

TRANSFORMATIVE LEARNING FOR SUSTAINABILITY: A SYNTHESIS OF LEARNING OUTCOMES

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Abstract

Although the transformative learning outcomes have been examined in the literature, there is limited discussion of whether these outcomes differ in a sustainability context, or of the additional dimensions that sustainability learning may introduce. This paper addresses the research question of what the learning outcomes in transformative learning for sustainability are and how they can be evaluated. The analysis is based on an integrative literature review (n=14). The study presents a synthesis of transformative learning outcomes for sustainability comprising an ecologically grounded and systemic worldview, critical sustainability awareness, respect and care for others and the non-human world, motivation for sustainability action, collaborative capacity, and sustainability agency. The evaluation of these learning outcomes warrants further research.

Keywords: *Transformative learning, education for sustainable development, learning outcome, higher education, integrative review.*

1. Introduction

The persistent problem of unsustainability and the transgression of planetary boundaries highlight the urgent need to transform prevailing frames of reference and to foster more sustainable mindsets, social practices, and institutions (Boström et al., 2018). The significant potential of transformative learning theory (Mezirow, 1997; Kitchenham, 2008) to advance sustainability education has been widely recognised (Sipos et al., 2008; Boström et al., 2018). The central idea of the transformative learning theory is the transformation of frames of reference, which occurs through critical reflection on underlying assumptions and engagement in dialogue through which new meanings are constructed (Mezirow, 1997). Learning outcomes, i.e. the final results of the learning process, have the potential to act as drivers of sustainability transformation.

Separate fields of study discuss transformative learning outcomes (Stuckey et al., 2013; Hoggan, 2016), and sustainability competencies (Redman & Wiek, 2021; Brundiers et al., 2021). However, there is not much literature available that has brought together these perspectives and examined what the transformative learning outcomes in the context of sustainability are. There is limited discussion of whether transformative learning outcomes differ in a sustainability context, or of the additional dimensions that sustainability learning may introduce. Furthermore, many studies in sustainability education focus on transformative pedagogy and learning activities and only briefly mention intended learning outcomes. This paper addresses the research question of *what the learning outcomes in transformative learning for sustainability are and how they can be evaluated.*

2. Transformative learning outcomes

Previous literature has conceptualised transformative learning outcomes (see Table 1). Transformative change – as opposed to minor or incremental change – entails “an existential change that is more global in nature, a change in worldview and lifestyle rather than a change in a specific belief of behavior” (Stuckey et al., 2022, p. 1460). Hoggan (2016a, p. 71) understands transformative learning outcomes as “significant and irreversible changes in the way a person experiences, conceptualises and interacts with the world”, metaphorically representing heart, head, and hands. Transformative learning is therefore both comprehensive and profound. Hoggan (2016b) further emphasises that, in transformation, the learner changes in a fundamental way, requiring impact that is deep (depth), spans multiple life contexts (breadth), and is not temporary (relative stability).

Table 1. Transformative learning outcomes by Stuckey et al. (2013; 2022), Hoggan (2016a; 2016b) and Cox (2021) and their suggested matching.

	Stuckey et al. (2013; 2022)	Hoggan (2016a; 2016b)	Cox (2021)
Hands	Acting differently: Changes in behavior that are remarkably different from previous behaviors	Behaviour: Actions consistent with new perspective, Social action, Professional practices, Skills	I made major changes in my life This program changed my life
Head	Worldview Shift: Shift in paradigm that radically alters a perspective and replaces a prior thought process or way of being	Worldview: Assumptions, beliefs, values, expectations, Ways of interpreting experience, More comprehensive or complex worldview, New awareness/new understandings	My view of the world changed My deeply held beliefs changed
	Open Perspective: Receptivity to new ideas and experiences, often involving curiosity and seeking to understand others' point of view	Epistemology: More discriminating, Utilising extrarational ways of knowing, More open, Shifts in thoughts and ways of thinking, More autonomous thinking, More complex thinking	
		Capacity: Cognitive development, Consciousness, Spirituality	
Heart	Self-Awareness: Conscious reflection and knowledge of one's own character, values, feelings, motivation, and impact on others	Self: Self-in-relation to others/world, Empowerment/Responsibility, Identity/View of self, Self-knowledge, Personal narrative, Meaning/purpose of persons life, Personality	My view of myself changed I developed a greater sense of responsibility toward others
		Ontology: Affective experience of life, Ways of being, Attributes	I changed my goals for the future

3. Method

This study adopts an integrative literature review approach, which “reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated” (Torraco, 2005, p. 356). A systematic search was conducted in Scopus and Web of Science by using the following search query: (TITLE (transformative OR transformational) AND TITLE (sustainability OR "sustainable development") AND TITLE-ABS-KEY (learning OR education) AND TITLE-ABS-KEY (outcome* OR competenc*)). A web-based systematic review management tool, Covidence, was used to organise the review process. After the removal of duplicates, the search yielded 70 articles. Only peer-reviewed journal articles and review papers published in English were included, and no time restrictions were applied. Following title and abstract screening, 29 irrelevant sources were excluded. Subsequently, full-text screening led to the exclusion of a further 27 studies. Studies were excluded if they did not address learning outcomes, were not focused on transformative learning, or did not concern sustainability education. Consequently, a total of 14 articles were included in the review for in-depth analysis. Integrative literature reviews require conceptual structuring to clarify how the main concepts of the topic come together as a unified idea (Torraco, 2005). This review is structured around the three learning domains: cognitive, affective (or social-emotional), and psychomotor (or behavioural) (Hoque, 2016; UNESCO, 2019). This tripartite division of learning, metaphorically represented as head, heart, and hands (Sipos et al., 2008; Hoggan, 2016a), has its roots in established learning theories and is also widely applied within education for sustainable development.

4. Results

4.1. Overview of learning outcomes in transformative learning for sustainability

The reviewed articles (n=14) were published between 2017 and 2026, with the majority appearing within the last three years, indicating that academic engagement with the topic is relatively recent. The literature examines transformative sustainability learning outcomes across a range of disciplines, including agriculture (Probst et al., 2019), hospitality (Wang & Teng, 2019), leadership (Bryant et al., 2023; Brooks & Brooks, 2024), innovation and business (Macagno et al., 2024; Viera Trevisan et al., 2024; Xiao et al., 2025), architecture and construct management (Bales et al., 2025; Siva & Ershadi, 2025), language education (Hämäläinen 2025) and planning (Ziafati Bafarasat et al., 2025), as well as more generally through reviews (Rodríguez Aboytes & Barth, 2020), conceptual development (Ziafati Bafarasat et al., 2025) and interdisciplinary workshops (Fagerholm et al., 2026).

Most of the articles (Probst et al., 2019; Rodríguez Aboytes & Barth, 2020; Bryant et al., 2023; Brooks & Brooks, 2024; Macagno et al., 2024; Bales et al., 2025; Siva & Ershadi, 2025; Ziafati Bafarasat et al., 2025; Fagerholm et al., 2026) conceptualise the learning outcomes of transformative learning for sustainability as multidimensional, encompassing cognitive (head), psychomotor (hands), and affective (heart) aspects. Many studies rely on their conceptualisations on previous frameworks: Bryant et al. (2023) and Brooks & Brooks (2024) propose that transformative learning for sustainability can be captured by Hoggan's (2016a; 2016b) typology of transformative learning outcomes. In addition, Brooks & Brooks (2024) refer to Inner Development Goals (n.d.). Probst et al. (2019) rely on Stuckey's et al. (2013) categorisation of transformative learning outcomes. Xiao et al. (2025) conceptualise outcomes based on

sustainability competencies by Redman & Wiek (2021) and Brundiers et al. (2021). Fagerholm et al. (2026) uses the five clusters of inner-outer transformation by Wamsler et al. (2021). The conceptualisations share many common elements; however, it is evident that there is no established or standardised approach to conceptualise learning outcomes in transformative learning for sustainability.

This lack of consensus is even more pronounced with regard to the evaluation and assessment of learning outcomes. Only Probst et al. (2019) address the assessment or evaluation of transformative learning outcomes in their study by developing a theory-led instrument to assess sustainability learning outcomes. In other studies, learning outcomes are identified either through the analysis of data collected from participants in transformative learning courses or programmes, or through systematic reviews of the existing literature. Consequently, the majority of the articles do not provide specific measures for assessing learning outcomes; instead, they rely on qualitative and quantitative analyses of students' reflections, concept maps, interviews, or survey data. Based on existing studies, the evaluation of transformative learning outcomes for sustainability appears to be a relatively under-discussed topic in the literature. However, the associated challenges are acknowledged. Xiao et al. (2025) note that an emphasis on immediate learning experiences does not capture whether these translate into long-term behavioural changes towards sustainability beyond the classroom. Similarly, Fagerholm et al. (2026) call for further development in assessment and evaluation approaches, recognising that traditional assessment methods may not be suitable for capturing the qualities and capacities of inner-outer transformation for sustainability.

4.2. Learning outcomes of 'Head'

Although some articles identify sustainability-related knowledge as a learning outcome (Rodríguez Aboytes & Barth, 2020; Macagno et al., 2024; Viera Trevisan et al., 2024; Siva & Ershadi, 2025; Ziafati Bafarasaet et al., 2025), many place greater emphasis on more profound cognitive change. This is variously described as a change or shift in worldview (Bryant et al., 2023; Brooks & Brooks, 2024), the development of systems thinking or a holistic approach (Rodríguez Aboytes & Barth, 2020; Macagno et al., 2024; Härmäläinen, 2025; Xiao et al., 2025), a transformation of mindset (Macagno et al., 2024), or the emergence of new insight (Fagerholm et al., 2026). Across these perspectives, a systemic and relational orientation is emphasised, in which the worldview becomes broader and more complex, enabling recognition of the interconnectedness of sustainability problems. Fagerholm et al. (2026) define based on Wamsler et al. (2021) insight as "the ability to think from a relational, equitable, and systems perspective that recognises complexity and interconnectedness". Harmin et al. (2017) refer to a reconceptualisation of relationships, whereby relations with the more-than-human become less anthropocentric, positioning humans and the more-than-human as relational equals within ecological systems. Similarly, Brooks and Brooks (2024) describe a worldview change in which a new understanding of the self as part of nature is formed. Many studies also identify forms of critical thinking and awareness as key learning outcomes. These are described variously as an increased awareness of structures that perpetuate unsustainability (Bryant et al., 2023), the deconstruction of power relations and epistemic hegemony (Harmin et al., 2017), and critical thinking that acknowledges the influence of power structures (Rodríguez Aboytes & Barth, 2020). Fagerholm (2026) conceptualises awareness as the capacity to be present, open, self-reflexive, and attentive.

4.3. Learning outcomes of 'Hands'

Many of the reviewed articles place strong emphasis on behavioural learning outcomes. These are described as behavioural intentions (Viera Trevisan et al., 2024), a sense of agency and empowerment (Rodríguez Aboytes & Barth, 2020), as well as actual behavioural change (Siva & Ershadi, 2025) and sustainability-focused behaviour (Bryant et al., 2024). Accordingly, authors differ in whether they seek to capture observable behavioural change or the potential and capacity for sustainability-related agency. Such outcomes are regarded as particularly important in the context of sustainability education, where the focus is not only on learning about sustainability but also on developing the capacity to advance societal change and transformation. Macagno et al. (2024) argue that mindsets and creative confidence, comprising creative agency and creative self-efficacy, are equally important to solving sustainability problems as sustainability literacy. Similarly, Bales et al. (2025) argue that declarative, disciplinary knowledge may be counterproductive for transformation if students' personal bodies of sustainability-related knowledge and motivation are replaced by more academic and less personal framings. In such cases, students may experience a loss of autonomy, agency and empowerment, thereby undermining transformative learning. Furthermore, collaborative capacity is highlighted in some studies (Macagno et al., 2024; Siva & Ershadi, 2025; Xiao et al., 2025; Fagerholm et al., 2026). The ability to foster collaboration among diverse stakeholders is considered crucial for addressing interdisciplinary sustainability challenges (Siva & Ershadi, 2025).

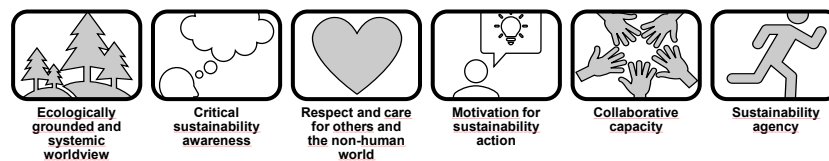
4.4. Learning outcomes of ‘Heart’

Affective learning outcomes relate to relational values (Rodríguez Aboytes & Barth, 2020; Fagerholm et al., 2026), environmental attitudes (Probst et al., 2019) and motivation for sustainability (Wang & Teng, 2019; Bales et al., 2025). Fagerholm et al. (2026) argue that the root of the sustainability crisis lies in an inability to relate to ourselves, others, and the environment in compassionate and caring ways, and that a transformation of these relationships is therefore required. They emphasise connection and compassion towards other people and living things as key learning outcomes. Similarly, Bryant et al. (2023) describe ontological change as a shift from self-interest towards more collective concerns, highlighting the relational nature of the self and a sense of interconnectedness with others and the world. Rodríguez Aboytes and Barth (2020) refer to the reconstruction of values, whereby learners become more empathetic and oriented towards collective concerns. Furthermore, motivation and passion to engage with sustainable practices and to respond to environmental and social impacts are seen as the basis for motivated action (Wang & Teng, 2019; Bales et al., 2025).

5. Discussion and conclusions

Most of the reviewed studies conceptualise transformative learning outcomes as final and measurable sustainability-related results. An exception is Probst et al. (2019), who examined the transformative learning experience itself and subsequently analysed whether it predicted sustainability-related attitudes, skills, and agency. Rodríguez Aboytes and Barth (2020) similarly acknowledge that it is not always clear whether transformative learning should be understood as a learning outcome in its own right or a means of achieving other outcomes. This ambiguity might stem from the separate development of measures for sustainability competencies and transformative learning experiences. Figure 1 presents a synthesis of transformative learning outcomes for sustainability derived from the reviewed literature, integrating transformative learning experience into sustainability education outcomes.

Figure 1. Transformative learning outcomes for sustainability.



Although prior research has studied transformative learning outcomes, their specific nature within sustainability contexts remains under-conceptualised. This study contributes to the literature by advancing a conceptualisation of transformative learning outcomes for sustainability. Further research is needed on the assessment and evaluation of these outcomes.

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*Included in the review.