



Fragmentation and Integration in Educational Research: A Systematic Review of Self-Efficacy, Character, and Green Education

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Abstract: This study addresses the fragmentation of research on self-efficacy, character building, and green education, which are often examined separately despite their potential interconnection in shaping holistic learners. The objective of this study is to synthesize how self-efficacy and character education are positioned within the framework of green education and to identify their integrative potential. A systematic literature review was conducted using the PRISMA 2020 protocol with Scopus as the primary database. Two keyword strategies were applied, yielding 174 records, of which 33 peer-reviewed Q1-Q3 articles met the inclusion criteria. Data were analyzed using thematic synthesis based on research focus, methodology, educational level, and main findings. The results reveal three dominant but fragmented clusters: self-efficacy as a psychological construct for academic confidence, character education as moral and social development, and green education as curricular and institutional innovation. The synthesis further shows that green education provides a promising context for integrating self-efficacy and character through sustainability-based learning experiences. In conclusion, this study proposes an integrative framework in which psychological confidence, moral formation, and ecological awareness interact to support transformative education in primary and secondary schools.

Keywords: Character building; Green education; Self-efficacy; Systematic literature review

Introduction

Green education has increasingly assumed a strategic position within global educational discourse, responding to the urgent need to integrate sustainability values into learning systems. Reports by UNESCO (2023) and the 2030 Agenda emphasize that modern education must move beyond the cognitive dimension and begin to focus on cultivating ecological awareness, ethical responsibility, and the capacity for transformative action (Calp & Bütüner, 2022). In various international forums such as COP26, the G20 Education Ministers' Meeting, and the Global Education Monitoring Report, green education is recognized as a

primary catalyst for achieving the Sustainable Development Goals, particularly SDG 4.7, which highlights the importance of education that promotes human rights, global citizenship, and sustainable development (Akman & Erdirençelebi, 2024). Green education is no longer viewed as a peripheral aspect of education but has become a central framework for curriculum reorientation and pedagogical practice, especially at the primary level, where foundational values and long-term awareness are developed (Su & Zhao, 2023). This global orientation reflects a universal scientific concern that education must respond not only to academic demands, but also to ethical, social, and ecological responsibilities.

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The shift in educational paradigms over the past decade has demanded a move from knowledge transmission models toward approaches that nurture critical consciousness, sustainability commitment, and socio-ecological responsibility. Education can no longer be confined to delivering facts and scientific concepts, it must equip learners with the capacity to make value-based decisions, form moral identities, and engage in collective empowerment to address planetary challenges (Chen et al., 2017). Initiatives such as Education for Sustainable Development, Global Citizenship Education, and green education have become integral to global strategies for preparing future generations who are intellectually capable, ecologically conscious, and socially engaged (Lu, 2024). In the context of primary education, this transformation carries particular urgency because primary school years serve as a critical phase for forming cognitive structures, attitudinal patterns, and affective values that shape character and life orientation. At this stage, green education functions as a pedagogical tool to embed sustainability values through concrete, reflective, and contextually grounded learning experiences, including the integration of environmental issues into subject matter, project-based learning, and the cultivation of eco-pedagogical school cultures (Hanisch & Eirdosh, 2023).

The effectiveness of green education, however, is closely tied to students' psychological readiness and internal capacity. Self-efficacy plays a key role in bridging learning experiences with meaningful action. It refers to individuals' beliefs in their ability to organize and carry out actions needed to achieve specific goals. At the primary level, self-efficacy relates closely to learning motivation, autonomy, persistence, and the ability to overcome academic and social challenges (Alonso-García et al., 2024). Beyond psychological aspects, character education has long served as the backbone of primary education. Its main objective is to instill moral and social values that shape students' behavior in everyday life. Values such as honesty, responsibility, integrity, and empathy serve as the pillars of children's character development. In the Indonesian context, these values are formalized through national policies such as the Pancasila Student Profile, which outlines the ideal character of 21st-century learners (Hursen et al., 2023). It emphasizes independence, collaboration, critical thinking, spiritual awareness, and global cultural competence. When character education is aligned with sustainability principles, it opens possibilities for fostering ecological character that respects both human relationships and the planet's ecological limits.

Global literature shows significant developments in the study and implementation of green education, self-

efficacy, and character education. Green education contributes to increased ecological literacy, student engagement in environmental action, and the transformation of school culture. Self-efficacy has been linked to academic success, learning resilience, and social engagement (Baas et al., 2020). Character education continues to be a major focus in moral and values-based curriculum development, implemented through formal learning as well as school culture. Each of these approaches contributes significantly to the realization of holistic and future-oriented education. However, as these approaches continue to evolve, a critical problem emerges regarding how they are positioned within the literature. Research on green education has predominantly emphasized curriculum policy and instructional innovation, but has often neglected students' internal capacities such as agency, resilience, and confidence. Studies on character education have largely focused on moral and social values, without adequately situating these within eco-pedagogical or sustainability-oriented frameworks. Meanwhile, scholarship on self-efficacy has typically explored its relationship with academic achievement and learning motivation, while giving limited attention to its role in shaping pro-environmental behaviors and sustainable practices (Julistiyana et al., 2025).

This conceptual fragmentation raises fundamental research questions. Can green education function as a pedagogical space that simultaneously develops character and strengthens student self-efficacy? Do the character values taught in schools lead to ecological awareness and sustainable behaviors? How can psychological dimensions such as self-efficacy serve as mechanisms that transform ecological knowledge into impactful behavior? These questions indicate a theoretical and empirical gap in current educational research, particularly within the context of primary education, where sustainability values, psychological development, and moral formation should ideally evolve in an integrated manner.

Building on this gap, this study offers a novel contribution by positioning green education as an integrative framework that connects self-efficacy and character education within a unified conceptual synthesis. Unlike previous studies that tend to treat these three domains separately, this research systematically maps their intersections through a Systematic Literature Review (SLR) guided by the PRISMA 2020 protocol using 33 Scopus-indexed articles (Q1 to Q3). The novelty of this study lies in its integrative perspective, which bridges psychological confidence, moral formation, and ecological awareness within primary and secondary education contexts. This integration is urgently needed to respond to contemporary educational challenges, where students

are required not only to achieve academically but also to become confident, ethical, and environmentally responsible global citizens. Therefore, this study is expected to contribute theoretically to the development of integrative educational frameworks and practically to the design of sustainability-oriented pedagogical strategies for teachers, curriculum developers, and policymakers (Angganing et al., 2023).

Method

This study employed a Systematic Literature Review (SLR) design guided by the PRISMA 2020 protocol, ensuring transparency and replicability in the identification, screening, and inclusion of studies. The review specifically investigated the intersection of self-efficacy and character building within the framework of green education, with a focus on primary and secondary educational contexts (Raihan et al., 2025). The database selected was Scopus, given its comprehensive indexing of peer-reviewed international journals across educational and interdisciplinary fields.

Two sets of search queries were applied to capture relevant studies. The first query (Keywords 1) combined "self-efficacy" AND "character building", yielding 11 records. The second query (Keywords 2) employed broader environmental and pedagogical terms, such as "green education" OR "environmental education" OR "permaculture pedagogy" and was refined using Scopus filters for subject area (Social Sciences), document type (Articles), publication stage (Final), and language (English), which yielded 163 records. Together, these searches identified an initial 174 articles.

Database and Search Strategy

The Scopus database was selected due to its comprehensive indexing of peer-reviewed international journals. Two sets of keywords were applied. *Keywords 1* combined "self-efficacy" AND "character building" (n

= 11). *Keywords 2* employed broader terms such as "permaculture pedagogy" OR "green education" with additional Scopus filters for subject area (Social Sciences), document type (articles), and language (English), yielding 163 records. Together, 174 initial records were identified.

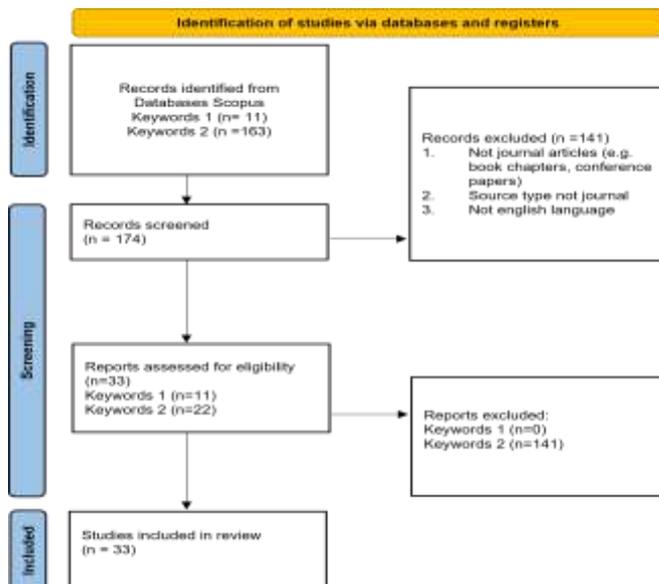


Figure 1. Prisma flowchart

Inclusion and Exclusion Criteria

The inclusion criteria comprised: (1) studies explicitly addressing self-efficacy and/or character building, (2) studies situated in the framework of green education or environmental education, (3) articles published in peer-reviewed Scopus-indexed journals (Q1-Q3), and (4) written in English. Exclusion criteria were: (1) non-journal sources such as book chapters or conference proceedings (n = 32), (2) non-peer-reviewed publications (n = 27), (3) non-English articles (n = 20), and (4) studies irrelevant to self-efficacy, character education, or green education (n = 62). Following exclusions, 33 articles remained eligible for review.

Table 1. Inclusion and Exclusion Criteria

Criteria	Description (with n=)
Search terms	Keywords 1: "self efficacy" AND "character building" (n=11) Keywords 2: "permaculture pedagogy" OR "green education" + filters (Education, Green Education, Students, Climate Effect) (n=163) Total records identified = 174
Identification - Exclusion	Records screened (n=174) → After exclusion, assessed for eligibility (n=33) Records excluded (n=141): 1) Not journal articles 2) Not peer-reviewed journal 3) Not English language
Screening	Reports assessed for eligibility (n=33): - Keywords 1 (n=11) - Keywords 2 (n=22)
Eligibility	Studies included in final review (n=33)
Inclusion	Limited to Social Sciences (n=22)
Subject Area	

Criteria	Description (with n=)
Document type	Articles only (n=22)
Language	Limited to English (n=22) Green Education (n=17) Education (n=9)
Keywords (Scopus Filter)	Students (n=0) Climate Effect (n=0) Studies explicitly addressing self-efficacy and/or character education (n≈11) Studies situated in the framework of green education, ESD, or environmental education (n≈22) Published in peer-reviewed Scopus journals, final publication stage
Inclusion Criteria	Written in English Records excluded at identification stage (n=141, total): Not journal articles (conference papers, book chapters, etc.) n=32 Not peer-reviewed journal source type n=27 Non-English language n=20 Keywords 2 irrelevant (did not align with green education focus) n=62
Exclusion Criteria	Studies unrelated to self-efficacy, character education, or green education
Quality Benchmark	Journal rank: Scopus indexed (Q1-Q3, emphasis on education & sustainability)

From the total of 174 records initially identified, 141 were excluded at the identification and screening stage due to reasons such as duplication, non-English language, non-peer-reviewed sources, and irrelevance to the focus on self-efficacy, character building, or green education. This process resulted in a final pool of 33 eligible articles, consisting of 11 studies from Keywords 1 and 22 studies from Keywords 2. All selected articles demonstrated thematic relevance, methodological clarity, and alignment with the research objectives, thereby ensuring the robustness of the final dataset.

The included studies were then subjected to a structured quality assessment. Only Scopus-indexed journals ranked between Q1 and Q3 were retained to guarantee academic rigor. Data extraction was carried out systematically by coding each article’s objectives, methodological approach, sample characteristics, and key findings related to self-efficacy, character building, and green education. These data were organized into a synthesis matrix to enable comparative reading and thematic clustering. Subsequently, a thematic synthesis was employed to identify convergences and divergences across the studies, mapping how self-efficacy and character formation are positioned within educational practices of green education and highlighting both fragmentation and emerging opportunities for integrative frameworks.

Results and Discussion

Literature Fragmentation: Self-Efficacy, Character Education, and Green Education

A systematic analysis of the thirty-three articles identified in this review reveals a clear pattern of fragmentation within three primary clusters, namely self-efficacy, character education, and green education. These clusters have evolved with distinct focuses and

contributions, generating a rich but disconnected body of discourse. This indicates that potential integrations among psychological, moral, and ecological dimensions remain underexplored, thus opening opportunities for future research to build meaningful connections.

The first cluster, self-efficacy, concentrates on individuals’ beliefs in their abilities to complete tasks, make decisions, and overcome learning challenges. Six articles in this cluster highlight the role of self-efficacy in influencing academic performance, learning motivation, and the professional preparedness of both students and teachers. For example, Prasetia et al. (2024) emphasized that direct field experience during teacher education programs significantly enhances pedagogical self-efficacy, thereby reinforcing professional identity. A similar finding is presented by Kazi et al. (2018), who noted that active participation in school culture fosters not only social solidarity but also students' confidence in engaging with classroom interactions and decision-making. The primary focus in this cluster lies in strengthening psychological and cognitive dimensions. Students with high self-efficacy exhibit greater confidence in approaching tasks, persistence in solving problems, and openness to academic challenges (Machida-Kosuga et al., 2025). However, studies in this domain rarely link self-efficacy with sustainability concerns or ecological awareness.

The second cluster, character education, holds a central place in the discourse of primary education due to its direct relevance to the formation of students’ values, attitudes, and behaviors. Five articles focus on this theme, emphasizing moral development, discipline, social responsibility, and personal integrity. For instance, Teques et al. (2019) highlight how school culture serves as an effective medium for instilling character values in elementary students. Batugal (2020) underscore that character education is an integral

component of achieving quality education in alignment with the Sustainable Development Goals, particularly inclusive and equitable education. Furthermore, Kazi et al. (2018) found that integrating character values into civic education significantly contributes to the development of citizenship attitudes and social concern from an early age. These findings indicate that character education in Indonesia is implemented not only through formal curricula but also through daily practices in schools. Nonetheless, despite its contributions to morality and social development, most research still situates character education within general moral domains such as discipline, responsibility, and honesty, without explicitly articulating ecological values like environmental care, sustainability consciousness, or ecological ethics, all of which are becoming increasingly critical.

The third and most dominant cluster is green education, or education for sustainable development (ESD), represented by nineteen articles. These studies primarily focus on ecological literacy, curriculum transformation, and institutional innovation to support the sustainability agenda. Prasetia et al. (2024) emphasized the role of digital transformation in enhancing the quality of sustainability-oriented learning. Su et al. (2023) described how Islamic educational management can serve as a foundation for post-pandemic recovery by emphasizing principles of sustainability. Another study by Chen et al. (2017) explored the relevance of Society 5.0 in integrating technology into education systems in ways that support ecopedagogical agendas. A related contribution by Prasetia et al. (2024) examined teachers' strategies in responding to digital transformation to ensure that learning remains adaptive to new era demands. Overall, the articles in the green education cluster reflect significant momentum in structural and institutional innovation. However, these studies rarely address psychological outcomes such as self-efficacy or moral dimensions such as character development among students.

The depiction of these three clusters reveals that educational literature is currently evolving with distinct thematic emphases. Self-efficacy studies prioritize academic and professional confidence. Character education research emphasizes moral and social development. Green education literature primarily addresses curriculum design, technology integration, and institutional transformation. This pattern of fragmentation suggests that connections among psychological, moral, and ecological dimensions have not yet been comprehensively mapped within existing research. Nevertheless, these dimensions hold substantial potential for mutual reinforcement. Self-efficacy can empower students to take initiative as

change agents. Character education can provide the moral foundation for responsible behavior. Green education can offer curricular frameworks and real-world contexts to internalize sustainability values.

From a global perspective, these findings are relevant to the Sustainable Development Goals, particularly Target 4.7, which emphasizes the importance of education for sustainable development, and to UNESCO's initiatives on Global Citizenship Education. The fragmentation observed in this literature review presents a valuable opportunity for future studies to bridge these three clusters, thereby advancing an educational model that not only produces academically competent students but also fosters character and agency in addressing sustainability challenges. Thus, this analysis of fragmentation not only describes the current state of the literature but also opens a space for reflection on new directions for theoretical development and educational practice.

Green Education as a Medium for Enhancing Self-Efficacy

Green education has proven to be a learning space that enables students to build confidence in facing academic challenges and real-world problems. Several studies affirm that sustainability-oriented learning practices do not only enhance ecological understanding, but also foster learning experiences that strengthen self-efficacy (Shi, 2017). In this context, self-efficacy serves as a bridge that connects academic concept mastery with the belief in one's ability to take real-life action, particularly in relation to environmental issues.

Some studies have demonstrated that curriculum transformation towards green education has a significant impact on student engagement. For instance, Da Costa et al. (2025) emphasized that the integration of digital technology into sustainability-oriented learning expands students' access to learning resources while also creating collaborative projects that enable students to feel capable of solving environmental problems. These project-based learning experiences represent mastery experiences, which are key sources for the development of self-efficacy. This finding is supported by Yu et al. (2019), who reported that education management with a sustainability perspective helps students build confidence in managing their own learning processes and increases their readiness to face complex socio-ecological challenges.

In addition to curriculum transformation, the role of teachers is crucial in reinforcing student self-efficacy through green education. Myers et al. (2005) found that teacher strategies in navigating digital transformation create learning environments that promote exploration and student initiative. When teachers offer opportunities for students to try, experiment, and engage actively, they create challenging yet supportive learning experiences.

Such environments reinforce students' perceptions that they are capable of understanding content, making decisions, and solving problems. Self-efficacy is cultivated when students recognize that their efforts in completing sustainability-oriented tasks are valued and impactful.

Self-efficacy development is also evident at the level of teachers and pre-service teachers. Teaching practices that integrate sustainability themes contribute to professional self-confidence, encourage teacher readiness to act as change agents, and facilitate the internalization of sustainability values among students. Teachers with high self-efficacy tend to be more confident in using innovative approaches such as environmentally based project-based learning or collaborative instruction to address ecological issues. In this regard, green education functions not only as a curricular framework but also as a platform for teachers to strengthen their professional confidence in implementing transformative pedagogy.

Furthermore, articles in the green education cluster highlight the importance of institutional support. Digital transformation and school policies that promote sustainability provide broader opportunities for both students and teachers to experiment and innovate. A supportive school environment, such as the implementation of eco-school programs or ESD-based curricula, encourages students to actively participate in environmental projects while reinforcing their belief that they can contribute to real-world solutions (Hou et al., 2020; Yin et al., 2024).

These findings illustrate that self-efficacy is not formed solely through individual experience, but also strengthened by an educational ecosystem that enables students to witness the outcomes of their actions.

Although much of the literature in the green education cluster still centers on curriculum, technology, and institutional aspects, there is a growing trend indicating that sustainability-based educational practices tend to yield psychological effects, particularly increased self-efficacy. Students who engage in environmental projects acquire authentic experiences that cultivate their confidence to address real problems. Teachers supported by flexible curricula and responsive policies become more confident in implementing innovative instructional approaches. This relationship underscores the role of green education as a learning space where cognitive, affective, and psychological dimensions converge within a single educational framework.

In the global context, the link between green education and self-efficacy aligns with UNESCO's agendas on Education for Sustainable Development and Global Citizenship Education. These agendas emphasize the importance of developing personal capacities that

empower individuals to respond confidently to global issues. Sustainability education embedded within the curriculum not only fosters ecological literacy but also shapes students' belief in their ability to play an active role in environmental stewardship (Al-Karasneh et al., 2025; Xiao, Duritan et al., 2024).

This body of literature demonstrates that green education serves not merely as a curricular or policy instrument. It functions as a medium through which students develop self-efficacy via meaningful learning experiences, collaborative projects, and supportive learning environments. Teachers and pre-service teachers also gain professional self-efficacy as they integrate sustainability issues into their pedagogical practices. Therefore, green education can be understood as a domain in which self-confidence and ecological competence intersect, providing a foundation for transformative learning that responds to the demands of the twenty-first century.

Character Formation within the Framework of Ecopedagogy

Character education has long stood as one of the fundamental pillars of educational practice, particularly at the primary school level, which serves as the foundation for shaping students' personalities. An analysis of the articles within this category reveals significant attention to character education, both through curricular integration and school culture. While the literature demonstrates a meaningful contribution to moral and social value formation, most studies still conceptualize character within conventional domains such as discipline, responsibility, and honesty, with limited emphasis on ecological dimensions. Within the ecopedagogical framework, however, character education should be understood as a process that also internalizes environmental concern. Character, in this sense, is not only about cultivating harmonious social relationships but also about fostering a commitment to ecological sustainability.

School culture emerges consistently in the literature as an effective medium for character formation. Imron et al. (2023) affirm that school-based cultural activities, such as habituation programs and collective rituals, are instrumental in cultivating students' discipline and social solidarity. These activities generate behavioral patterns that gradually transform into a shared identity, thereby shaping resilient character rooted in daily social interaction. Similarly, Benawa (2022) demonstrate that schools implementing character culture systematically are able to foster a sense of individual responsibility while also reinforcing group cohesion. These findings indicate that character education can be cultivated not only through formal curricula but also through daily school practices that shape positive habits.

In addition to school culture, the integration of character education into formal curricula is also a key concern. Boardley et al. (2008) highlight the role of Civic Education as a crucial platform for instilling values such as social responsibility, compassion, and civic discipline from an early age. Studies by Cheng et al. (2024) and Xiao et al. (2024) show that value-based learning within the curriculum can foster students' responsibility in the learning process and promote moral integrity. This demonstrates that character education can be systematically embedded within instructional activities, rather than being relegated to extracurricular or supplemental programs. Thus, curriculum and school culture mutually reinforce the foundation of students' character development.

The literature also indicates a growing linkage between character education and broader educational development agendas. Benawa (2022) asserts that character education plays a vital role in improving educational quality within the context of sustainable development. Character is increasingly viewed as a component of inclusive and equitable education, aligned with global demands. In parallel, (Imron et al., 2023) discuss the implementation of the Pancasila Student Profile policy as a strategic effort to institutionalize character values within the long-term vision of national education. These studies suggest that character education in Indonesia is being reoriented not only towards individual development but also towards contributing to the broader goals of transformative education.

Nevertheless, the ecological dimension of character education remains underrepresented. A few studies have begun to explore this direction, such as research by Mohiuddin et al. (2014), which underscores that environmental awareness can be instilled through character-based learning, particularly in fostering care for cleanliness and local ecosystems. This study provides evidence that ecological values can be embedded within character-building programs, although such efforts remain marginal and have yet to become mainstream. Adding to this perspective, Hou et al. (2020) and Yin et al. (2024) explore nature-based schools where direct student interaction with the environment cultivates resilient, creative, and sustainability-oriented character. Their studies suggest that ecopedagogical approaches may serve as an avenue for directing character education toward ecological consciousness.

Ecopedagogy, as an approach that integrates sustainability values into the educational process, offers an opportunity to expand the scope of character education. Traditional values such as honesty, discipline, and social responsibility can be broadened to include environmental concern, sustainability ethics, and ecological accountability. In this way, character is no

longer seen solely as an individual moral attribute but also as a collective commitment to environmental stewardship. Schools can function as socio-ecological laboratories where students not only learn about sustainability concepts but also develop environmentally conscious habits that become embedded in their character Yue et al. (2024).

This analysis reveals that such integration remains relatively limited in the existing literature. Most studies still prioritize general moral and social dimensions, while ecological character tends to be treated as an ancillary concept. However, this trend signals a promising direction for the expansion of character education through an ecopedagogical lens. By integrating ecological values, character education can better prepare students to face contemporary global challenges, including environmental crises and climate change. These challenges require not only cognitive competencies but also personalities grounded in sustainability commitment.

Therefore, character formation within the framework of ecopedagogy presents an opportunity to cultivate a generation that is not only ethically sound in social relations but also deeply aware of ecological realities. The existing literature demonstrates that schools have already laid a strong foundation for instilling moral and social values. The next challenge is to systematically develop the ecological dimension. Doing so will not only enrich the conceptual understanding of character education but also render it more relevant in a world increasingly shaped by sustainability imperatives.

Towards an Integrative Framework: Self-Efficacy and Character through Green Education

Current educational literature remains largely fragmented. Self-efficacy is often emphasized as a psychological construct, character education is situated within the moral and social domains, while green education is primarily positioned as a matter of curriculum and institutional innovation. This fragmentation has limited the exploration of potential synergies among these dimensions, even though each holds complementary strengths. The systematic analysis conducted in this study reveals a new direction, namely the necessity of constructing an integrative framework that positions green education as a platform to bridge self-efficacy and character education within a holistic educational process.

Several studies provide initial indications of this integrative potential. Tu et al. (2017) demonstrate that digital transformation in sustainability-oriented learning not only enhances ecological literacy but also fosters students' confidence in addressing environmental challenges. Collaborative projects

facilitated through digital platforms create authentic learning experiences that reinforce students' belief in their own capabilities. On the other hand, Tsorbatzoudis et al. (2003) emphasize that school culture serves as a vehicle for internalizing values such as responsibility and solidarity, which can be extended to form the basis of ecological character. These findings suggest that psychological elements such as self-confidence and moral dimensions such as character can flourish in tandem when situated within sustainability-based learning environments.

Integration is also reinforced in studies that link character education with broader educational development agendas. Kupper et al. (2012) highlight the role of character in fostering high-quality and equitable education. Similarly, Tubbs (2018) provide empirical evidence that environmental concern can be embedded within character education practices in schools. If this connection is extended to include self-efficacy, the concept of ecological character gains additional strength, as students not only internalize environmental values but also develop the confidence to act upon them. In this sense, character without self-efficacy risks remaining at the level of discourse, while self-efficacy without ecological character may become overly self-serving and disconnected from communal responsibility.

Teachers and pre-service teachers occupy a strategic position in constructing this integrative framework. Batugal (2020) underscore that field teaching experiences significantly enhance pre-service teachers' pedagogical self-efficacy. Simultaneously, Kazi et al. (2018) show that consistent school culture contributes to the development of students' character. If teachers with high self-efficacy implement sustainability-based learning, they not only facilitate the transfer of environmental knowledge but also help students internalize ecological responsibility. In this context, teachers serve not merely as facilitators but also as role models who integrate psychological, moral, and ecological dimensions in everyday educational practices.

The proposed integrative framework may be conceptualized as the intersection of three foundational dimensions. Self-efficacy provides the psychological basis that enables students to face challenges with confidence. Character education establishes the moral and social compass that guides students in making ethical decisions (Mosca et al., 2024). Green education offers real-world contexts through curriculum design, environmental projects, and community-based activities, thereby allowing these psychological and moral dimensions to be internalized through concrete learning experiences. As a result, students are not only educated about the importance of sustainability but are

also empowered with the confidence to act and the character to act ethically.

However, developing this framework requires a more sophisticated methodological approach. Much of the current research remains descriptive or based on basic quantitative methods, which are insufficient to capture the long-term dynamics of self-efficacy and ecological character development. Longitudinal studies are needed to trace how repeated experiences in green education shape students' belief systems and behavioral patterns over time. Classroom ethnography may also serve as a valuable tool for examining how daily school interactions contribute to the formation of ecological character. A combination of quantitative and qualitative data would provide a more comprehensive understanding of how psychological, moral, and ecological dimensions intersect in educational practice.

The implications of this integrative framework are far-reaching. For schools, it provides direction for designing programs that transcend academic achievement by linking students' confidence with sustainability-oriented character development. Initiatives such as eco-schools, the integration of the Pancasila Student Profile with ecological values, and environmental project-based learning can serve as concrete implementation strategies. For teachers, the framework supports the development of professional self-efficacy and promotes confidence in embedding sustainability issues into teaching strategies. For students, the framework enables the formation of personal identities that are confident, principled, and environmentally conscious.

Overall, the literature suggests that integrating self-efficacy and character education through the lens of green education is not only possible but necessary. These three dimensions complement one another. Self-efficacy provides the psychological strength to act, character education offers the moral direction for that action, and green education presents a contextual space where both can be exercised and internalized. Through this integrative framework, education can fulfill its transformative potential by cultivating a generation of learners who are confident, ethically grounded, and committed to sustainability.

Discussion

Key Findings

Twenty-first century education faces increasingly complex challenges, not only in preparing students with academic competencies but also in shaping confident, character-driven individuals who are environmentally conscious in the midst of global ecological crises. The literature analyzed in this study reveals that research on self-efficacy, character education, and green education is growing rapidly, although often developing within

distinct and fragmented scholarly spaces. Self-efficacy is primarily explored in relation to students' or pre-service teachers' confidence in handling academic and professional tasks. Character education focuses on moral values, discipline, responsibility, and social solidarity. Meanwhile, green education evolves along curricular, pedagogical, and institutional lines to support sustainability agendas. While this fragmentation highlights the unique contributions of each domain, it also underscores the need for a comprehensive framework that bridges these dimensions to address the demands of contemporary education.

Opportunities for integration begin to emerge when findings are read across clusters. Self-efficacy can be viewed as a psychological foundation that empowers students to face challenges with confidence. Character education provides the moral compass that ensures this confidence is not limited to personal achievement, but is directed toward socially rooted actions. Green education offers a concrete learning context in which both psychological and moral dimensions can be tested and internalized through meaningful, contextual experiences. Therefore, while fragmentation persists, the existing body of literature holds untapped potential for synergy, which could inform an integrative framework combining psychological, moral, and ecological dimensions.

Findings from the green education cluster demonstrate that sustainability-oriented learning can serve as a medium to enhance self-efficacy. Student engagement in environmental projects, whether through digital activities or community-based initiatives, provides authentic experiences that foster a sense of personal contribution. Xu et al. (2023) highlight that digital transformation in sustainability-based learning enhances student participation in environmental problem-solving. Sharabi (2024) adds that educational management rooted in sustainability supports students' learning autonomy while increasing their perceived ability to navigate complex social-ecological issues. Teachers also play a vital role in this process. Mosca et al. (2024) show that when teachers employ digital strategies effectively, they create spaces where students can experiment, take initiative, and experience success. For pre-service teachers, field experiences involving sustainability themes strengthen pedagogical self-efficacy and prepare them to confidently implement innovative teaching strategies. In this regard, green education contributes not only to curriculum content but also functions as a psychological arena that enhances both student and teacher self-belief.

In parallel, the character education literature consistently emphasizes the cultivation of moral and social values through both curriculum and school culture. Al-Karasneh et al. (2025) report that well-

managed school culture fosters discipline and solidarity. Gorai (2025) finds that sustainable character education programs enhance students' sense of responsibility toward their learning community. Underscores the role of Civic Education in shaping civic-minded attitudes, while Blaustein (2010) reports that value-based instruction promotes individual accountability in learning. These findings indicate that character education significantly contributes to the moral development of students. However, ecological dimensions within character education remain underrepresented. Alders (2018) positions character education as a pillar of quality education, and Imron et al. (2023) discuss the implementation of the Pancasila Student Profile policy to reinforce character values. A few studies are beginning to bridge character education with ecological awareness. For instance, Xiao et al. (2024) illustrate how environmental care values can be embedded in character education, and Teques et al. (2019) describe how nature-based schools foster resilient and environmentally conscious character. These insights affirm that ecopedagogy can expand the scope of character education, allowing students to develop not only ethical social behavior but also strong ecological awareness.

Synthesizing these three clusters suggests the need for an integrative framework that unites psychological, moral, and ecological dimensions. Self-efficacy provides the psychological strength necessary for students to face academic and life challenges with confidence. Character education offers moral grounding that guides their behavior, while green education presents authentic contexts in which confidence and character values can be exercised and internalized through meaningful learning experiences. The literature reviewed offers a strong foundation for such a framework. Benawa (2022) confirms the role of green education in building self-efficacy. Prasetia et al. (2024) demonstrate how school culture reinforces character formation. Imron et al. (2023) highlight opportunities for integrating environmental values into character education. Collectively, these studies show that integration is not only possible but increasingly urgent.

Establishing this integrative framework also requires a paradigm shift in research design. Most current studies are descriptive or based on basic quantitative methods, which are insufficient to capture the dynamic development of self-efficacy, character, and ecological consciousness. Longitudinal research is needed to trace the evolution of these dimensions over time. Classroom ethnography can uncover the daily interactions that shape students' values and beliefs. Mixed-methods approaches are particularly well suited to providing a more nuanced understanding of how psychological, moral, and ecological factors interact

within educational settings. By adopting richer methodologies, researchers can generate deeper insights and open new pathways for contextually grounded and applicable educational research.

This study shows that while literature on self-efficacy, character education, and green education has developed within strong but separate domains, cross-cluster readings reveal points of intersection that merit further exploration. Sustainability-oriented learning experiences provide spaces not only for strengthening confidence but also for internalizing character values. These diverse findings suggest that contemporary primary education offers not just a variety of approaches but also opportunities to reconceptualize psychological, moral, and ecological dimensions as interconnected parts of a unified educational process. The findings also indicate that such connections remain underexplored, leaving considerable room for future studies to examine the dynamics of this integration more comprehensively.

Comparison with Previous Studies

Prior systematic reviews focusing on self-efficacy and character education (Batugal, 2020; Prasetia et al., 2024; Myers et al., 2005) have largely emphasized the importance of moral and social values in shaping student dispositions. However, these studies rarely positioned such discussions within the broader framework of environmental sustainability. Parallel research on green education (Kupper et al., 2012; Xiao, Duritan, & Jia, 2024; Yu et al., 2019) has concentrated more on curriculum transformation and digital innovation, yet has remained limited in its engagement with psychological constructs such as student self-efficacy.

This study offers a more integrative perspective than earlier works by Yin et al. (2024) or Yue et al. (2024), which focused primarily on civic education or policy reform. By combining the ecological dimension of character education with the psychological function of self-efficacy, the present analysis constructs a more comprehensive synthesis that bridges conceptual gaps across previously separate domains.

Unlike prior studies that treat self-efficacy as a static predictor of academic performance (Tsorbatzoudis et al., 2003) or character education as an isolated moral project (Kazi et al., 2018), this study highlights a dynamic interrelationship in which ecological contexts function as the mediating platform connecting psychological belief and moral development. By positioning sustainability as a shared foundation, the analysis introduces a novel lens through which the co-evolution of psychological, moral, and ecological dimensions in primary education can be understood. In doing so, it opens new areas of inquiry that remain underexplored in the existing body of research.

Limitations and Implications

This study contributes practical insights to the field of primary education by advocating for the integration of self-efficacy and character building within the framework of green education. For policymakers and educational leaders, the findings suggest the need to move beyond fragmented initiatives toward holistic strategies where ecological learning environments serve as platforms for nurturing both psychological confidence and moral integrity. Teachers are encouraged to adopt pedagogical approaches aligned with sustainability values, while schools are urged to cultivate institutional cultures that reinforce responsibility, resilience, and ecological awareness. Such alignment provides a pathway to strengthen students' self-belief and ethical orientation in responding to real-world challenges.

Despite its contributions, the study acknowledges several limitations. The exclusive reliance on Scopus-indexed publications may constrain the diversity of disciplinary perspectives, highlighting the importance of incorporating additional academic databases in future reviews. Moreover, the majority of the reviewed studies employed descriptive or cross-sectional designs, which limit the capacity to understand the developmental nature of efficacy and character formation. Future research would benefit from longitudinal and ethnographic methodologies to capture these processes more comprehensively.

Theoretical diversity also remains underutilized. Frameworks such as Self-Determination Theory or Social Interdependence Theory could offer richer explanations of how ecological contexts mediate the development of psychological and moral outcomes. Finally, cross-cultural variation has yet to be systematically examined, indicating a need for comparative research to enhance generalizability and contextual relevance, especially across different educational systems and sociocultural environments.

Conclusion

This systematic literature review demonstrates that research on self-efficacy, character education, and green education has grown substantially, yet remains largely fragmented in conceptual orientation. Across the 33 Scopus Q1-Q3 articles analyzed, self-efficacy is predominantly positioned as a psychological construct supporting academic confidence and learner persistence, character education is framed mainly as moral and social value formation, and green education is emphasized as a curricular and institutional strategy for sustainability literacy. The central finding of this study is that green education consistently emerges as a pedagogical space capable of integrating psychological

confidence and moral character through sustainability-based learning experiences. These findings can be generalized to primary and secondary education contexts, indicating that ecological learning environments have strong potential to simultaneously cultivate students' self-belief, ethical responsibility, and environmental awareness. From a practical perspective, this study suggests that teachers should design sustainability-oriented instructional practices, such as project-based learning, community-based environmental activities, and eco-pedagogical school programs, to strengthen students' self-efficacy and ecological character in an integrated manner. Schools are encouraged to align character education programs with green school initiatives to ensure that moral values are internalized through authentic ecological practices. For policymakers and curriculum developers, the findings highlight the importance of embedding explicit links between self-efficacy, character formation, and green education within national curriculum frameworks and sustainability education policies. This study provides a conceptual foundation for integrative educational models that unite psychological, moral, and ecological dimensions within a single instructional design. However, further empirical research using longitudinal, experimental, and mixed-method approaches is needed to validate and operationalize this integrative framework across diverse sociocultural and institutional contexts.

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