Chinese Industry and Technology of Eco-environment
2026, VOL. 7, NO. 1, 53-57
DOI: 10.47297/wspciateWSP2633-772X11.20260701

Research on Empowering Green Industry Development through Ecological Civilization Education

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ABSTRACT
Against the backdrop of comprehensive green and low-carbon economic and social transformation as well as the in-depth advancement of ecological civilization construction in China, ecological civilization education and green industrial development form an inherently interconnected system featuring two-way empowerment and collaborative symbiosis. As a core carrier for shaping the public's ecological literacy, fostering green development thinking, and supplying green professional talents, ecological civilization education can empower the transformation and upgrading of green industries from multiple dimensions including , talent cultivation, technology and institutions. In turn, the practical development of green industries reversely drives the innovation of ecological civilization education models, iteration of educational content and realization of its value. This paper systematically analyzes the collaborative mechanism through which ecological civilization education empowers green industrial development, constructs a two-way collaborative framework from three perspectives: education system reform, policy and legal support, and digital technology empowerment, and proposes phased and region-specific implementation paths. It further elaborates on the feedback value of green industries to ecological civilization education, aiming to provide theoretical references and practical support for deep integration of ecological education and green industries, and advance the modernization featuring harmonious coexistence between humanity and nature.

KEYWORDS
Ecological civilization education; Green industry; Collaborative development; Low-carbon transformation; Talent cultivation

With the harmonious coexistence between humanity and nature becoming a core proposition of development in the new era and the green development philosophy deeply integrated into national development strategies, ecological civilization education has evolved into a vital component of the moral education system for fostering virtue through education in the new era. It serves as a key initiative to cultivate core literacy among new generations and consolidate the talent foundation for building a Beautiful China. Ecological civilization education is not a simple popularization of environmental knowledge, but a systematic, multi-level and all-round education system. It comprehensively shapes ecological thinking, ecological concepts and ecological character among adolescents and the general public, and ultimately cultivates high-quality new generations equipped with ecological knowledge, ecological awareness, ecological morality and ecological responsibility, so as to offer solid ideological support and talent guarantee for advancing ecological civilization construction and realizing the modernization of harmonious coexistence between humanity and nature.

1 Core Concepts

1.1 Ecological Civilization Education

Ecological civilization represents a new stage and form of human social civilization succeeding primitive civilization, agricultural civilization and industrial civilization. It covers all aspects of social life and advocates harmony between humanity and nature, between individuals, and between humanity and society. Ecological civilization education is a comprehensive quality education dedicated to fostering ecological literacy and shaping green development personalities for the new era. The complete education system integrates knowledge, and morality, empowers all-round individual growth, and strives to cultivate new generations of ecological civilization who integrate knowledge and action with ecological cognition, ecological awareness and ecological responsibility.

1.2 Green Industry

Green industry is the core industrial form that practices the philosophy of ecological civilization and advances the green and low-carbon transformation of the economy. It covers key fields such as environmental protection technology, green energy, sustainable production and green consumption. Centered on technological innovation and guaranteed by institutional design, industrial development continuously renovates traditional high-energy-consuming and high-emission industries, optimizes industrial structures, and shifts the economic growth model from extensive expansion to low-carbon, green and sustainable development, thereby realizing the coordinated unification of economic, social and ecological benefits.

2 Collaborative Mechanism of Ecological Civilization Education Empowering Green Industries

2.1 Education System Reform Drives Technology Application

2.1.1 Curriculum System Optimization

Curriculum teaching constitutes the main platform for ecological moral education in universities. The traditional education system suffers from drawbacks such as overemphasis on theoretical knowledge while neglecting practice and literacy cultivation, failing to meet the demand of green industries for interdisciplinary and practice-oriented talents. To optimize the curriculum system of ecological civilization education, we must adhere to the principle of all-staff, whole-process and all-round education, systematically incorporate ecological civilization education into the national education system covering all learning stages, break disciplinary barriers, and realize interdisciplinary integration and penetration.

Core ideological and political courses shall deeply integrate core concepts including the natural view of ecology, ecological justice and symbiotic morality. Through the design and application of practical teaching, case-based teaching and split-class teaching modes, academic rationality is combined with interesting learning, problem orientation with thematic teaching, and teacher guidance with students' dominant status to cultivate high-quality innovative talents for the new era. Such measures correct cognitive biases such as anthropocentrism and prioritizing development over protection embedded in traditional development models, and consolidate students' value foundation of green development. Meanwhile, innovative case-based and immersive teaching modes shall be adopted, incorporating real industrial practice cases such as conversion of forest ecotourism value, low-carbon operation of the Green Winter Olympics, and resource recycling into classroom teaching. Abstract ecological theories are translated into concrete industrial practice scenarios, enabling students to intuitively perceive the dual value of green industries—ecological protection plus economic appreciation. This effectively improves students' practical understanding of green technologies and green industries, and reserves high-quality backup talents for the industrial application and model innovation of green technologies.

2.1.2 Innovation of Evaluation Mechanisms

Constructing a scientific and diversified education evaluation mechanism serves as an institutional guarantee for improving the quality and efficiency of ecological civilization education and empowering the long-term development of green industries. Traditional education evaluation centers on academic scores, ignoring the cultivation of students' ecological literacy, green behaviors and innovation capabilities, which cannot match the talent evaluation requirements for high-quality development of green industries. In response, a diversified and whole-process comprehensive quality evaluation system shall be established, incorporating core indicators such as ecological cognition level, ecological moral literacy, green consumption concepts and low-carbon practical behaviors into students' comprehensive quality assessment.

Following the four-dimensional education logic of "cognition-perception-action-innovation", a hierarchically progressive evaluation system shall be built: the ecological cognition dimension assesses students' mastery of ecological scientific knowledge and understanding of ecological crises; the ecological perception dimension evaluates students' recognition of green development values and sense of ecological responsibility; the ecological action dimension inspects students' daily low-carbon practices and green consumption behaviors; the innovation dimension focuses on students' thinking and practice regarding green technological innovation and optimization of green industrial models. Through reforming evaluation mechanisms, ecological education shifts from knowledge indoctrination to literacy cultivation and behavioral implementation, continuously fostering sustainable development talents adaptable to the transformation and upgrading of green industries.

2.2 Improvement of Policies and Laws Supports Industrial Transformation

2.2.1 Construction of Legal Framework

China's legal system related to ecological civilization construction has gradually improved, yet the top-level legislation specifically targeting ecological civilization education remains insufficient. It is urgent to accelerate the improvement of a special legal framework for ecological civilization education and promote the formulation of supporting regulations, so as to clarify the legal status, implementation scope, responsible subjects and assessment & supervision mechanisms of ecological civilization education at the national level.

In addition, China shall benchmark international green development rules, improve norms for international cooperation on ecological education, align China's ecological civilization education concepts and green industrial standards with international norms, and provide institutional support for the international development of green industries and cross-border ecological cooperation. Legalization ensures the regular implementation of ecological education and institutionalization of industrial green transformation.

2.2.2 Design of Incentive Mechanisms

Long-term incentive mechanisms are critical to translating ecological civilization concepts into social consensus and driving enterprises' green transformation. Based on the logic of public participation and government-enterprise coordination, a multi-level low-carbon incentive system covering individuals, enterprises and regions shall be fully rolled out via the carbon inclusive incentive mechanism. For the public and adolescent groups, carbon point redemption, low-carbon honor commendations and green benefit incentives can be adopted to encourage green consumption, low-carbon travel and other ecological behaviors, fostering a nationwide green lifestyle.

For market entities, binding ecological civilization conventions, low-carbon assessment standards, tax incentives and policy subsidies shall be implemented to restrict high-energy-consuming and high-emission behaviors and motivate enterprises to take the initiative in technological renovation, energy conservation, emission reduction and green innovation. Combining rigid constraints and flexible incentives eliminates enterprises' passive attitudes toward transformation, and makes green and low-carbon transformation an endogenous initiative of market entities and the general public, creating a sound social environment for large-scale and regular development of green industries.

2.3 Technology Empowers the Innovation of Education Modes

2.3.1 Application of Big Data and Intelligent Technology

Iterative upgrading of digital and intelligent technologies provides technical support for innovating ecological civilization education modes and accurately cultivating talents for green industries. Traditional ecological education is plagued by homogenized content, monotonous scenarios and insufficient visualized practice, which cannot adapt to the intelligent and precise development demands of green industries in the new era. Relying on big data, artificial intelligence, virtual reality and other digital technologies, an intelligent ecological education platform can be constructed to realize targeted push of educational content and immersive restoration of practical scenarios.

Big data analysis can identify weaknesses in ecological cognition and learning demands of groups at different educational stages, pushing adaptive educational content such as green energy technologies, low-carbon production modes and green consumption standards to enhance the pertinence and effectiveness of ecological education. Meanwhile, an intelligent simulation training system can be developed with training functions including carbon footprint simulation calculation, ecological loss monitoring and low-carbon scheme optimization, allowing students and social learners to intuitively grasp carbon emission logic in production and daily life as well as paths for green decision-making. This improves the scientificity of decision-making in green consumption and low-carbon production, and realizes precise docking between ecological education and the intelligent development of green industries.

In the current era, the digital transformation of ecological civilization is an important outcome driven by technological change. We must seize this opportunity to guide people to construct ecological knowledge graphs and form habitual ecological behaviors, facilitating the transformation to a new paradigm of civilized development.

2.3.2 Interdisciplinary Collaborative Innovation

The integrated and composite development characteristics of green industries determine that ecological civilization education must break disciplinary barriers and build an interdisciplinary collaborative education system. Green industries cover multiple fields including ecology, engineering, economy, management and science and technology, requiring interdisciplinary talents equipped with ecological literacy, technical capabilities and economic thinking. The traditional single-discipline education model fails to meet industrial talent demands, hence education authorities shall cooperate deeply with science and technology, industrial and economic departments, integrate cross-disciplinary teaching and research resources, and jointly develop an integrated curriculum system for ecological education.

As core platforms for talent cultivation, universities can deeply integrate ecological ethics, ecological science with engineering technology, industrial economics and environmental management, and launch interdisciplinary courses such as green industrial technology, low-carbon economy and ecological restoration engineering to build a composite talent cultivation model. Interdisciplinary collaborative innovation makes up for the shortcomings of single-discipline education, and delivers high-quality interdisciplinary talents for technological innovation, model upgrading and industrial integration of green industries.

3 Typical Cases and Implementation Paths

3.1 Practical Cases

3.1.1 Forest Ecotourism Model

Forest ecotourism serves as a typical paradigm of "ecological industrialization and industrial ecologization", as well as a core practical carrier for ecological civilization education to empower green industries. Breaking the extensive development model relying solely on timber harvesting in traditional forestry, this model relies on forest ecological

resources and ecological cultural heritage to drive in-depth integration of forestry, tourism, cultural and health industries, constructing a green industrial system featuring coordinated progress of ecological protection, cultural tourism development and residents' income growth.

Regions develop standardized forest trails, ecological research bases and forest health camps to convert high-quality ecological resources into sustainable economic value. This not only realizes the protection and restoration of forest ecosystems and biodiversity conservation, but also drives the development of related industries such as regional cultural tourism, catering and employment. It effectively resolves the conflict between ecological protection and economic development, achieving multi-dimensional unification of ecological protection, industrial development and people's livelihood improvement, and providing a replicable practical paradigm for ecological education to empower green industries.

3.1.2 Experience Promotion of the Green Winter Olympics

The 2022 Beijing Winter Olympics and Paralympics fully adhered to the development philosophy of "green, low-carbon and sustainable", representing a concentrated display of China's achievements in ecological civilization construction and the development level of green industries, and forming a replicable and referable Chinese solution for green development. All competition venues adopted photovoltaic, wind power and other green energy sources, energy-saving building materials and intelligent temperature control technologies, realizing 100% clean energy power supply. It formed a green development paradigm featuring low-carbon environmental protection, resource conservation and technological empowerment, setting a benchmark demonstration for the green transformation of cultural, sports, construction, tourism and other industries nationwide, and providing vivid practical teaching cases for ecological civilization education.

3.2 Implementation Paths

3.2.1 Phased Promotion Strategy

Practice acts as a critical bridge connecting cognition and emotion and facilitating behavioral transformation. Therefore, to realize ecological civilization education empowering green industrial development, we must follow the laws of education and industrial development, adopt a hierarchical and progressive phased education strategy aligned with educational objectives of different stages, and achieve targeted empowerment across all learning stages.

Basic education focuses on enlightenment of ecological cognition and cultivation of labor literacy. Basic ecological scientific knowledge and ecological labor concepts are integrated into daily teaching and labor practice in primary and secondary schools. Through campus low-carbon practices, ecological research trips and garbage classification activities, adolescents are guided to understand the internal connection between nature and production & daily life, establish basic concepts of respecting nature and resource conservation, and consolidate the foundation of nationwide green development literacy.

Higher education focuses on value shaping and professional empowerment. Core concepts including ecological justice, symbiotic development and green innovation are strengthened in ideological and political courses and professional courses of universities. Specialized talent cultivation, technological innovation research and industrial practice surveys are carried out in response to the development demands of green industries. Efforts are concentrated on fostering students' sense of ecological responsibility, green innovation capacity and industrial service competence, delivering high-quality professional talents for R&D of green technologies, model innovation and transformation & upgrading of green industries. This forms a full-chain education pattern where basic education lays a foundation and higher education provides professional empowerment.

3.2.2 Region-Specific Paths

China's regions differ drastically in ecological endowments and industrial foundations, so differentiated development paths for ecological education empowering green industries shall be explored tailored to local conditions to avoid homogeneous construction. Based on regional ecological governance practices such as returning farmland to forests, desertification control, water-saving irrigation and grassland restoration, distinctive ecological education courses and research practice programs can be developed, integrating ecological governance technologies, green agriculture and animal husbandry development and ecological restoration industry cases into teaching systems.

Through distinctive ecological education, local green talents matching regional development demands can be cultivated, facilitating the application of ecological governance technologies and boosting the development of green agriculture and animal husbandry, ecological restoration industries and desert cultural tourism industries. This delivers multiple benefits including regional ecological environment restoration, industrial structure optimization and increased income for residents, forming a green development path suitable for ecologically fragile regions.

4 Feedback Effects of Green Industries on Ecological Civilization Education

4.1 Technological Feedback Boosts Educational Innovation

Ecological civilization education provides ideological and talent support for green industrial development, while technological innovations of green industries in turn empower the innovation of ecological education models and upgrading of educational content, forming a two-way circular collaborative pattern. With the rapid development of green industries, a series of mature green technologies including degradable environmental materials, intelligent ecological monitoring systems, clean energy utilization, carbon capture and storage continue to iterate, offering advanced teaching carriers, practical scenarios and technical support for ecological civilization education.

Relying on cutting-edge technologies of green industries, universities and research institutes can optimize interdisciplinary curriculum systems, deeply integrate engineering technology, industrial economy and ecological ethics, and update teaching content of ecological education, eliminating the dilemma that traditional ecological education theories lag behind industrial practices. Meanwhile, R&D centers, production workshops and industrial bases of green enterprises can be transformed into off-campus practical teaching platforms, providing immersive training scenarios for teachers and students, extending ecological education from theoretical teaching to practical innovation, and supporting the cultivation of interdisciplinary green talents.

4.2 Green Consumption Patterns Force Educational Transformation

Large-scale development of green industries continuously upgrades the supply of green products, raises the public's willingness and capacity for green consumption, and forces ecological civilization education to shift from knowledge indoctrination to behavior guidance and value shaping. Currently, young groups especially college students show high acceptance and purchasing willingness toward green products and low-carbon services, and green consumption has become a new consumption trend in the new era, profoundly changing the production, living and consumption logic of the public.

Based on real changes in green consumption behaviors, the green perceived value model can be introduced to systematically analyze the internal mechanism of consumers' ecological cognition, emotional perception and behavioral decision-making, and accurately identify influencing factors for the formation of public green behaviors. On this basis, intervention strategies for ecological education can be optimized to abandon single theoretical preaching, focus on behavior guidance, habit cultivation and value shaping, and launch targeted practical education on green consumption, low-carbon living and ecological responsibility. This promotes ecological civilization education to better fit social development realities and match demands of industrial transformation, realizing synchronized progress of talent cultivation and industrial development.

5 Conclusion

In summary, ecological civilization education and green industrial development are not independent systems, but an organic whole featuring mutual empowerment, two-way circulation and coordinated advancement. Through three major paths—education system reform, improvement of policies and laws, and digital technology empowerment, ecological civilization education comprehensively boosts the low-carbon transformation and high-quality development of green industries from multiple dimensions including talent cultivation, value shaping, technological application and institutional guarantee. In return, technological iterative innovation and upgrading of green consumption driven by green industries reversely push forward the model innovation, content optimization and effectiveness improvement of ecological education. The coordinated development of the two provides solid talent support, technical guarantee and institutional foundation for promoting the construction of a Beautiful China and realizing the dual carbon goals.

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References

[1] Lv Shaoli. Implication, Current Situation and Implementation of Ecological Civilization Education in the New Era[J]. Journal of Jilin College of Education, 2023,39(6):36-44.

[2] Teng Fei, Jiang Yue. Research on Ecological Moral Education in Universities in the New Era[J]. Jiangsu Higher Education, 2024,(3):98-102.

[3] Huang Luyu, Sun Yuanyuan. Reflections on Integrating Ecological Civilization Education into the Ideological and Political Teaching System of Agricultural Universities[J]. Journal of Smart Agriculture, 2023,3(18):153-156.

[4] Shao Baidong. Digital Transformation of Ecological Civilization Education: Connotation, Structural Framework and Practical Approaches[J]. Journal of Nanjing Forestry University (Humanities and Social Sciences Edition), 2026,26(2):107-118.

[5] Zhu Hong, Song Bingbo. Research on Scientific Connotation and Contemporary Value of Ecological Civilization Education[J]. Forestry Teaching, 2026,(1):8-15.