



OPEN ACCESS

APPROVED BY
Frontiers Editorial Office,
Frontiers Media SA, Switzerland

*CORRESPONDENCE
Sangita Iyer
✉ support@vfaes.org

RECEIVED 20 January 2026
REVISED 20 January 2026
ACCEPTED 27 January 2026
PUBLISHED 18 February 2026

CITATION

Iyer S, Kshetry A, Ireland L, Rizzolo JB
and Suman S (2026) Correction:
Teaching systems thinking to protect
wildlife: a pilot study in West Bengal's
secondary schools.
Front. Ethol. 5:1792510.
doi: 10.3389/fetho.2026.1792510

COPYRIGHT

© 2026 Iyer, Kshetry, Ireland, Rizzolo and
Suman. This is an open-access article
distributed under the terms of the
[Creative Commons Attribution License](#)
(CC BY). The use, distribution or
reproduction in other forums is
permitted, provided the original
author(s) and the copyright owner(s) are
credited and that the original publication
in this journal is cited, in accordance
with accepted academic practice. No
use, distribution or reproduction is
permitted which does not comply with
these terms.

Correction: Teaching systems thinking to protect wildlife: a pilot study in West Bengal's secondary schools

Sangita Iyer^{1,2*}, Aritra Kshetry³, Liza Ireland⁴,
Jessica Bell Rizzolo² and Shalvi Suman⁵

¹National Geographic Society, Washington, DC, United States, ²Voices for Asian Elephants Society (VFAES), Palo Alto, CA, United States, ³Wildlife Biologist, Kolkata, West Bengal, India, ⁴Royal Roads University, Victoria, BC, Canada, ⁵Independent Researcher, Siliguri, India

KEYWORDS

systems thinking, multidisciplinary education, designing curriculum, ecological principles, holistic, elephants, nature immersion, pedagogy

A Correction on

Teaching systems thinking to protect wildlife: a pilot study in West Bengal's secondary schools

By Iyer S, Rizzolo JB, Kshetry A, Ireland L and Suman S (2026). *Front. Ethol.* 4:1693306. doi: 10.3389/fetho.2025.1693306

The order of authors in the **Author List** of the published paper was erroneously given as: "Sangita Iyer, Jessica Bell Rizzolo, Aritra Kshetry, Liza Ireland, Shalvi Suman"

The correct author list reads:

"Sangita Iyer, Aritra Kshetry, Liza Ireland, Jessica Bell Rizzolo, Shalvi Suman".

Author "Aritra Kshetry" was erroneously assigned to affiliation 1 "National Geographic Society". This affiliation has now been removed for "Aritra Kshetry".

Author "Jessica Bell Rizzolo" was erroneously assigned to affiliation 1 "National Geographic Society". This should have been 2 "Voices for Asian Elephants Society". The affiliation has now been updated for "Jessica Bell Rizzolo".

Affiliation 2 "Voices for Asian Elephants Society" was erroneously given as "Voice for Asian Elephants Society". This has been corrected.

Affiliation 1 "National Geographic Society, Washington, DC" was erroneously given as "National Geographic Society, Washington, WA". This has been corrected.

In the **Keywords**, the word "Elephants" was incorrectly given an initial capital "E". This should be "elephants".

In Section 1, **Literature review**, paragraph 5, in the sentence, "There has been limited attention to applying these approaches within India's unique cultural and ecological context—a country with a significant elephant population, resulting in spatial and cultural dynamics distinct from regions like Europe (Wilson et al., 2013; Majumder, 2022)", the citation Wilson et al., 2013 did not appear in the Reference list. This citation has been removed and the sentence now reads: "There has been limited attention to applying these approaches within India's unique cultural and ecological context—a country with a

significant elephant population, resulting in spatial and cultural dynamics distinct from regions like Europe (Majumder, 2022)."

In Section 2, **Methodology**, paragraph 1, there was an extra "to" in the sentence, "The research team developed a holistic, topic-based curriculum rooted in ecological principles to in response to the above-mentioned research questions" This has been changed to read: "The research team developed a holistic, topic-based curriculum rooted in ecological principles in response to the above-mentioned research questions".

Also in Section 2, **Methodology**, paragraph 1, there was a mistake in the title given to Liza Ireland in the sentence, "Lead investigator SI, in collaboration with scientific advisor LI and elephant ecologist AK, led an interdisciplinary initiative to address the escalating conservation crisis posed by human-elephant conflict (HEC) in India". This has been changed to read: "Lead investigator SI, in collaboration with curriculum advisor LI and elephant ecologist AK, led an interdisciplinary initiative to address the escalating conservation crisis posed by human-elephant conflict (HEC) in India".

In Section 2.2, *Research framework*, paragraph 1, in the sentence, "The research is rooted in systems thinking and the Eco-centric Curriculum Framework (Ireland, 2020) - (Figure 2), which integrates ecological principles into pedagogical design", the citation "(Ireland, 2020)" should read "(Ireland, 2022)". The sentence has been updated to read: "The research is rooted in systems thinking and the Eco-centric Curriculum Framework (Ireland, 2022) - (Figure 2), which integrates ecological principles into pedagogical design."

In Section 2.6, *Phase 1: curriculum development and initial workshops*, paragraph 1, in the sentence, "The sessions, held in ecologically rich regions of Jalpaiguri and Alipurduar, emphasized the nine ecological principles defined in Ireland's Eco-centric Educational Framework (2020)", the citation for "Ireland (2020)" should again read "Ireland (2022)". The sentence has been updated to read: "The sessions, held in ecologically rich regions of Jalpaiguri and Alipurduar, emphasized the nine ecological principles defined in Ireland's (2022) Eco-centric Educational Framework".

The reference, "Ireland, L. (2022). Recognizing and addressing influential root metaphors: the key to reorienting teaching and teacher education in the Anthropocene" in Farrell, A., Skyhar, C., and Lam, M. (Eds.). *Teaching in the Anthropocene*. CSP Books Inc." has been added to the References.

In Section 2.9, *Pedagogical strategies and curriculum delivery*, paragraph 1, "into" was spelled "int" in the sentence, "Nature Immersion and Slow Pedagogy: Time was built int sessions for observation, journaling, and reflective conversations." This has been changed to read: "Nature Immersion and Slow Pedagogy: Time was built into sessions for observation, journaling, and reflective conversations."

In Section 3.5, *Student reflections and systems thinking*, paragraph 4, the participant quote, "We learned that female elephants live in close herds and protect their young ones. They must always be stressed, worrying about their calves, especially since humans have taken over their migration paths", was not italicized. This has been changed to read: "*We learned that female elephants live in close herds and protect their young ones. They must always be stressed, worrying about their calves, especially since humans have taken over their migration paths*".

In Section 3.6, *Impact of multimedia as a pedagogical tool*, paragraph 1, there was an erroneous bullet point at the start of the paragraph. This has been deleted.

In Section 3.8, *Enthusiastic participation in experiential activities*, paragraph 1, there were several errors in the sentence, "Hands-on activities such as Nature Immersion, the Interdependence, and Habitat Loss games energized the classroom and maintained student interest." This has been changed to read: "Hands-on activities such as Nature Immersion, the Interdependence game, and the Habitat Loss game energized the classroom and maintained student interest."

In Section 4, **Discussion**, paragraph 12, the project "Teaching Systems Thinking to Protect Wildlife: A Pilot Study in West Bengal's Secondary Schools" was incorrectly titled as "Protecting Wildlife by Integrating Systems Thinking Principles in West Bengal Secondary School Curricula". The sentence "The implementation of the *Protecting Wildlife by Integrating Systems Thinking Principles in West Bengal Secondary School Curricula* presented a range of obstacles that highlight the systemic limitations of the current education structure in India's remote regions" has been changed to read: "The implementation of *Teaching Systems Thinking to Protect Wildlife: A Pilot Study in West Bengal's Secondary Schools* presented a range of obstacles that highlight the systemic limitations of the current education structure in India's remote regions."

There was a mistake in [Table 2](#) as published. The serial numbers were missing for several schools. The corrected [Table 2](#) appears below.

The original version of this article has been updated.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

TABLE 2 Student and teacher reactions.

Serial #	Name of school	Student reactions
1.	Adarsh Vidyalaya Hindi High School, Jalpaiguri	Students spoke about their direct encounters with elephants, including raids on homes or crop fields. One student admitted: <i>“Our field was destroyed by elephants a few times, and once I even tried to take a selfie with a bull. It chased me, and that moment taught me a lesson I will never forget—you should never chase elephants, because they are powerful beings who deserve their space.”</i> The experiential activities also left a strong impression, particularly the Interdependence game. A participant reflected: <i>“The game was so much fun, but it also made me realize how everything is connected—humans, animals, and forests. If one part collapses, the whole system suffers.”</i> Following the Habitat Loss game, one student explained: <i>“There are new railways and highways everywhere, trees are cut down for timber, tourists go everywhere and trashing our forests. These things destroy forests, and if the habitat keeps shrinking, elephants will have nowhere to go. But farmers like us will also lose our crops and our lives will get harder.”</i> The 15-minute nature immersion helped students pay closer attention to their surroundings. One young girl described: <i>“When I closed my eyes, I could hear the sweet songs of the birds and even feel ants crawling in the grass. I realized how alive everything is around us.”</i> Another youth added, <i>“Our school used to be greener when I was younger, but now many trees are gone. I miss that.”</i> In the end, many students expressed a new empathy for elephants. One summarized: <i>“I see them differently now. Elephants are just like us—they are trying to survive and care for their families.”</i>
2.	Kanta Dighi Kumar Para High School, Jalpaiguri	Students were asked to spend 15 minutes in nature, quietly observing and sensing everything around them without distraction. During this time, they appeared more relaxed and open, often smiling at one another. The boys chose to stand near a narrow road lined with tea bushes, while the girls walked along a small path between their village and a tea estate. After they returned to their class they were asked to write short essays about what their five senses revealed. One youth explained: <i>“I focused on the sounds of the birds, the smell of elephant dung near the tea bushes, and the gurgling of a narrow stream. But then I also noticed garbage lying around and the noise of passing vehicles. Those things spoiled the moment, yet still, it felt good to be outside the school compound.”</i> Another added, <i>“When I paid attention with all my senses, even the little things like ants in the grass or the breeze on my face made me feel more alive.”</i> On the final day, students were encouraged to ask questions and reflect on their learning: • “We have seen elephants many times, but until now, I had never thought about what they might feel or how they see us.” • “We learned that female elephants live in close herds and protect their young ones. They must always be stressed, worrying about their calves, especially since humans have taken over their migration paths.” • “Why do elephants damage crops and houses? Are they angry at us, or just hungry?”
3.	Lal Bahadur Shastri Smarak Bengali Hindi HS School, Jalpaiguri	Twenty students were taken outdoors near the Kuji-diana River for the nature immersion activity that Shabbir and Gupta explained. They were excited to step out of the school and spread themselves along the riverbank. Some removed their shoes to feel the water flow between their bare feet, others sat quietly on the grass, while a few chose to wander along the riverside. Their teachers gently reminded them not to get distracted, but instead to use all four senses—touch, smell, sight, and hearing—to fully experience the natural world around them. Back in class, the students eagerly shared their reflections. One remarked: <i>“My family often travels to expensive, overcrowded tourist places that are full of trash. But today I realized that the beauty around me is far better than those popular sites—we already have such rich surroundings in our own backyard.”</i> Another added, <i>“I live near this river, but I had never really looked at it or felt it this way before. It was like seeing my home for the first time.”</i> Afterward, the students watched three solution-focused films, which sparked a lively Q&A session. Their questions included: • “Why do elephants throw dirt on themselves?” • “What exactly is the colour of an elephant?” • “What should we do if a bull elephant becomes aggressive?” • “Why are the ears of African elephants shaped differently from those of Asian elephants?” • “What can farmers do when elephants destroy their crops?” • “How much does an elephant eat in a day?” Teachers then encouraged the students to think about their own actions. One group reflected: <i>“We will stop throwing food waste out of train windows—it only attracts animals to dangerous places. We also want to appreciate the natural spaces around us more, instead of ignoring them.”</i> The session ended with deeper questions from the students, showing how their thinking was expanding: • “Why do we ignore the beauty of our own surroundings, and instead spend money to visit polluted tourist spots just to feel connected with nature?” • “Can’t development projects be more sensitive to wildlife so that we can prevent horrific accidents? We already know that making underpasses under busy railways and roads can save lives, so why are there so few eco-friendly developments?”
4.	Birpara Shree Mahavir Hindi High School, Alipurduar	Chettri encouraged the students to ask questions and share their personal experiences with elephants. One of them responded by sharing her uncle’s close encounter with a bull elephant who almost killed him while he was guarding his crops. She said, <i>“Humans fear elephants, but we are also the reason for the challenges they are facing today. We need to respect their presence.”</i> Another student seated in a back row shared, <i>“My uncle was killed by an elephant a year ago, but I still do not resent elephants.”</i> She almost broke down and cried while narrating this story and had to be consoled by Chettri. Another student complained: <i>“Every year elephants damage houses in my village. I want to understand why they are so aggressive.”</i> One of them said: <i>“I help my family with crop guarding during the harvest season.”</i> The opportunity to share their personal stories made the discussions more relatable, and easier for students to ask questions. The students were then taken out for a 15-minute nature immersion activity near the school. Since the school was situated inside a busy market, it was difficult to find a quiet place. They adapted and took the students to a temple situated beneath a revered old

(Continued)

TABLE 2 Continued

Serial #	Name of school	Student reactions
		and tall banyan tree. After 15 minutes of contemplation, the students shared their observations. One student said: <i>“The Ficus religiosa tree adds natural value to the concrete jungle. It provides shade from the scorching sun, offering a soothing experience. People also worship the tree by tying red strings around it and lighting incense sticks, which adds cultural significance.”</i> Another observed: <i>“It wasn’t until recently that our school became surrounded by so many buildings—a noisy market, shops, hawkers, and houses. It causes disturbance all the time and makes it hard to focus in school.”</i> One of the new attendees said: <i>“Elephants are very protective of their family members and generally avoid risking the safety of their young ones.”</i> Some of the students shared their experience of the nature immersion activity by reading out their essays. One of them said: <i>“The Ficus religiosa tree is surrounded by concrete buildings on all sides. We should respect and conserve trees, and avoid any kind of construction around them.”</i> Another student shared a hand-drawn map, explaining: <i>“This shows the tree with our school at the centre and the market nearby. It’s a way to show how congested our school area has become.”</i> Four conflict-related films evoked traumatic expressions of shock and distress after witnessing scenes of injured and dead elephants. Some of the questions that emerged in the discussion included: a. <i>“If the sensing ability of elephants is so high, why can’t they sense an approaching train and get out of the way?”</i> b. <i>“Are elephants also killed for their skin?”</i> c. <i>“Are elephants good swimmers?”</i> One of the students shared a powerful reflection on social media and elephant bullying. He said: <i>“Young men love to brag on social media and the addiction can be dangerous. I’ve seen young people trying to take selfies with elephants and harass them. Wild animals should not be treated as entertainment.”</i> His words received a big round of applause from his peers, who strongly agreed with his opinion.
5.	St. Maria Gorethi Girl’s High School, Alipurduar	After students were shown three conflict-related films, Devi encouraged them to ask questions. Some of the questions the students raised included: a. <i>“How fast can an elephant run when he’s angry?”</i> b. <i>“Do elephants get drunk when they consume ‘Handia’ or rice beer?”</i> c. <i>“If people pretend to be dead, will the elephant attack?”</i> The remaining ecological principles—Cycling, Feedback, Adaptation, and Emergence—were explored after a nature immersion activity during a trip to a nearby plantation. The students were asked to use their senses to feel the natural world, carrying notebooks to jot down their observations. After returning to class, many shared their reflections. One student said: <i>“It was a nice escape into open space, away from the congested classroom.”</i> Another student added: <i>“Even though it was hot, stepping into the shade of tall trees felt refreshing.”</i> One of the girls who chose to sit next to the small stream observed: <i>“We saw small fishes swimming back and forth, and the big banyan tree created a small ecosystem, perfect for little beings like ants, algae, and insects.”</i> Another young girl shared a particularly insightful observation about ants: <i>“I saw an army of ants moving right next to me on the ground. Out of curiosity, I placed a small twig in their path. To my amazement, some ants teamed up and took a detour, while the others followed. I wish I could be that quick in decision-making and look at the bright side of situations when there are setbacks in my life.”</i>
6.	Lataguri Boy’s High School	Four conflict-related films, including one on human-elephant negative interactions, were shown to the students. They were less interested in the theoretical part and eager to watch the films, leading to multiple screenings on Day-1. Das began the session by asking the students to recap their learnings. One student spoke thoughtfully: <i>“Elephants are social animals with unique relationships. Females live in close-knit herds, taking care of calves, while bulls live alone after their teenage years. But their traditional movement routes are threatened by unplanned development—railways, roads, mining—and habitat degradation is pushing elephants into farmland, causing huge economic losses for local communities.”</i> After the recap, the students asked insightful questions, such as: a. <i>“Why does the government allow mining in these landscapes?”</i> b. <i>“Why punish local loggers and not big industrialists who cause more damage?”</i> They then watched two additional films on bullying and human-leopard interactions before going to the periphery of Gorumara National Park for a 15-minute nature immersion activity. On returning to class, students shared reflections. One said: <i>“The railway lines cutting through the National Park are causing many elephant deaths.”</i> Another noted, <i>“The small stream of water is filled with garbage, harming the ecosystem.”</i> Students also questioned insensitive development projects, like the railway track and overbridge in Lataguri, which disrupt elephant movements. Although students were inattentive at the start and the school administration did not provide additional support, many later shared profound reflections. One asked: <i>“Why does the government turn a blind eye to environmental damage caused by big industries?”</i> Another young girl said: <i>“Observing unplanned roads and railway projects blocking elephant routes made me realize how human development affects wildlife. This workshop helped me understand that protecting nature is not just for animals, but also for our own survival.”</i>

(Continued)

TABLE 2 Continued

Serial #	Name of teacher and school	Teacher reactions
7	St. Maria Gorethi Girls High School	St. Maria Girls High School teacher underscored the importance of outdoor activities and nature immersion programs: <i>“The interactive multimedia and games increased student participation, even among those who were previously disengaged. I was so impressed that I’m considering expanding the program to lower grades, though time and resource constraints are a challenge.”</i> She also highlighted the need for regular teacher’s training to enhance community awareness and program impact: <i>“When more teachers are involved, the message can reach many more students. We need to integrate environmental studies into the curriculum and hold more frequent sessions—not just once a year—so that we stay connected to the program and share more with our students.”</i> Another teacher said of the nature immersion: <i>“The silence of this area compared to the noise near the road was a completely different feeling. As I stood there looking at the sky, I saw a flock of birds flying across the sun. The cool breeze brushed against me, and the sounds of the birds awakened my senses. In that moment, I realized how beautiful nature truly is—but felt saddened by the way people are dumping garbage everywhere, and spoiling the beauty.”</i>
8	Lal Bahadur Shastri Smarak Hindi Bengali High School	The lead teacher praised the Innovative Teaching Curriculum (ITC), noting how its interactive approach inspired students: <i>“Students must be involved in programs like this. What they learn here, they can share with their friends and even encourage them to get involved too. The ITC is truly unique and impactful at the grassroots level. However, we lack the tools to monitor the program’s impact effectively. I believe door-to-door campaigns could enhance community engagement.”</i> Another teacher said: <i>“This was a truly unique workshop—unlike anything we teachers had experienced before. For the first time at the school level, we had the opportunity to engage so closely with wildlife through films and discussions. We learned so much, especially about the lives of elephants, and this workshop gave us a deeper appreciation of their world.”</i>
9	Birpara Shree Mahavir Hindi High School	<i>“This curriculum deepened my understanding of elephant behaviors and ecological principles. My students, who had never been exposed to systems thinking, quickly grasped the connections between human-wildlife conflict and human pressures. Despite challenges with community awareness and balancing exams, with the support of my Headmaster and colleagues, I successfully conducted a two-day ITC (Innovative Teaching Curriculum) for grades 10 and 11.”</i> Another teacher highlighted some of the challenges in implementing the ITC, including teacher shortages, irregular student attendance: <i>“There are pressures from the administration, and in some schools, there are too few teachers. Many students are not regular in school, and our timetable gives us only 35 minutes to finish the syllabus. That leaves no time for extra lessons, and this is one of the biggest challenges teachers face.”</i>
10	Lataguri Boys’ High School	Highlighting the community resistance shaped by poverty and frequent human-wildlife conflicts: <i>“The ITC needs to reach more tribal-majority schools in Northern West Bengal. Including teacher-in-charges and Headmasters in future workshops will be crucial, as their influence can drive broader change.”</i>