecotourism and sustainable product design. Additionally, the case studies of some ecopedagogical and ecoliteracy approaches aimed to inform the development of ecology-enhanced curricula in business schools. The synergy between biodiversity preservation and sustainable business development is pivotal to achieving future biodiversity goals. To stimulate intrinsic motivation in students and foster competency in action, curricula should provide students with a vision of their future roles in sustainability. In concert, ecopedagogy and ecoliteracy prioritise ecological awareness, sustainability and human–nature interconnectedness through critical analysis of sustainable development frameworks, power structures and established doctrines explored through engaged in-class debates and roleplaying. They should offer guidance on actualising ideas that can positively contribute to solving global environmental challenges. As organisational paradox theory that addresses the nature and management of competing demands continues to expand (Carmine & Smith, 2022), so does our study contribute to an emerging literature in conceptualising sustainable development paradox within business education.

Future endeavours to conceptualise, analyse and enhance a broadly applicable and pedagogy-guiding framework for sustainable business, business ethics and responsible management or leadership education, in terms of standards and assessments of educational achievement, could further build upon the solidifying foundation of scholarship and support the emerging, prodigious expertise within and related to the field. We aspire for this work to inspire academic practitioners and future business leaders to embrace transformative education focused on alternative economies, such as degrowth. By aligning these insights with the broader context of sustainable business practices and environmental stewardship, we aim to contribute to scholarly discourse and demonstrate the potential to inspire meaningful change within management education, thereby broadening the scope of impact in management research.

CONFLICT OF INTEREST STATEMENT

We declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

No data is available.

ETHICS STATEMENT

We declare that there are no outstanding ethical issues.

ORCID

Helen Koprina  <https://orcid.org/0000-0001-7617-2288>

Ruopiao (Scarlett) Zhang  <https://orcid.org/0009-0001-5927-6509>

Mike Russell  <https://orcid.org/0009-0001-9572-4946>

Engelbert Fellingner  <https://orcid.org/0009-0001-4331-5825>

Simon M. Smith  <https://orcid.org/0000-0001-8083-2728>

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