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The Role of Life Skills in Developing Sustainable Development Competencies among Higher Secondary Students: Implications for Curriculum and Teaching Practice

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Abstract

Education for sustainable development has become a central concern of educational policy worldwide, yet a persistent gap remains between students' awareness of sustainability issues and their capacity to act on them. This paper examines the role of life skills in developing sustainable development competencies among higher secondary students and considers the implications for curriculum and teaching practice. Adopting an integrative review design, the study synthesises international literature published between 2015 and 2026, identified through the Scopus database, spanning education, sustainability studies, the social sciences and teacher education. The analysis identified six interrelated themes. First, critical thinking, problem solving, communication, resilience and emotional intelligence act as foundational enablers of sustainability competencies such as systems thinking, ethical responsibility and action competence. Second, project-based learning, design thinking and experiential learning emerge as the most promising pedagogies for integrating life skills with sustainability education. Third, gender and spatial (urban and rural) disparities shape the acquisition of these competencies and call for inclusive, context-specific curricular adaptation. Fourth, sustained, active and culturally responsive teacher professional development is essential to embed life skills in classroom practice. Fifth, fragmented policies, curriculum overload and weak interdisciplinary planning constrain implementation. Sixth, significant research gaps persist, particularly regarding longitudinal evidence, cross-cultural validation and the assessment of collective and emotional competencies. The paper concludes that life skills education should be treated not as an add-on but as the connective tissue of sustainability-oriented curricula, and it proposes implications for curriculum design, pedagogy, teacher education and policy, with particular reference to the Indian higher secondary context under the National Education Policy 2020.

Keywords: *Life skills; Education for sustainable development; Sustainability competencies; Higher secondary education; Project-based learning; Teacher professional development; Inclusive curriculum*

1. Introduction

1.1 Background

The adoption of the 2030 Agenda for Sustainable Development placed education at the heart of the global response to climate change, inequality, resource depletion and social fragmentation (United Nations, 2015). Target 4.7 of the Sustainable Development Goals (SDGs) explicitly calls on education systems to ensure that all learners acquire the knowledge and skills needed to promote sustainable development. In response, education for sustainable development (ESD) has moved from the margins of environmental education to become a guiding principle of curriculum reform in many countries (Papavasileiou et al., 2025; Suárez-López & Eugenio-Gozalbo, 2021; UNESCO, 2017).

The higher secondary stage is a particularly significant point at which to pursue these aims. Students at this level are on the threshold of adult citizenship, further study and entry into the workforce, and the dispositions they form are likely to shape their civic and economic behaviour for decades. Yet a recurrent finding in the literature is that sustainability awareness does not automatically translate into sustainable action. Students may be well informed about sustainability principles while lacking the competence to apply them to real situations (Edjah et al., 2026; Elmassri et al., 2025). This awareness to action gap suggests that knowledge-centred approaches to ESD are insufficient on their own.

Life skills, understood as the cognitive, socio-emotional and practical abilities that enable individuals to deal effectively with the demands of everyday life (World Health Organization, 1997), are increasingly recognised as a means of bridging this gap. Critical thinking, problem solving, decision making, communication, empathy and resilience are precisely the capacities that learners need in order to analyse complex sustainability problems, negotiate competing interests, and sustain engagement when progress is slow (Edjah et al., 2026; Hvalby et al., 2024; Sunismi et al., 2026). The integration of life skills into sustainability education is therefore timely, given the urgency of the SDGs and the need for transformative and inclusive educational strategies that foster agency, ethical responsibility and systems thinking among diverse student populations (Ahmad, 2025; Edjah et al., 2026).

1.2 Rationale and Problem Statement

Although the literatures on life skills education and on ESD have each grown substantially, they have largely developed in parallel. Life skills research has tended to focus on health, well-being and employability, whereas ESD research has concentrated on environmental knowledge, values and key competency frameworks (Corres et al., 2020; Hvalby et al., 2024). Comparatively little work has examined how the two domains interact, which pedagogies integrate them most effectively, and what conditions are needed for such integration to succeed at the higher secondary level. In India, the National Education Policy 2020 calls for the development of life skills, experiential learning and environmental awareness across school education (Ministry of Human Resource Development, 2020), but guidance on how these commitments can be operationalised together in higher secondary classrooms remains limited.

1.3 Objectives of the Study

Against this background, the present study pursues the following objectives:

1. To examine the conceptual and empirical relationship between life skills and sustainable development competencies.
2. To identify pedagogical approaches that effectively integrate life skills with sustainability education.
3. To analyse the influence of gender and spatial disparities on the development of these competencies.
4. To examine the role of teacher professional development and institutional support in sustaining integration.
5. To derive implications for curriculum design, teaching practice and policy, and to identify priorities for future research.

1.4 Research Questions

1. How do life skills contribute to the development of sustainable development competencies among higher secondary students?
2. Which pedagogical approaches are most effective in integrating life skills with sustainability education?
3. How do gender and spatial contexts shape students' acquisition of life skills and sustainability competencies?
4. What forms of teacher support and institutional arrangement enable, or constrain, effective integration?

2. Conceptual and Theoretical Framework

2.1 Life Skills

The World Health Organization defines life skills as abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life, and identifies a core set comprising decision making, problem solving, creative thinking, critical thinking, effective communication, interpersonal relationship skills, self-awareness, empathy, coping with emotions and coping with stress (World Health Organization, 1997). Subsequent scholarship has extended this framework towards outcome-based education and teacher education (Babu & Charles, 2024; Bhardwaj et al., 2025; Narayanan, 2023), and a recent systematic scoping review of life skills in compulsory education confirms that these competencies are increasingly

embedded in national curricula, albeit with considerable variation in definition and assessment (Hvalby et al., 2024).

2.2 Sustainable Development Competencies

Sustainability competencies refer to the integrated knowledge, skills, attitudes and values that enable individuals to contribute to sustainable development. The influential framework proposed by Wiek et al. (2011) identified systems thinking, anticipatory, normative, strategic and interpersonal competencies as key to sustainability problem solving. UNESCO subsequently set out eight cross-cutting key competencies: systems thinking, anticipatory, normative, strategic, collaboration, critical thinking, self-awareness and integrated problem-solving competencies (UNESCO, 2017). More recent work has refined these frameworks and considered how they may be used in curriculum design and assessment (Corres et al., 2020; Wiek & Redman, 2022), while others have called for attention to the emotional and inner dimensions of sustainability transformation (Wamsler & Janss, 2025; Wickson et al., 2025).

2.3 Interconnection between Life Skills and Sustainability Competencies

A comparison of the two frameworks reveals substantial overlap. Critical thinking, self-awareness, collaboration and problem solving appear in both, while life skills such as empathy, coping with emotions and communication underpin the interpersonal and normative dimensions of sustainability competence. This paper therefore adopts the working proposition that life skills function as foundational enablers of sustainability competencies: they are the everyday capacities through which higher-order competencies such as systems thinking, strategic action and ethical responsibility are exercised. This proposition guides the thematic synthesis presented in Section 4.

3. Methodology

3.1 Research Design

The study adopts an integrative literature review design. Integrative reviews are appropriate where a field draws on heterogeneous evidence, including quantitative, qualitative, mixed methods and conceptual studies, and where the aim is to generate a new conceptual understanding rather than to pool effect sizes. The review therefore synthesises findings thematically and does not claim to be a statistical meta-analysis.

3.2 Data Sources and Search Strategy

Literature was identified through the Scopus database, supported by the Scopus AI search and summarisation tool. The search combined terms relating to life skills (for example, critical thinking, problem solving, emotional intelligence, resilience and empathy), sustainability (for example, education for sustainable development, sustainability competencies and the SDGs), pedagogy (for example, project-based learning, design thinking and experiential learning) and educational context (for example, secondary education, curriculum and teacher professional development). All sources retrieved were subsequently examined by the authors, and a small number of foundational policy and framework documents were added to anchor the conceptual framework.

3.3 Inclusion Criteria

Sources were included if they (a) were published between 2015 and 2026; (b) appeared in peer-reviewed journals, edited scholarly volumes, book series or conference proceedings indexed in Scopus; (c) addressed life skills, sustainability competencies, or their integration in educational settings; and (d) offered empirical evidence, systematic review findings or conceptual frameworks relevant to curriculum and teaching practice. Studies from higher education and non-school settings were retained where their findings bore directly on pedagogical approaches transferable to the higher secondary level. In total, 81 indexed sources were retained for synthesis.

3.4 Data Analysis

The retained literature spanned education, sustainability studies, the social sciences and teacher training, and employed a range of methods: quantitative measures of competency development (for example, of critical thinking, resilience and sustainability behaviours), qualitative accounts of classroom practice and teacher training, cross-sectional and longitudinal intervention studies, and comparative analyses of gender and spatial disparities. The findings were coded inductively and organised into themes, which were then refined through comparison

across studies. This methodological diversity allowed triangulation of findings, although it also limited the extent to which evidence could be compared quantitatively. Table 1 summarises the principal themes.

Table 1. Thematic synthesis of the reviewed literature

Theme	Key insights	Representative sources
Interconnected life skills and sustainability	Critical thinking, problem solving, communication, resilience and emotional intelligence are foundational to sustainable development competencies.	(Edjah et al., 2026; Sunismi et al., 2026; Zarzycki, 2025)
Pedagogical innovation	Project-based, design thinking and experiential approaches are the most effective means of integrating life skills and sustainability.	(Cummings & Yur-Austin, 2022; Evans, 2015; Saseendran & Thomas, 2025; Ásványi & Gedeon, 2025)
Addressing disparities	Gender and spatial inequities require inclusive, context-specific curricular adaptation.	(Boned-Gómez et al., 2025; Chakraborty et al., 2024; Escobedo et al., 2025)
Teacher professional development	Ongoing, active and culturally responsive teacher training is essential to sustain integration.	(Dolev & Leshem, 2016; Murphy et al., 2020; Rahmi & Rassanjani, 2025)
Curriculum integration challenges	Fragmented policies, curriculum overload and weak interdisciplinary planning impede effective sustainability education.	(Papavasileiou et al., 2025; Schutte et al., 2025; Suárez-López & Eugenio-Gozalbo, 2021)
Research gaps	Longitudinal and cross-cultural studies are needed, together with frameworks for collective and emotional competencies.	(Corres et al., 2020; Hvalby et al., 2024; S. Leal et al., 2026)

Source: Compiled by the authors from the reviewed literature.

4. Findings and Discussion

4.1 Life Skills as Foundations of Sustainability Competencies

The reviewed research consistently shows that life skills such as critical thinking, problem solving, communication, resilience and emotional intelligence are interrelated and essential to students' capacity to act sustainably. These skills enable learners to engage with real-world challenges, to bridge the gap between sustainability awareness and practice, and to build systems thinking and ethical responsibility (Edjah et al., 2026; Sunismi et al., 2026).

Critical thinking emerges as the most extensively evidenced of these skills. In a study of students in Ghana, Edjah et al. (2026) found that critical thinking behaviours predicted systems thinking, sustainable action and ethical responsibility. Zarzycki (2025) similarly characterises critical thinking as a key to competence building in sustainable development, and Wako (2026) shows that critical thinking facilitates reflection on, reframing of and enactment of sustainability reasoning in intercultural collaborative learning.

Problem solving and decision making enable students to engage with complex, ill-structured sustainability issues in which there is no single correct answer (Babu & Charles, 2024; Bhardwaj et al., 2025; Edjah et al., 2026; Faragó et al., 2026; Narayanan, 2023). Resilience and empathy foster adaptability, collaboration and sustained engagement with sustainability challenges ("Empathy, Emotional Self-Regulation,", 2025; Faragó et al., 2026), while communication and collaboration support teamwork and interdisciplinary learning (Bhardwaj et al., 2025; Faragó et al., 2026; Narayanan, 2023). Emotional intelligence appears to play a mediating role: it has been found to link soft skills with innovative competencies among educators (Sunismi et al., 2026), to underpin green practices in organisational settings (Chouhan et al., 2025), and to interact with problem solving in shaping mental well-being (Erdoğan et al., 2026).

Taken together, these findings indicate that life skills are not isolated attributes. It is their interplay that is crucial to holistic competency development. Effective curricular frameworks must therefore integrate cognitive, socio-emotional and practical dimensions if they are to foster agency and ethical action.

4.2 Interplay of Critical Thinking, Empathy and Resilience

Critical thinking, empathy and resilience appear to be mutually reinforcing dispositions that together underpin sustainable development competencies (Edjah et al., 2026; "Empathy, Emotional Self-Regulation,", 2025; Faragó et al., 2026; Zarzycki, 2025). Critical thinking provides the analytical capacity to interrogate claims and consider alternatives (Wako, 2026); empathy promotes well-being and positive social interaction, which are essential for conflict resolution and collective action ("Empathy, Emotional Self-Regulation,", 2025); and resilience supports students in coping with real-life problems and sustaining long-term personal development (Ahuja et al., 2019). The literature further suggests that culturally and politically sensitive approaches are needed to integrate these skills effectively, particularly in diverse student populations (Edjah et al., 2026; Zarzycki, 2025). This implies that integration cannot rely on a single, standardised programme but requires context-specific design supported by well-prepared teachers.

4.3 Pedagogical Approaches for Integrating Life Skills and Sustainability

4.3.1 Project-Based Learning

Project-based learning (PBL) is among the most thoroughly documented approaches for integrating life skills with sustainability education. By engaging students in extended inquiry into authentic problems, PBL promotes critical reflection, real-world problem solving and interdisciplinary collaboration, and enhances student agency and creativity (Agustira et al., 2025; Ahuja et al., 2019; Sohaee & Farsad, 2025; Ásványi & Gedeon, 2025). Systematic review evidence indicates that PBL develops collaboration, communication, critical thinking and teamwork (Becerra-Goicochea et al., 2026; Cierniak-Emerych et al., 2026; Syamsudin et al., 2024). Agustira et al. (2025) report that a PBL model with multiliteracy content improved critical thinking, problem solving, decision making and environmental literacy, while Ásványi & Gedeon (2025) found both short- and long-term gains in sustainability consciousness following a PBL intervention. Ahuja et al. (2019) explicitly frame PBL as a vehicle for the inculcation of life skills in the service of sustainability.

4.3.2 Design Thinking

Design thinking, with its iterative cycle of empathising, defining, ideating, prototyping and testing, fosters creativity, adaptability and systems thinking (Taimur & Onuki, 2022; Taimur et al., 2022; Zhang et al., 2025). Its explicit emphasis on understanding the needs of others makes it well suited to developing empathy alongside analytical skills. Evidence from Japan and Germany indicates that design thinking can serve as a transformative pedagogy in sustainability education, including in digital and hybrid settings (Taimur & Onuki, 2022; Taimur et al., 2022), and conceptual work proposes combining design thinking with educational technology in science education to develop sustainability competencies (Saseendran & Thomas, 2025). Community-oriented design thinking projects have also been shown to generate tangible local impact (Cummings & Yur-Austin, 2022).

4.3.3 Experiential and Challenge-Based Learning

Experiential learning, in which students learn through direct engagement with real environments and communities followed by structured reflection, has been shown to enhance systems thinking and sustainability agency (Chui,

2026; Livingston et al., 2026). Field-based studies illustrate how experiential learning develops competencies for sustainable development (Ghanem et al., 2026), and challenge-based learning offers a related model that has been implemented in secondary education, although teachers report practical tensions in doing so (Schutte et al., 2025). Student-centred pedagogies of these kinds are widely regarded as central to implementing education for sustainability (Ahmad, 2025; Evans, 2015).

Table 2 summarises the life skills and sustainability competencies associated with each approach in the reviewed literature. Overall, the evidence indicates that active, real-world and interdisciplinary pedagogies are more effective than predominantly transmissive methods in fostering sustainability competencies and life skills. However, most comparative evidence derives from higher education settings, and its transferability to the higher secondary level requires further empirical testing.

Table 2. Pedagogical approaches and associated competencies reported in the reviewed literature

Approach	Life skills developed	Sustainability competencies supported	Representative sources
Project-based learning	Collaboration, communication, critical thinking, problem solving, decision making	Integrated problem solving, collaboration, sustainability consciousness	(Agustira et al., 2025; Becerra-Goicochea et al., 2026; Syamsudin et al., 2024; Ásványi & Gedeon, 2025)
Design thinking	Creativity, empathy, adaptability	Systems thinking, anticipatory and strategic competencies	(Saseendran & Thomas, 2025; Taimur & Onuki, 2022; Taimur et al., 2022; Zhang et al., 2025)
Experiential and challenge-based learning	Reflection, resilience, teamwork	Systems thinking, action competence, agency	(Chui, 2026; Ghanem et al., 2026; Livingston et al., 2026; Schutte et al., 2025)
Culturally responsive teaching	Critical thinking, empathy, self-awareness	Normative competence, equity and social justice awareness	(Damianidou & Phtiaka, 2016; Ernawati et al., 2026; Ghaemi & Boroushaki, 2025; Zeng et al., 2025)
Whole-school and interdisciplinary models	Communication, collaboration	Knowledge integration, systems thinking	(Braßler & Sprenger, 2021; Gan & Alkaher, 2021; Karaarslan-Semiz & Sund, 2026; Liu et al., 2022)

Source: Compiled by the authors from the reviewed literature.

4.4 Culturally Responsive and Inclusive Pedagogies

Culturally responsive teaching (CRT) enhances critical thinking, empathy and engagement in diverse classrooms and thereby supports the development of sustainability competencies (Damianidou & Phtiaka, 2016; Ernawati et al., 2026; Rahmawati et al., 2019; Zeng et al., 2025). CRT draws on students' cultural backgrounds as resources for learning, promotes equity literacy and fosters awareness of social justice (Ghaemi & Boroushaki, 2025).

Studies in science education show that problem-based and ethnoscience approaches rooted in local culture can improve both critical thinking and cultural literacy (Ernawati et al., 2026; Rahmawati et al., 2019). Empathy can be deliberately cultivated through critical pedagogy and through understanding students' perspectives (Damianidou & Phtiaka, 2016), while CRT-focused professional development increases teachers' self-efficacy (Brazil et al., 2025). Mixed methods evidence further suggests that culturally responsive teaching combined with identity affirmation improves student outcomes in diverse settings (Zeng et al., 2025). Culturally responsive pedagogies are therefore essential to inclusive sustainability education, as they validate diverse identities and promote psychosocial safety.

4.5 Whole-School and Interdisciplinary Approaches

Whole-school strategies and interdisciplinary curriculum models embed life skills and sustainability education across subjects and school structures, fostering holistic competency development (Faragó et al., 2026; Gan & Alkaher, 2021; Karaarslan-Semiz & Sund, 2026; Shen et al., 2025). Research on green schools in Sweden and Türkiye, and on school culture in Israel, highlights leadership commitment, teacher professional development and community partnerships as critical conditions (Gan & Alkaher, 2021; Karaarslan-Semiz & Sund, 2026). Interdisciplinary models that introduce sustainability themes into courses beyond environmental science enhance knowledge integration and communication (Braßler & Sprenger, 2021; Liu et al., 2022), and interdisciplinary project work in chemistry education illustrates how such integration can be achieved within existing subjects (Nguyen et al., 2026; Shen et al., 2025). These findings indicate that systemic, collaborative and interdisciplinary strategies are necessary for sustainable and impactful integration, rather than isolated modules or extracurricular activities.

4.6 Teacher Professional Development and Support

4.6.1 Models of Teacher Support

Teacher training and ongoing professional development are catalysts for sustaining the integration of life skills in sustainability curricula (Candeias et al., 2024; Dolev & Leshem, 2016; Foster & Foster, 2023; Lavy et al., 2024; Rahmi & Rassanjani, 2025). Coaching and emotional intelligence training enhance teachers' well-being, self-efficacy and emotional regulation (Candeias et al., 2024; Dolev & Leshem, 2016). Reflective practice supports self-reflection and critical thinking among pre-service teachers (Fuertes-Camacho et al., 2021), and strengths-based school support increases teachers' engagement and motivation (Lavy et al., 2024). Evidence from Indonesia links teacher professional development directly with progress towards SDG target 4.c on the supply of qualified teachers (Rahmi & Rassanjani, 2025). These findings suggest that teachers can model the life skills they are expected to develop in students only if their own socio-emotional capacities are also supported.

4.6.2 Professional Development for Experiential and Action-Oriented Pedagogies

Targeted professional development enables teachers to adopt experiential, action-oriented and transformative pedagogies for sustainability education (Ajani, 2023; Ghanem et al., 2026; İlhan et al., 2026; Murphy et al., 2020). Murphy et al. (2020) found that a professional development programme in inquiry-based science increased teachers' self-efficacy and competence in teaching about sustainability. Experiential learning within professional development improves pedagogical content knowledge and classroom practice (Ajani, 2023), and creative projects such as teacher-produced digital comics on SDG themes offer accessible entry points (İlhan et al., 2026). Teacher action competence, however, requires not only knowledge but also motivation and a willingness to act (Vukelić, 2022). Educator competence frameworks for sustainability education reinforce the view that professional development should be continuous, context-responsive and aligned with teachers' actual needs if teachers are to act as agents of change (Corres et al., 2020).

4.7 Equity: Gender and Spatial Inclusion

4.7.1 Gender and Spatial Disparities

Gender and spatial (urban and rural) disparities significantly affect the acquisition of life skills and sustainability competencies (Bhanu et al., 2025; Boned-Gómez et al., 2025; Chakraborty et al., 2024). Research on secondary education in India by Chakraborty et al. (2024) has shown that social sustainability skills vary across gender and

spatial contexts. Female students often display greater sustainability awareness yet encounter more limited access to resources and opportunities (Aljaaidi et al., 2025; Boned-Gómez et al., 2025), reflecting the multidimensional nature of gender dynamics documented in development research more broadly (Miruka et al., 2016). Rural students frequently attend under-resourced schools and face regional inequalities in educational provision (Liu, 2022; Qian et al., 2026), and urban and rural disparities are recognised as a significant dimension of sustainable development planning at the societal level (Baffoe et al., 2021).

4.7.2 Gender-Sensitive and Inclusive Curriculum Strategies

Gender-sensitive and spatially inclusive curricular strategies can reduce these disparities and promote more equitable development of sustainability competencies (Boned-Gómez et al., 2025; Chakraborty et al., 2024; Escobedo et al., 2025; Ferreras-Garcia et al., 2022; Webb et al., 2025). Gender-sensitive approaches have been associated with enhanced sustainability awareness and competencies among female students (Aljaaidi et al., 2025; Boned-Gómez et al., 2025). Inclusive curriculum adaptations recognise student heterogeneity and promote accessibility as a strategy for achieving the SDGs in education (Escobedo et al., 2025), and curricula that integrate gender equality with sustainability can foster action competence, as demonstrated through analysis of Swedish lower secondary textbooks (Biström & Lundström, 2021). Gender-transformative interventions in early adolescence have also been shown to influence perceptions of gender norms (Beckwith et al., 2023).

4.7.3 Empowering Marginalised Learners

Programmes that empower rural, female and other marginalised learners through targeted life skills and sustainability education are critical (Beckwith et al., 2023; Bhanu et al., 2025; Gupta et al., 2024; Liu, 2022). The Life Enrichment Education curriculum developed for rural women in India, for example, integrates leadership, entrepreneurial and digital skills within vocational education (Bhanu et al., 2025). Curricula for economic autonomy need to incorporate decision-making skills aligned with local opportunities (Gupta et al., 2024), and attention to psychological support, including emotional well-being and the effects of microaggressions, is also needed (Suresh et al., 2024). Such empowerment strategies must be contextually adapted and supported by coherent policy and adequate resource allocation.

4.8 Barriers to Implementation

Despite the promise of the approaches described above, several systemic constraints impede effective integration. Analyses of national curricula in Spain and Portugal reveal fragmented and uneven treatment of sustainability (Suárez-López & Eugenio-Gozalbo, 2021). Curriculum overload, fragmented policies and limited teacher preparedness are recurrent barriers (Papavasileiou et al., 2025; Ramu & Thangavel, 2026; Zaca & Dube-Xaba, 2026), and a survey of higher education institutions in South India identified similar constraints on SDG integration (Ramu & Thangavel, 2026). Teachers implementing challenge-based learning report tensions between innovative pedagogy and existing assessment and timetabling structures (Schutte et al., 2025). Conversely, strategic planning, resource provision, collaborative governance and teacher leadership emerge as critical enablers (J. P. Leal et al., 2026; Papavasileiou et al., 2025; Wamsler & Janss, 2025; Widodo et al., 2026). These findings underline that pedagogical innovation cannot be sustained without supportive institutional and policy conditions.

5. Implications for Curriculum and Teaching Practice

5.1 Curriculum Design

The findings suggest that curriculum design should be holistic, interdisciplinary and equity-focused, embedding life skills and sustainability across subjects and school structures rather than confining them to a single subject or co-curricular slot (Cavka, 2025; Nguyen et al., 2026; Papavasileiou et al., 2025). Sustainability themes can be mainstreamed within existing disciplinary lessons through systems thinking approaches (Nguyen et al., 2026), and interdisciplinary integration fosters holistic learning (Liu et al., 2022; Shen et al., 2025). Curricula should also incorporate gender-sensitive and spatially inclusive adaptations to ensure equitable access and competency development (Boned-Gómez et al., 2025; Escobedo et al., 2025).

5.2 Teaching Practice

Teaching practice at the higher secondary level should prioritise active, experiential and culturally responsive pedagogies. Project-based learning, design thinking and real-world problem solving appear most effective in developing sustainability competencies and life skills (Agustira et al., 2025; Ahmad, 2025; Ásványi & Gedeon, 2025). Teachers should design learning experiences around authentic local sustainability issues, such as water use, waste management, livelihoods or biodiversity, which require students to collaborate, communicate, weigh evidence and make decisions. Structured reflection and attention to students' emotional responses to sustainability challenges should form part of these experiences (Wickson et al., 2025).

5.3 Teacher Education and Professional Development

Continuous and context-responsive professional development is needed to empower teachers as agents of change (Murphy et al., 2020; Rahmi & Rassanjani, 2025). Such development should combine pedagogical training in experiential and project-based methods with support for teachers' own emotional intelligence and reflective practice (Candeias et al., 2024; Dolev & Leshem, 2016; Fuertes-Camacho et al., 2021). Mainstreaming the SDGs within initial teacher education curricula would help to ensure that new entrants to the profession are prepared for this role (J. P. Leal et al., 2026).

5.4 Whole-School Leadership and Policy

Whole-school strategies involving leadership commitment, teacher development and community partnerships are essential for institutionalising sustainability education (Gan & Alkaher, 2021; Karaarslan-Semiz & Sund, 2026). Educational policy should prioritise inclusive, context-specific strategies, robust teacher training and systemic support, and should address the curriculum overload and policy fragmentation that currently constrain practice (Papavasileiou et al., 2025; Ramu & Thangavel, 2026).

5.5 Implications for the Indian Higher Secondary Context

These implications have particular relevance for India. The National Education Policy 2020 emphasises experiential learning, critical thinking, life skills and environmental awareness, and calls for reduced curricular content in favour of deeper, competency-based learning (Ministry of Human Resource Development, 2020). The findings of this review suggest that these commitments would be strengthened by explicitly linking life skills outcomes to sustainability competencies at the higher secondary stage, by supporting teachers through sustained professional development rather than one-off training, and by attending to the gender and rural and urban disparities documented in Indian research (Bhanu et al., 2025; Chakraborty et al., 2024; Ramu & Thangavel, 2026). For states in the North-East such as Tripura, where schools serve diverse rural, tribal and linguistic communities, culturally responsive and locally grounded approaches may be especially valuable.

6. Limitations of the Review

Several limitations should be acknowledged. First, the reviewed literature is predominantly drawn from Europe and the Global North, with limited representation of other cultural contexts, which constrains the generalisability of the findings. Second, much of the strongest evidence, particularly on pedagogical approaches, derives from higher education, and fewer studies focus specifically on the higher secondary stage; evidence on early childhood and primary education was outside the scope of this review. Third, longitudinal evidence of impact and scalable instruments for assessing life skills and sustainability competencies remain underdeveloped. Fourth, collective competencies and emotional dimensions, such as eco-anxiety, are not yet fully operationalised in existing frameworks. Finally, the review relied on a single database and on AI-assisted identification of sources, and a systematic review following established reporting guidelines would be a valuable extension of the present work.

7. Directions for Future Research

The review identifies several priorities for future research:

- Longitudinal and cross-cultural studies that empirically connect life skills training with sustainable behaviour change over time (Corres et al., 2020; J. P. Leal et al., 2026; Wamsler & Janss, 2025; Wickson et al., 2025).

- The development and validation of frameworks for collective competencies and emotional dimensions of sustainability learning, including eco-anxiety (Elmassri et al., 2025; Hvalby et al., 2024; S. Leal et al., 2026; Wiek & Redman, 2022).
- Innovative assessment tools capable of capturing the social, emotional and collaborative dimensions of competence (Klingenberg et al., 2025; Wiek & Redman, 2022).
- Research on digital and blended pedagogies for integrating life skills with sustainability education.
- Studies of institutional and policy barriers, and of effective leadership and governance, in diverse educational systems, including the Global South (Papavasileiou et al., 2025; Ramu & Thangavel, 2026; Zaca & Dube-Xaba, 2026).
- Empirical studies located specifically in higher secondary classrooms, particularly in India and other under-represented contexts.

8. Conclusion

This review has examined the role of life skills in developing sustainable development competencies among higher secondary students. The synthesis indicates that life skills are fundamental to fostering sustainability competencies: critical thinking, problem solving, communication, empathy, resilience and emotional intelligence provide the everyday capacities through which students translate sustainability awareness into informed and ethical action. Effective educational strategies integrate experiential and project-based learning with interdisciplinary curricula that address both cognitive and socio-emotional dimensions. Teacher professional development and inclusive pedagogical frameworks are critical to overcoming systemic and structural barriers, particularly those relating to gender and spatial disparities (Ahmad, 2025; Edjah et al., 2026; S. Leal et al., 2026).

The transformative potential of integrating life skills with sustainability education is considerable. Realising it, however, demands systemic change, collaborative leadership, and sustained investment in teacher capacity and inclusive curriculum design. For curriculum developers, teachers and policymakers, the central message is that life skills should be treated not as an optional supplement to the academic curriculum but as the connective tissue through which sustainability competencies are developed.

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