Communication

What Could and Should Ecological Civilization Education Be?

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Abstract: With the promotion of the term "ecological civilization" by the Chinese government, ecological civilization education (ECE) has gradually become popular in China. However, the concept of ECE remains unclear. In this commentary, we construct three triple-property models considering theories from environmental education (EE) to interpret ECE's goals, program design perspectives, and learning outcomes. We suggest that the content of ECE can be replaced with the concept of EE, and that the three models implicit in EE can be utilized to establish an integrated landscape of ECE or EE per se.

Keywords: environmental education; ecological civilization education; educational goals; program design perspectives; learning outcomes

Ecological civilization is being increasingly popularized by the Chinese government, such that even the theme of the 15th Conference of the Parties (COP15) to the Convention on Biological Diversity (CBD) is "Ecological Civilization: Building a Shared Future for All Life on Earth". Along with its popularity, many educational programs titled as "ecological civilization education" (ECE) have been implemented as strategies to approaching ecological civilization. Although there has been a lot of practice, we find the concept of ECE unclear and in need of further interpretation, especially in need of considering existing theories from environmental education (EE) so as to guide or improve ECE programs. Here, we construct three triple-property models implicit in EE to provide an overall framework of ECE.

1. The Identical Goals of ECE and EE

As the basis of ecological civilization, we need primarily to understand the term "ecology". Ernst Haeckel [1] coined and defined it as the subject to "understand the comprehensive science of the *relationships* of the *organism* to its surrounding *environment*, where we can include, in the broader sense, all 'conditions of existence'" [2] (my emphasis). The Ecological Society of America [3] maintains this definition on their website as "the study of the *relationships* between living *organisms*, including humans, and their physical *environment*" (my emphasis).

The essential elements of these definitions are "*relationship*," "*organism*," and "*environment*". Since "civilization" is used to describe human society, which means that ecological civilization is disposed to be anthropocentric, the "*organism*" in ecological civilization is supposed to be humans, while other living organisms and non-living existences are regarded as the "*environment*".

In accordance with the spirit of ecology, which emphasizes relationships, we suggest that ecological civilization should be a process to form and enhance humans' positive relationships with their environment, and that ECE should provide people with learning opportunities to facilitate these relationships.

However, that is not to say that we agree with the anthropocentric implications in ecological civilization that only those relationships between humans and their environment

are the focuses, that only the humans are the subjectivities, and that only those phenomena identified by humans as "environmental problems that are confronting or will confront humans" are worth considering and addressing. All these anthropocentric interpretations of relationships are neglecting non-human organisms.

Since the Earth has already entered the Anthropocene [4,5], during which humans have significant impacts on all aspects of the environment, we argue that even a non-human organism's relationships with other non-human existences will be influenced by humans, and that a non-human organism's suffering from existing or potential problematic relationships, from the organism's perspective, with other non-human existences are most likely caused by humans. Even if we are not in the Anthropocene, humans' injustice behaviors towards a non-human existence will cause them to suffer injustice directly. Whether or not these behaviors are deemed as present or future environmental problems faced by humans, they are already the environmental problems that the non-human existence encounters.

Thus, although we still put humans in the center as the "*organism*" in ecological civilization and ECE, we attempt to interpret it from a direction completely opposed to anthropocentrism, emphasizing the responsibility of humans to proactively minimize their existing and potential negative impacts on the *environment* and treat all existences that are considered to be the *environment* righteously.

Not coincidentally, EE seeks to promote human–environment relationships [6] in order to address and prevent corresponding environmental issues confronting human and non-human existences, though it has diverse currents with various theoretical and practical concerns [7]. The environment surrounding humans, from a post-human perspective of EE, however, is not only the more-than-human world [8,9] such as the natural and built environment, which has been the prevalent focus in the natural science of ecology, but also includes the human society and the individual's selves, which interrelate and intersect with the more-than-human world [10] and have their own significance to social justice, personal development, and sustainability [11] (Figure 1). In accordance with these three aspects of the environment, the environmental issues that EE attempts to deal with by facilitating corresponding human–environment relationships are the more-than-human world issues, the human society issues, and the issues of individual's selves.
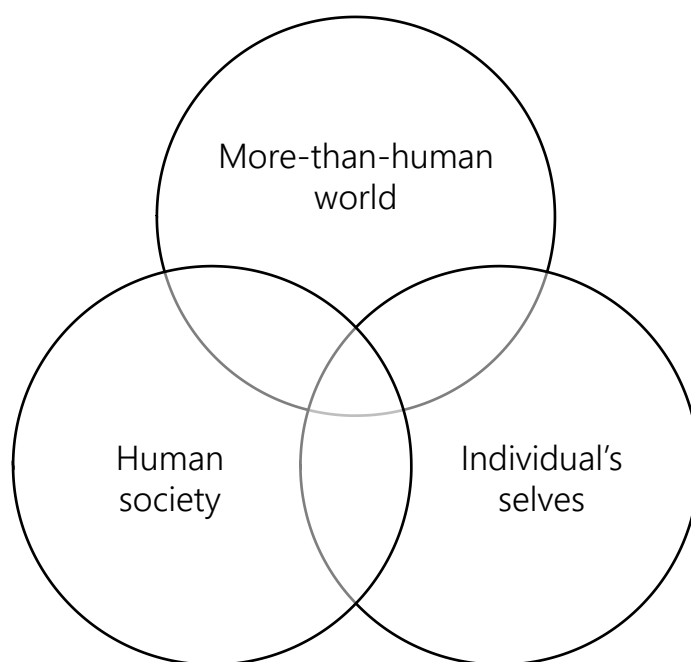

Figure 1. The concept of environment in environmental education.

Indeed, some ECE discourse exceeds the narrow sense of environment to comprehend ecological civilization in a triple-property model: human's positive relationships with nature, society, and people, or with nature, society, and self. However, when comparing these two models with the triple-property model (the environment contains the more-than-human world, the human society, and the individual's selves) implicit in EE, the last one seems more inclusive and less redundant. Thus, we assume and suggest that EE covers the connotation of ECE. We anticipate that EE can introduce existing educational and learning theories into the "emerging" field of ECE to facilitate corresponding practice.

2. The Triple-Property Model of ECE Program Design Perspectives

The ultimate goal of EE is to improve human–environment relationships [6], which will manifest as resolving environmental problems or protecting the environment. People have three types of reasons to perform protecting the environment with autonomy: eco-centric, altruistic, and egoistic environmental concerns [9,12]. Environmental educators have leverage these to encourage participants' environmental behaviors. Based on the 15 currents proposed by Sauvé [7], which give a panorama of the pedagogical landscape of EE, we find that the three environmental concerns received divergent priorities in different currents, leading to three categories of EE program design perspectives (Table 1).

The naturalist, value-centered, socially critical (for the environment), and feminist currents emphasize eco-centric environmental concerns. They are based on respecting the intrinsic value or subjectivity of the environment and the human–environment inter-subjectivity to protect the environment. The humanistic/mesological, bioregionalist, socially critical (for social justice), ethnographic, and sustainable development/sustainability currents express altruistic environmental concerns. They are based on the value of the environment for social interactions (the instrumental value of the environment) to protect the environment. The socially critical (for empowerment) and eco-education currents enjoy the egoistic environmental concerns. They are based on the value of the environment for an individual's self-development (the instrumental value of the environment) to protect the environment. The conservationist/resourcist, problem-solving, systemic, scientific, holistic, and praxic currents are universal for all three environmental concerns.

The categories pose an environment–others–selves model to design programs from diverse perspectives of concerns to address an environmental issue. Prevalent discourse in ecological civilization is encapsulated in the slogan "clear waters and green mountains are as valuable as gold and silver mountains" (Chinese: 绿水青山就是金山银山) [21]. Obviously, it is built on the instrumental value of the environment (especially, the natural environment). However, when referring to the field of education, we cannot rely solely on instrumental value or take it as primary foundation to justify environmental protection. If the environment (e.g., soil) is considered to have no intrinsic value/subjectivity, it will receive no concerns from people when it is not recognized by them as "the environment" (e.g., soil sprinkled on the bedroom floor is considered garbage rather than "the soil"), let alone be treated as "the environment with instrumental value" and treasured (e.g., soil is valuable to humans so we need to protect it). Therefore, ECE should incorporate the triple-property model of program design from EE to remind educators of eco-centric perspectives.

Table 1. The program design perspectives in environmental education.

Programs for Whom?	Eco-Centric Concerns: for the Environment				Altruistic Concerns: for Others				Egoistic Concerns: for One's Selves	
Corresponding currents	**Naturalist:** connecting with the environment **Value-centered:** respecting the environment **Socially critical:** transforming attitudes and behaviors toward respecting the environment **Feminist:** caring for the environment [7]				**Humanistic/Mesological:** knowing and appreciating one's milieu of life **Bioregionalist:** local or regional community ecodevelopment **Socially critical:** transforming attitudes and behaviors toward justice and equality **Ethnographic:** valuing one's cultural relationship with the environment **Sustainable development/Sustainability:** promoting economic development that considers social equity and ecological sustainability [7]				**Socially critical:** transforming attitudes and behaviors, and empowerment **Eco-Education:** individual development through interaction with the environment [7]	
All-purpose currents	**Conservationist/Resourcist:** conservation; **Problem-solving:** addressing problems; **Systemic:** systemic thinking; scientific: natural and social science inquiry; **Holistic:** "organically" understanding the world; **Praxic:** actions [7]									
Program standpoints	Based on respecting **the intrinsic value** or **subjectivity** of the environment and the human–environment **inter-subjectivity** to protect the environment				Based on the value of the environment for social interactions (**the instrumental value** of the environment) to protect the environment				Based on the value of the environment for an individual's self-development (**the instrumental value** of the environment) to protect the environment	
Preliminary definitions	Non-instrumentally **connecting** to the environment: equal-status contact [13] with the environment, through seeing or listening to the lived experiences of it rather than simply spending time with it [14,15]	Empathically **understanding** the environment: supporting individuals to put themselves in the environment's position through creative activities such as story writing, drawing, imagining, role playing, and appropriate anthropomorphization [16]	**Respecting** the environment, viewing and treating it with justice: encouraging transformative learning, through disrupting taken-for-granted assumptions, stirring critical reflection, and building rational discourse [17,18]	**Caring** for the environment: facilitating learning through environmental-action [19] or participatory action research [20] programs that are aimed at helping the environment become what it could be, based on the respect for its subjectivity	Realizing the utility of the environment for **social development**	Becoming conscious of the intersectionality of the environment in promoting **equality** in other issues	Perceiving the influence of the environment to enhance **interpersonal relationships**, such as social skills		Valuing the functions of the environment to **empower individuals**: helping to build self-efficacy and gaining a positive evaluation of one's abilities, thereby promoting physical and mental health	Appreciating the affordance of the environment for **other aspects of self-growth**: helping to boost self-esteem, improve personal traits, expand hobbies, and set up ideals, thereby promoting physical and mental health

3. The Triple-Property Model of ECE Outcomes

There are many frameworks [19,22–25] for the learning outcomes of EE. We adopt a framework (Table 2) from autobiographical memory functions [22,26,27], as it accommodates other EE outcomes' frameworks (Supplementary Material: Table S1) and organizes various sorts of outcomes in a configuration that echoes the ultimate objective of EE (i.e., behavior change) [22,28,29], which we suppose ECE to seek.

Table 2. The learning outcomes in environmental education.

Environmental learning	**Environmental awareness**	The environment Environmental problems Environmental protection Environmental exploration
	Environmental knowledge	The environment Environmental problems Environmental protection Environmental exploration
	Environmental skills	Environmental protection Environmental exploration
	Environmental attitudes	The environment Environmental problems Environmental protection Environmental exploration
	Environmental behaviors	Environmental protection Environmental exploration
Social interaction	**Social skills**	Interpersonal networks
		Communication skills
		Teamwork skills
	Reminiscing with other participants	
	Sharing with nonparticipants	
Self-development	**Self-efficacy**	
	Self-esteem	
	Traits	
	Hobbies	
	Visions	

The framework integrates three parts: environmental learning, social interaction, and self-development. Environmental learning implies raising environmental awareness, gaining environmental knowledge, improving environmental skills, forming environmental attitudes, and performing environmental behaviors—five typical outcomes of EE. Social interaction indicates enhancing social skills, reminiscing with participants about the program, and sharing the experience with nonparticipants, to sustain or deepen learning outcomes and change social norms to encourage environmental behaviors. Self-development entails building self-efficacy, boosting self-esteem, changing traits, expanding hobbies, and renewing visions, which reflect diverse self-growth and support environmental behaviors by increasing self-efficacy and interests or motivations to pursue environmental causes. All three aspects are relevant to changing behavior.

We suppose ECE seeks to enhance the relationships of humans to the more-than-human world, the human society, and the individual's selves. They can be dealt with in respective issues through environmental learning outcomes. Moreover, the last two enhancements can be sideswiped in all issues through social interaction and self-development outcomes.

However, given the common propensity that executives limit ECE's potential by equating the concept of environment and ecology with nature, neglecting human society issues and issues of individual's selves, the three aspects of EE learning outcomes are likely to be unwittingly reduced to mere environmental learning in ECE. This leads to a missed opportunity to explore the additional effectiveness towards improving human–society and human–selves relationships in an ECE program.

Thus, another reason for advocating this framework is that the environmental-learning–social-interaction–self-development model allows ecological civilization educators to consider not only the intended or typical learning outcomes (i.e., environmental learning) related straightforwardly to an environmental issue, but also the non-predetermined or by-product outcomes (i.e., social interaction and self-development), which may also be significant to the issue and ECE.

4. The Cube of ECE/EE

By integrating the environmental aspects/issues, program design perspectives, and learning outcomes of ECE/EE, we constructed a cube model (Figure 2) to describe their contents. It can provide an overall framework of ECE under the direction of EE theories, helping executives to reflexively figure out where they are standing, to what they can refer, and what significant things they neglect in approaching the vision of ecological civilization.
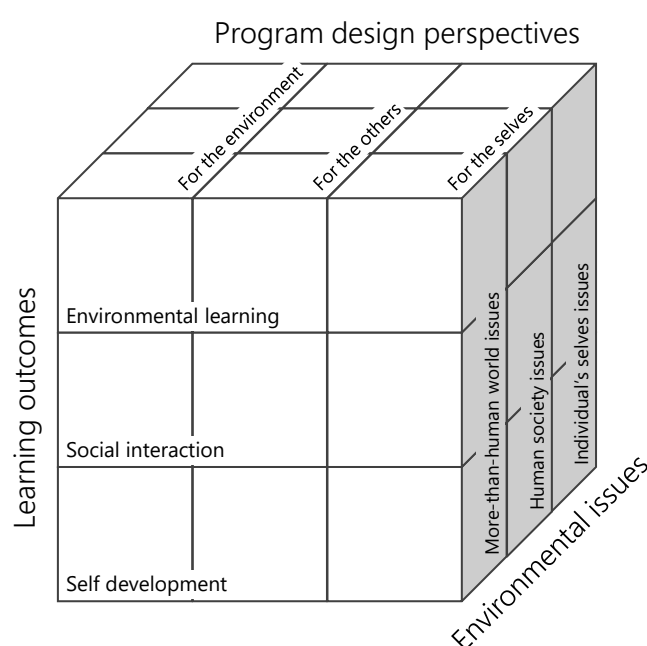

Figure 2. The ecological civilization education/environmental education cube.

We expect that the emerging prevalence of ECE will be a chance in China to value EE more than before and increase EE program implementation for addressing diverse global and local environmental issues. Although those programs are far more likely in the discourse of ECE rather than in the name of EE, fitting those praxis in the cube model of EE and conducting rigorous research on them may have the potential to contribute significantly to the EE field.

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