Learning in Paradox:

Student Engagement with Sustainability in Higher Education

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Abstract. Despite institutional commitments to sustainability, higher education continues to struggle with engaging students in ways that translate values into consistent behaviours. Many students express pro-sustainability values, yet act in ways that contradict them, a persistent "value–behaviour gap" that highlights unresolved tensions in sustainability education. This paper develops a conceptual argument for understanding these contradictions as enduring paradoxes rather than deficits. Building on the widely adopted ESD competence framework, the paper proposes the integration of "paradox literacy" as an overarching competence that equips students to recognise, articulate and work with tensions. This reconceptualisation challenges linear awareness-to-action models and can offer practical implications for curriculum design, pedagogy and assessment in higher education.

Keywords: Education for Sustainable Development, Value-Behaviour Gap, Paradox Theory, Sustainability Learning.

1 Introduction

Higher education has become central for advancing sustainability. Reflecting the broad commitments of the United Nations' Agenda 2030 and the Sustainable Development Goals (SDGs), the sector has been charged not only with generating new knowledge but also with shaping graduates who possess the competences and values necessary to respond to current crises (Barth & Rieckmann, 2016; Brundiers et al., 2021). Universities have increasingly adopted Education for Sustainable Development (ESD) frameworks to embed sustainability within curricula, governance and campus operations, aligning with global policy initiatives led by UNESCO (2017). Within Europe, these developments have been reinforced through quality assurance frameworks and institutional strategies that present sustainability as a strategic priority for higher education (Lozano, 2011; Buckner & Zhang, 2025).

Despite these commitments, a consistent challenge remains: students often articulate strong pro-sustainability values yet engage in behaviours that contradict those beliefs. This value–behaviour gap, widely recognised in sustainability and consumer research,

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raises critical questions about the effectiveness of current educational approaches (Kollmuss & Agyeman, 2002; Franco et al., 2019). While awareness of sustainability issues has grown, behavioural change has been less evident. For instance, students may express concern about climate change yet continue to consume fast fashion. Such contradictions are not marginal; they are pervasive across national and disciplinary contexts (Leal Filho et al., 2019).

Several factors contribute to these contradictions, as short-term social, cultural and economic pressures compete with long-term ecological concerns (Sinakou et al., 2019). Education plays an important role. Pedagogically, many teaching methods may fail to engage students meaningfully with sustainability issues. Institutionally, the absence of coherent sustainability strategies and inconsistent messaging can undermine student agency and motivation.

ESD has clearly made a difference, but it has often been interpreted in relatively instrumental terms, focusing on the acquisition of competences and knowledge while underplaying the complex and sometimes contradictory lived experiences of students (Redman, 2013). Much of the literature assumes a linear progression from awareness to action, where the task of education is to build knowledge, instil values and thereby trigger sustainable behaviours (Brundiers & Wiek, 2017). Yet this model has proven inadequate for explaining why well-informed and apparently motivated students continue to act in ways that undermine their own stated commitments. Addressing this limitation requires a shift from seeing contradictions as deficits or failures to recognising them as part of the conditions under which students engage with sustainability. This requires pedagogical innovation, interdisciplinary collaboration and institutional commitment. It also raises the question of whether current ESD competence frameworks, though foundational, are sufficient on their own or whether they need to prepare students more explicitly to work with tensions.

This paper argues that student value–behaviour gaps should be understood less as simple inconsistencies and more as manifestations of enduring tensions that require educational approaches capable of engaging with ambiguity. Work in organisational and educational theory highlights the potential of paradox perspectives, which view contradictions not as problems to be solved but as dynamics to be navigated (Lewis, 2000; Smith & Lewis, 2011). Paradox theory offers a useful lens to explore these aspects, recognising that sustainability education often involves competing demands between urgency and deliberation, individual agency and systemic constraints and idealism and pragmatism. The aim is not to resolve these tensions but to encourage educators and institutions to work with the contradictions students already experience (Carmine & De Marchi, 2023). Instead of assuming that greater awareness automatically leads to action, the focus shifts towards designing curricula that engage with tensions directly, encouraging critical reflection and dialogue.

The aim of this paper is twofold. First, it seeks to conceptualise student value–behaviour gaps in sustainability not as mere inconsistencies but as productive paradoxes that can deepen learning when engaged critically. Through the lens of paradox theory, the paper seeks to advance understanding of how higher education can more effectively support students in translating sustainability values into meaningful action. Second, it contributes to debates on curriculum design in higher education by exploring how ESD

might be reframed to embrace complexity and ambiguity rather than striving for linear models of change. In doing so, the paper advances theoretical discussions of sustainability education while offering practical implications for educators.

2 Theoretical Framework: Education for Sustainable Development and Paradox Theory

2.1 Education for Sustainable Development (ESD)

ESD has become the dominant framework through which sustainability is advanced in higher education. In broad terms, ESD aims to align learning with the global policy agenda of the Sustainable Development Goals (UNESCO, 2017). Within universities, this has meant integrating sustainability into curricula, research and operations, with the expectation that students will graduate with the competences needed to address ecological and social challenges (Barth & Rieckmann, 2016; Brundiers et al., 2021). In recent years, ESD research has increasingly focused on defining and assessing the key competences that enable learners to contribute to sustainable development. UNESCO (2017) outlines eight interrelated competences as foundational to this agenda: systems thinking, anticipatory, normative, strategic, collaboration, critical thinking, self-awareness and integrated problem-solving. Systems-thinking competence is the ability to analyse complex socio-ecological systems and understand interconnections. Anticipatory competence involves exploring possible futures, dealing with uncertainty and assessing long-term impacts. Normative competence refers to understanding and negotiating sustainability values, principles and goals. Strategic competence is the capacity to design and implement interventions to move systems towards sustainability. Collaboration competence highlights the importance of participatory, cross-cultural and interdisciplinary teamwork. Critical thinking competence fosters the questioning of assumptions, power structures and dominant narratives. Self-awareness competence helps learners reflect on their values, motivations and roles in shaping change. Finally, integrated problem-solving competence synthesises the above abilities in practical, real-world sustainability contexts.

This comprehensive framework represents an evolution from earlier competence models (Wiek et al., 2011), expanding the emphasis from knowledge and skills to include reflection, identity and ethical reasoning. The framework has provided a useful structure for curriculum development and pedagogical innovation, encouraging higher education institutions to move beyond content delivery toward transformational learning experiences (Brundiers et al., 2021).

While the competence model has strengthened sustainability education by clarifying outcomes and raising awareness, studies also show that contradictions remain between students' expressed values and their behaviours (Redman, 2013; Franco et al., 2019). Moreover, institutional approaches can further reinforce instrumental goals, presenting education as a linear process with predictable outcomes (Sinakou et al., 2019). An emerging direction for ESD is to acknowledge and integrate the tensions students experience, encouraging them to explore the ambiguities of sustainability as part of their

learning journey. This opens up the possibility of reviewing the competence framework, not by replacing its existing elements, but by enriching it with a focus on how students engage with tensions as part of their development.

2.2 Paradox Theory

Paradox theory offers a lens for understanding contradictions that are persistent, interdependent and central to organisational and social life. Lewis (2000) defined paradox as "contradictory yet interrelated elements that exist simultaneously and persist over time." Building on this foundation, Smith and Lewis (2011) developed a dynamic equilibrium model, identifying four domains where paradoxes typically arise: learning (past vs. future), belonging (individual vs. collective identity), organising (flexibility vs. control) and performing (competing goals). Rather than seeing these as dilemmas to be resolved, paradox theory frames them as tensions to be continuously navigated. More recent work has extended paradox theory in two directions. Schad et al. (2016) reviewed paradox research across management and highlighted its applicability to global challenges such as sustainability, where tensions between economic, social and environmental goals are unavoidable. Putnam et al. (2016) further argued that paradoxes are not only structural but also discursively constituted: they take shape through the ways actors talk about, frame and negotiate contradictions. These insights highlight that paradoxes are not temporary inconsistencies but enduring conditions that shape behaviour and meaning-making.

Other perspectives such as complexity theory, systems theory or cognitive dissonance offer useful insights into sustainability contradictions, but they either treat tensions as problems to be resolved or focus on individual cognition. Paradox theory is distinctive in framing tensions as persistent, interdependent and unavoidable. This makes it especially suited to sustainability education, where contradictions recur at personal, institutional and societal levels.

2.3 Paradox Theory and ESD

For sustainability education, this perspective on paradoxes is particularly relevant. Student contradictions, such as concern for climate change while engaging in unsustainable practices, can be understood not simply as individual cognitive dissonance, but as paradoxes embedded in broader institutional, cultural and economic contexts. They are unlikely to disappear with more information or improved competences. Incorporating paradox theory within ESD may help us better frame sustainability learning in higher education and viewing the contradictions between values and behaviours not as issues to be corrected, but as conditions to be embraced. This suggests that the ESD competence framework can be complemented by an explicit focus on "tension work", equipping students not only with knowledge and skills but also with the capacity to live with and learn from contradictions.

While critical pedagogy and transformative learning also emphasise ambiguity, they often focus on empowerment and consciousness-raising. Paradox theory complements rather than replaces these traditions by offering a structured account of how competing

demands are produced, sustained and navigated over time. This conceptualisation has both theoretical and practical implications. From a theoretical perspective, it challenges normative models of student learning and reframes contradictions as opportunities for critical engagement. From a practical perspective, it points towards curricula that intentionally create space for students to identify, assess and address tensions. This helps move ESD forward: rethinking how the competence framework might evolve towards a pedagogy that acknowledges sustainability as contested, ambiguous and dynamic.

3 Literature Review

3.1 The "Value-Behaviour Gap"

Strong empirical evidence across diverse national contexts consistently indicates that university students express strong support for environmental values and more equitable social structures and regard sustainability as an important principle for both society and their own lives (Franco et al., 2019; Leal Filho et al., 2019). Within higher education, this has been taken as evidence that sustainability education is successfully raising awareness and shaping values, in line with institutional commitments and international policy goals (UNESCO, 2017).

However, despite this widespread support, a persistent and well-documented gap exists between students' pro-sustainability values and their actual behaviour. This is particularly evident in areas such as fashion, travel and lifestyle choices. For example, students may articulate opposition to fast fashion while continuing to purchase inexpensive, short-lived clothing; or they may acknowledge the need to reduce emissions while choosing air travel for convenience (Franco et al., 2019). This phenomenon is commonly referred to as the "value-behaviour gap", the "value-action gap" or the "attitude-behaviour paradox" (Kollmuss & Agyeman, 2002). Some empirical evidence confirms that this gap can be narrowed when sustainability is made personally relevant and when students are given real opportunities to get involved (Abdullahi et al., 2024; Li & Xue, 2023).

Psychological and social barriers, such as perceived behavioural control, displacement of responsibility and normative pressures, complicate the translation of values into action (Chaplin & Wyton, 2014). Students often feel their individual actions are too small to make a meaningful difference against large-scale systemic problems (Sidiropoulos, 2018; Franco et al., 2019). They also face competing motivations and cognitive dissonance as sustainable choices may conflict with social norms, financial constraints or immediate desires (Kollmuss & Agyeman, 2002).

This suggests that if students are already well-informed and value sustainability in principle, yet continue to act in ways that contradict these commitments, then the challenge lies less in building awareness and more in developing approaches that frame sustainability learning as a complex dynamic, where contradictions are recognised and actively engaged with.

3.2 The Role of Institutional and Cultural Contexts

Student engagement with sustainability is not an isolated individual phenomenon, it is shaped by institutional and cultural factors (Grunwald et al., 2025; UNESCO, 2021). Institutional strategies can both enable and constrain student engagement. Several prior studies (e.g., Lozano, 2011; Leal Filho et al., 2019; Findler et al., 2019) have found that while universities often promote sustainability across strategies and policies, operational practices on campus may undermine these messages, leaving students with mixed signals about how important these priorities really are. Actions often remain fragmented, symbolic, and do not extend into campus culture and external partnerships. Similarly, while institutions promote awareness campaigns, few fully embed sustainability into the core of teaching and assessment, thus failing to fully integrate Education for Sustainable Development (ESD) into the curriculum (Uggla & Soneryd, 2023). This highlights a mismatch between the typical stated institutional commitment to sustainability and the tangible experiences of its students. However, when sustainability is truly integrated into both the curriculum and the campus infrastructure, students are more willing to act because they see their institution taking responsibility and creating an environment where change is possible (Abdullahi et al., 2024).

Cultural contexts also shape how sustainability is understood and prioritised. Research shows that a student's cultural background significantly shapes how they interpret and apply sustainability. For example, students from collectivist societies may prioritise community well-being, while those from individualist cultures might focus more on personal responsibility (Sidiropoulos, 2018). Similarly, depending on cultural traditions and national policies, sustainability may be primarily associated with environmental protection, while for others it may be linked to social justice or economic development (Sinakou et al., 2019). The role of disciplinary culture is also significant; students in environmental sciences are more directly exposed to sustainability issues, while those in business or engineering may encounter them only indirectly or in optional modules (Barth & Rieckmann, 2016).

These findings highlight that the value–behaviour gap is embedded in institutional and cultural contexts that shape how students interpret sustainability and understanding these contexts is essential for creating genuine opportunities for students to engage critically and practically with sustainability.

3.3 Pedagogical Models in ESD

Building on the competence framework, a range of pedagogical models have sought to put these competences into practice. These approaches assume that clearer learning outcomes and measurable skills will translate into more sustainable behaviours, provided that competences are systematically taught and assessed. Brundiers et al. (2021) highlight the value of experiential and problem-based learning in enabling students to connect systems thinking, anticipatory skills and normative reasoning with real-world problems. Case studies suggest that such approaches can enhance student agency, particularly when classroom learning is linked with community or industry projects, campus sustainability initiatives, peer-led groups or simulations (Li & Xue, 2023; Uggla &

Soneryd, 2023). These findings align with Barth and Rieckmann's (2016) calls to embed competence frameworks in realistic contexts that move beyond acquiring abstract knowledge.

Other approaches emphasise transformative and participatory learning. Transformative models assume that contradictions arise because dominant paradigms constrain student thinking and that empowering students to question and disrupt these paradigms will enable more sustainable futures. Lotz-Sisitka et al. (2015) suggest transgressive learning, in which students are encouraged to interrogate dominant paradigms and imagine alternative futures, as a useful approach for disruption and the creation of new forms of collective agency. Reflective practice, which involves using journals, portfolios or guided discussions, also appears to be very effective at helping students develop critical self-awareness and navigate the complex scenarios posed by sustainability issues (Sidiropoulos, 2018). Reflective approaches assume that contradictions are primarily experienced at the individual level, and that personal awareness and critical self-examination are the pathway to change.

However, across these models, students continue to face contradictions between values and behaviours. The persistence and continuity of these tensions indicate that they may be intrinsic to sustainability learning. Recognising this provides a strong rationale for incorporating paradox theory in ESD and reframing contradictions as enduring conditions that can be worked with constructively rather than eliminated.

4 Discussion and Implications for Curriculum Design

The persistent gap between students' sustainability values and their behaviours requires a more nuanced understanding than traditional ESD frameworks often allow. Rather than viewing these gaps as simple failures of commitment or awareness, we argue that paradox theory may be integral to the nature of sustainability learning (Lewis, 2000; Smith & Lewis, 2011). The problem may not be that students are getting it wrong, but that sustainability education assumes a world without tensions or trade-offs, when these are exactly the conditions that define real-world sustainability challenges. Therefore, in order to address this, we propose that the ESD framework can be complemented by a paradox lens. Given their centrality, competences provide a suitable model for conceptual innovation. By integrating the capacity to work with tensions into each of the existing competences, it allows us to see the eight core ESD competences not just as skills for problem-solving but as capacities for engaging with the tensions inherent in sustainability. The goal is not to resolve these tensions once and for all, but to help students work with them productively, over time.

UNESCO's (2017) framework outlines eight key competences that support learners in navigating sustainability challenges and reflect the complexity of sustainability learning. To make these competences truly transformative, we propose the integration of paradox literacy as an overarching competence, conceptualised as the capacity to detect, name and navigate persistent tensions. In practice this involves three linked moves. Detecting a tension means recognising when a contradiction is structural rather than something more information or better planning could resolve. Naming it means

articulating both competing logics and holding them together instead of collapsing into one side. Navigating it means acting adaptively and iteratively within the tension. Fast fashion illustrates this: the pull between affordable clothing and the harm in global supply chains will not disappear with awareness alone (detect); both the economic constraint and the ethical commitment of young consumers are real and neither cancels the other (name); a workable response is provisional and ongoing, reducing purchases, extending the life of garments and buying secondhand while pressing for systemic change (navigate). It prepares learners to move beyond simplistic trade-offs and instead hold competing imperatives. Each of the eight UNESCO competences can be reinterpreted through this paradox lens (see Table 1 for details).

Table 1. UNESCO's ESD Competences Reframed Through a Paradox Lens

Competences	Paradox Enhancement
Systems thinking	Students map not only feedback loops and interdependencies, but also identify paradoxes within system dynamics, such as the tension between growth and limits or between efficiency and resilience.
Anticipatory	Futures thinking is enhanced by embedding tensions such as desirability versus feasibility, helping students envision plausible and preferable futures without collapsing into linear solutions.
Normative	Learners practise holding conflicting values, framing tensions (e.g., biodiversity versus livelihoods) as sites for ethical reflection rather than binary choices.
Strategic	Action planning becomes a balancing act, pairing control and flexibility, short-term delivery with long-term capability building.
Collaboration	Dialogic tools help students surface identity-based tensions and move conversations beyond polarisation.
Critical thinking	Students learn to critique dichotomous reasoning and recognise how tensions are framed and managed in discourse.
Self-awareness	Learners explore their own inner contradictions and positionalities in relation to sustainability.
Integrated problem-solving	Students practise designing interventions that synthesise opposing demands, using adaptive and iterative approaches.

Embedding paradox literacy across these competences has several implications for curriculum and pedagogy. First, curricula should be designed around real-world tensions, such as "Just vs. Rapid Transitions" or "Personal vs. Institutional Responsibility", which serve as anchors for exploring all eight competences. Pedagogical approaches

should include experiential, dialogic and reflective learning methods that surface contradictions rather than conceal them. Importantly, paradoxes are not only structural but also discursively constituted: the way students and educators talk about, frame and negotiate contradictions shapes how they are understood and acted upon (Putnam et al., 2016). This means that attention to language, narratives and dialogue is central to developing paradox literacy. Assessment strategies can therefore reward not only knowledge and problem-solving, but also the ability to recognise and engage with complexity, through rubrics that assess tension navigation, plural reasoning and integrative thinking. At a programme level, educators can scaffold learning across time, revisiting key sustainability paradoxes in different disciplinary and contextual settings. This supports the gradual development of students' capacity to tolerate uncertainty and to revisit and refine their responses. Finally, institutions themselves must reflect on their role in modelling paradox literacy. Universities frequently embody sustainability tensions, promoting internationalisation while committing to carbon neutrality or expanding enrolments while aiming to reduce ecological footprints. Making these tensions visible and inviting students into dialogue about them, creates a real learning environment aligned with ESD's transformative ambitions. Therefore, integrating paradox theory into ESD deepens the existing UNESCO framework and its transformative potential by equipping students to live with and learn from the tensions that define sustainability at its core.

5 Conclusion

This paper has argued that student value–behaviour gaps in sustainability education are best understood not as failures to internalise sustainability values, but rather as manifestations of deeper tensions that are fundamental to sustainability learning itself. By integrating paradox theory into ESD, educators can move beyond a focus on knowledge acquisition to support students in recognising, holding and navigating contradictions. This reframing allows the ESD competence model to evolve into a more dynamic, responsive and realistic pedagogy, that better reflects the uncertain and evolving nature of sustainability learning. This contribution complements the established structure of ESD. Institutions have a critical role to play in embedding this approach at both curricular and cultural levels. This equips students with tools to act and acknowledges the emotional, ethical and strategic complexity of sustainability practice; learning in paradox makes more realistic engagement possible.

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