Application of Eco-Aesthetics in Field Sketching for Environmental Design Practice

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Abstract. Eco-aesthetics emphasizes the harmonious coexistence, dynamic balance, and sustainable development between humans and nature, providing an important philosophical foundation for environmental design. Against the backdrop of the intensifying ecological crisis in modern society, field sketching—as an artistic practice—can effectively enhance designers' ecological awareness and creativity. This study explores, under the guidance of eco-aesthetic principles, the specific applications of field sketching in unifying regional culture and ecological characteristics, natural painting practice, the design of ecological soft furnishings, the integration of traditional architectural forms, and the ecological expression of landscape painting. The results show that environmental design sketching is not only a design tool but also a practical carrier of eco-aesthetics. It helps integrate inspiration from nature into the design process and promotes green and sustainable design practices. At the same time, sketching courses cultivate designers' interdisciplinary thinking ability, enriching environmental design with cultural connotation and ecological inspiration. This research provides theoretical support and practical direction for the future application of eco-aesthetic concepts in environmental design.

1. Introduction

Across design education and practice, there is a growing consensus that sustainable solutions cannot be achieved by technical optimization alone. They also require an ecological imagination—an ability to perceive, value, and translate the relations among people, places, and non-human systems into spatial and material decisions. Ecological aesthetics offers a conceptual lens for this work[1]. Rather than treating nature as scenic backdrop or resource stock, ecological aesthetics emphasizes relational qualities such as co-presence, reciprocity, resilience, and the situated experience of environment. In environmental design studios and field courses, sketching provides a concrete method to cultivate this lens. Direct, in-situ drawing slows perception, trains attention to subtle gradients of light, moisture, and growth, and encourages students to observe how cultural practices and ecological processes co-produce landscapes [2].

This paper advances the argument that sketching functions not merely as representation, but as a methodological bridge between ecological awareness and design action. We focus on field sketching that engages wetlands, vernacular settlements, traditional crafts, and culturally meaningful landscapes [3]. Through these settings, students learn how climate, topography, and biotic communities shape everyday life, and how cultural forms—rituals, motifs, building types—embody ecological wisdom accumulated over generations. By rendering these relationships graphically, students internalize design principles for climate responsiveness (e.g., ventilation, shading, drainage), material stewardship (e.g., low-impact, locally sourced materials), and spatial sequencing (e.g., layered paths and views that choreograph human–nature encounters) [4].

The study makes three contributions. First, it conceptualizes sketching as ecological practice, clarifying its role in environmental design beyond conventional visual communication. Second, it demonstrates a transdisciplinary workflow that integrates insights from ecology, geography, anthropology, architecture, and material science through field-based observation and translation.. transdisciplinary

Methodologically, the paper synthesizes literature in ecological aesthetics and environmental design with field cases from wetlands, ethnic villages, and heritage crafts. The cases are not presented as exhaustive, but as pedagogical prototypes that can be adapted to different regions and educational design contexts [5]. Each case begins with on-site sketching and ecological reading of place, proceeds to extraction of form/material/spatial cues, and culminates in schematic proposals for green infrastructure, interior/ecological soft furnishings, or landscape frameworks. Outcomes are assessed qualitatively through design reviews, reflective journals, and faculty critiques, with emphasis on how well proposals embed ecological processes and cultural meaning in spatial design decisions [6].

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2. Organization of the Text

2.1 The Concept of Eco-Aesthetics and Its Relationship with Environmental Design

Eco-aesthetics is the study of nature, environment, and aesthetics based on ecological principles, aiming to create a harmonious and sustainable coexistence between humans and the natural world.[10][11] It emphasizes harmony, dynamic balance, and symbiosis between humans and nature, which provide philosophical guidance for environmental design.

Field sketching, as an art practice rooted in direct observation of nature, helps designers explore and understand the aesthetic beauty and ecological patterns of the natural world.[9] Therefore, eco-aesthetics undoubtedly represents the aesthetic transformation and philosophical foundation required for the evolution of modern environmental design. During field sketching, designers are able to perceive subtle ecological details and extract design elements from natural forms and structures. These inspirations can be applied across various design fields such as landscape design, furniture design, and exhibition design.[10][11]. Numerous successful cases illustrate how natural observation enriches design practice: The Role and Value of Field Sketching in Environmental Design

During field sketching, designers are able to perceive subtle ecological details and extract design elements from natural forms and structures. These inspirations can be applied across various design fields such as landscape design, furniture design, and exhibition design. Numerous successful cases illustrate how natural observation enriches design practice:

Extracting structural inspiration from .trees.Observation: The branches and roots of trees exhibit inherent stability and aesthetic proportion. Application: Architect Antoni Gaudí incorporated tree-like structures in the Sagrada Família, transforming the supporting columns into branching forms that emulate nature's order and grace, while enhancing the building's load-bearing efficiency.

Deriving spatial flow from water. Observation: The curves of rivers, the spreading ripples, and the dynamic force of waterfalls embody natural rhythm. Application: In traditional Chinese and Suzhou gardens, winding paths and flowing streams mimic natural watercourses, creating depth and continuity in spatial experience.

Extracting decorative patterns from flowers., Observation: Petal arrangements and symmetrical structures reveal organic order. Application: Japanese Karesansui (dry landscape gardens) use stone arrangements inspired by flower petal spirals to express tranquility and harmony, while modern interior textiles often draw patterns from floral geometry.

Inspiration from mountain topography. Observation: The undulating terrain of mountains conveys rhythm and hierarchy. Iomorphic design from animal structures. Color harmony from natural phenomena. Material texture from rocks and minerals.

These examples demonstrate that observing nature through sketching allows designers to internalize ecological principles and incorporate them into visual and spatial aesthetics. Field sketching also enhances awareness of environmental fragility: through observing changes in flora, water quality, and ecosystems, students understand the importance of sustainable design and environmental protection.

2.2 Integration of Ecology and Regional Culture in Field Sketching

Through site-specific studies, designers can analyze how ecological characteristics, climate conditions, and local traditions influence design aesthetics and sustainability strategies. [8][9]. By integrating ecological awareness with cultural heritage, environmental design gains both emotional resonance and environmental responsibility. During field sketching, the integration of regional culture and ecology can be studied through case-based analysis. Students and designers are encouraged to observe and document the unique relationship between human activities and the natural environment within specific locations. Such practice deepens understanding of local materials, climatic adaptability, and cultural symbolism—key factors in achieving sustainable design outcomes.

Example: Wetland Ecosystem Sketching Practice. Context: Students conducted field sketching in a wetland conservation area known for its biodiversity and complex ecological structure. The site included aquatic plants such as reeds and habitats for birds, fish, and amphibians. Observation: Students hand-sketched the distribution of aquatic vegetation, analyzed community patterns, and noted zones where pollution affected water quality.

Reflection: They recognized the ecological fragility of wetlands—the "kidneys of the Earth"—and their essential functions in water purification, carbon storage, and biodiversity conservation. Design Application: Inspired by the wetland's cyclical ecosystem, students designed a community ecological garden using plant-based water filtration and constructed wetlands to simulate natural purification processes, promoting sustainability through design.

Field sketching thus becomes a bridge—connecting ecological science with humanistic expression, and transforming artistic observation into sustainable environmental design practice [11].

2.3.Natural Painting Practice and Ecological Aesthetics in Design

Natural painting practice is an essential medium for expressing ecological aesthetics in environmental design. It enables designers to directly perceive the vitality, rhythm, and balance of nature through artistic engagement, translating these experiences into design inspiration. Field sketching, as a key form of natural painting, cultivates sensitivity to ecological patterns and fosters a design philosophy that emphasizes "design as nature." By engaging in natural painting practice, designers learn to

express the subtle harmony between humans and the environment through visual composition, color coordination, and material selection.

In natural painting, ecological aesthetics is reflected in the observation and reconstruction of natural forms. Designers analyze patterns found in flora, fauna, landscapes, and geological formations to develop visual systems aligned with sustainability. For instance, the asymmetry and rhythm of tree branches can inspire organic furniture design; the color gradient of autumn forests can inform interior palette design; and the transparency of water reflections can guide the treatment of glass and lighting in spatial composition.

Moreover, natural painting contributes to the design of ecological soft furnishings: a critical element in sustainable interior design.

2.3.1 Natural color as creative inspiration

The dynamic color variations in natural environments—such as the transition from green to gold in autumn foliage—serve as references for creating warm, harmonious interior atmospheres. The dynamic color variations in natural environments—such as the transition from green to gold in autumn foliage—serve as references for creating warm, harmonious interior atmospheres.

2.3.2 Eco-material exploration.

Materials like dried branches, moss, and natural fibers collected during fieldwork can be integrated into soft decoration, forming *green walls*, eco-installations, or handcrafted ornaments that embody natural texture.[11].

2.3.3 Form and structure.

Non-symmetrical natural forms such as rock fissures or plant stems inspire innovative lighting, sculpture, or furniture designs with strong biomimetic aesthetics.

2.3.4 Function and beauty integration.

Observations of honeycomb geometry or coral growth patterns inform modular structural design, balancing efficiency with beauty [7][11].

2.3.5 Dynamic nature and motion aesthetics.

The rippling of water or the sway of grass under wind provides inspiration for kinetic installations or lighting systems that reflect the dynamic vitality of ecosystems.

The following is a Comprehensive Example:

In a field sketching course, students observed a forest landscape, recording through painting the color transitions, bark textures, and interplay of light and shadow under sunlight. These visual impressions were later transformed into an interior ecological design project:

Leaf patterns inspired wallpaper motifs; Tree bark textures informed fabric surface treatments; Light filtering through leaves inspired a dynamic lighting design simulating natural dappled effects; Local materials such as bamboo, bark, and handmade paper were used to create natural decorative artifacts.

This poetic vision encapsulates the very essence of eco-aesthetic experience—harmony, simplicity, and reverence for nature.

Through natural painting, designers internalize this ecological spirit, merging rational design thinking with emotional resonance, achieving a holistic design that unites aesthetics, ecology, and humanity.

2.4 Cross-Disciplinary Learning and Future Prospects in Field Sketching

Field sketching, when integrated into environmental design education, plays a vital role in cultivating interdisciplinary learning and innovative design thinking. It bridges multiple disciplines—art, architecture, ecology, geography, and material science—allowing students to approach design not only as a technical process but also as a holistic system of perception, reflection, and creation. Through sketching, students observe, analyze, and interpret the ecological environment, transforming visual experience into sustainable design logic.

In the cross-disciplinary context, field sketching encourages students to connect ecological theory with design practice. By studying local topography, climatic conditions, plant distribution, and human settlements, they develop a scientific understanding of spatial composition and an aesthetic appreciation of ecological systems. This dual perspective fosters design literacy that integrates both creativity and environmental responsibility.

Example: Field Study in Xijiang, Qianhu Miao Village, Guizhou Province, Interdisciplinary integration: architecture + ecology + cultural anthropology. Architectural insight: The traditional stilted dwellings (Diaojiaolou) adapt to mountainous terrain, minimizing earthwork and ensuring stability on steep slopes. Ecological observation: Wooden tile roofs with large slopes enhance rainwater drainage and ventilation, reflecting passive climatic adaptation. Cultural interpretation: The decorative motifs on Miao embroidery and wooden carvings convey reverence for nature and express local cosmology.

Example: Kyoto, Japan: Integrating Seasonal Ecology with Traditional Cultural Landscapes. Ecological Features Dynamic coastlines and pronounced tidal cycles. Strong coastal winds. Cultural Features. Māori Koru “spiral of life” motif. Sacred worldview linking mountains and sea. Integration in Sketching. Observing erosion patterns along coastlines recording spiral growth motifs in Māori carving. Linking tidal rhythms with cyclical cultural concepts.

Universal Method for Global Eco–Cultural Integration in Sketching

Step: Ecological Observation (Climate, landform, vegetation, hydrology) →Cultural Study (Motifs, materials, belief systems, spatial logic) →Field Sketching

(Color. Texture. Light–shadow. Composition) Eco–Cultural Translation (Ecological structures → spatial strategies Cultural symbols → design language. Ecological structure + cultural pattern → design expression. Ecological Features Strong seasonal transitions (cherry blossoms, maple leaves, moss) Micro-topography, water circulation, and wind guidance in garden design. Cultural Features Shinto belief in animism. Nature abstraction in karesansui (dry landscape gardens) [7]

Integration in Sketching: Observing ecological abstraction through sand-as-water representation. Recording "borrowed scenery" composition. Understanding nature–religion–space coherence

Through such projects, students enhance their ability to synthesize knowledge across disciplines. They learn that sustainable design requires not only technological innovation but also cultural empathy and ecological ethics. Field sketching becomes a research method—a way of "thinking through drawing"—that deepens understanding of human-environment relationships.

2.5 During design critiques, instructors applied an eco-aesthetic evaluation framework to determine whether student proposals effectively integrated ecological processes and cultural meaning.

To ensure consistency and reproducibility, five categories of core criteria were employed: Ecological Process Integration. Accuracy and logic of natural system representation. Responsiveness to microclimate, hydrology, and vegetation. Evidence of sustainability strategies.

Cultural Meaning Integration. Depth of cultural research. Appropriate translation of symbols, materials, and spatial customs. Avoidance of stereotypical or superficial cultural representation. Eco–Cultural Coherence. Synergy between ecological logic and cultural expression. Clarity and theoretical grounding of the design concept. Spatial and Material Realization. Feasibility of ecological strategies in spatial construction. Appropriateness of material selection for local climate and cultural context. Reflective Depth (from journals) Ability to articulate the observation–sketching–design relationship. Awareness of environmental ethics and cultural sensitivity.

2.6 Future Prospects: In the future, field sketching in environmental design should evolve toward more integrative and technology-assisted approaches.

2.6.1 Digital integration:

Combining traditional hand sketching with digital tools (e.g., tablets, VR environments) enables real-time ecological analysis and visual simulation.

2.6.2 Cross-cultural collaboration:

International sketching workshops can promote the exchange of ecological aesthetics among different cultural backgrounds.

2.6.3 Sustainability education:

Embedding sketching into design curricula as an experiential learning module strengthens ecological literacy and environmental ethics.

Ultimately, field sketching serves as more than a visual exercise—it embodies the ecological aesthetic principle of "unity between humanity and nature." It fosters not only design competence but also a renewed sense of environmental stewardship and cultural belonging. As eco-aesthetics continues to guide the evolution of environmental design, field sketching will remain a powerful bridge between seeing, thinking, and creating in harmony with nature.

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