

Teaching Evolution in the Galápagos

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Abstract

Experiential learning can be an effective way to teach many concepts, and evolution is no exception. We describe the pedagogical techniques, class structure and learning objectives, travel logistics, and impact of three undergraduate honors-level experiential learning seminars that combined teaching topics related to evolution with a field trip to the Galápagos Islands. One class took place in Spring 2002 focusing on animal behavior, biodiversity, and evolution (13 students), and the other two were held in Spring 2009, with one seminar focusing on international environmental policymaking (3 students) and the other on how the natural history of the Galápagos influenced the development of Darwin's thought (7 students). Qualitative comments from students illustrate both short and long term impact of the class on learning about evolution.

Keywords: Evolution, Galápagos, experiential learning, honors curriculum.

Experiential learning has long been touted as an effective way to introduce students to and immerse them in a subject area, and is a hallmark of many honors-level courses (see, e.g., Braid & Long, 2000; Bruce, 2005; Harper, 2006; Machonis, 2008; Srikwerda, 2007). Using experiential learning to teach evolution can be particularly powerful. In this paper, we highlight three honors-level experiential learning seminars that combined teaching topics related to evolution with a field trip to the Galápagos Islands. One class took place in Spring 2002 with a semester focus on animal behavior, biodiversity, and evolution (13 students), and the other two took place in Spring 2009, with one seminar focusing on international environmental policymaking (3 students) and the other on how the natural history of the Galápagos influenced the development of Darwin's thought (7 students). The Spring 2009 seminars traveled together to the Galápagos, along with a group of 10 adult learners through the university's Continuing Studies program. We describe the three approaches to teaching about evolution in the Galápagos, highlight similarities and differences in course structure, compare the two visits to the Galápagos, and compare student comments and learning objectives.

Seminar Structure and Course Descriptions

All three classes were developed as honors enrichment/experiential learning seminars and students earned one hour of course credit. All were part of the UNCW Honors Scholars Program "International Splash" initiative that encourages short study abroad experiences

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to whet the students' appetites for more comprehensive international study. Other destinations have included locations such as Paris, Prague, Berlin, the Amazon, and southern Spain. Students from all majors enroll. The typical course format is to hold class for an hour a week during the first half of the semester, then travel during spring break to the related international destination as the capstone experience. Debriefing and follow-up presentations by students are held during the second half of the semester. However, the 2009 Galápagos trip was held in May at the end of the semester to facilitate travel scheduling.

The 2009 Honors Enrichment seminar, *The Shaping of Darwin: Geology and Biology of the Galápagos* (taught by PHK), examined the life and work of Darwin in relation to his visit to the Galápagos. In particular, the course focused on how the biology and geology of the Galápagos archipelago shaped Darwin's understanding of the evolutionary process. Readings were mainly from the primary literature, including Darwin's scientific predecessors and contemporaries (e.g., Cuvier, Lyell, Erasmus Darwin, and Lamarck). Darwin's writings are now available online at <http://darwin-online.org.uk/> and students read several of Darwin's works: including the Galápagos sections of the *Beagle* diary and the *Voyage of the Beagle*, Notebook B: [Transmutation of species], and sections of the first edition of *Origin of Species*.

Students selected a taxon to research (Galápagos penguin, tortoises, finches, blue-footed booby, frigate bird, land and marine iguanas), gave a presentation to the class before the trip, and then served as a resource in the Galápagos. Finally, students produced journals based on their visit to the Galápagos using Darwin's work as a model – a field notebook (based on the model of the *Beagle* diary) and a more polished journal (akin to Darwin's *Voyage of the Beagle*) in which they elaborated on their field observations and reflected on their experience, comparing it with Darwin's experience of the Galápagos.

The 2009 Honors Enrichment Seminar, *Managing Evolution's Workshop: Global and Local Interests in Galápagos* (taught by JEH), examined how the various forces (domestic and international) interested in the Galápagos archipelago have shaped its management and conservation. We know that Darwin considered his voyage on the *Beagle* to have had a transformative impact on his life. It is equally evident that Darwin's visit had momentous consequences for the country of Ecuador and the Galápagos. Darwin's life, the publication of *On the Origin of Species*, and the subsequent development of science, generated the international interest in the archipelago that resulted in the international conservation effort. Although the first decades of the conservation effort were characterized by international support and benign neglect on the part of the Ecuadorian government, in the last two decades, tourism, a democratic transition and international fishing interests have emerged as key elements of the conservation effort. Thus, students examined the impact of each of these events from the international environmental policymaking perspective.

Course assignments included background readings on the Galápagos from both international and domestic political perspectives. In addition to Larson's *Evolution's Workshop: God and Science in the Galápagos Islands*, students read two key reports: *Galápagos at*

Risk produced by the Charles Darwin Research Station and *An Analysis of Nature Tourism in Galápagos* by McFarland. These reports focus on the contemporary pressures confronting the archipelago and provide discussions of various options for continued high quality conservation. Additional background material on the Ecuadorian political system and Galápagos' place in the same, as well as information on exactly what "eco" or "nature" tourism is, were provided via lectures.

Each student selected a park or marine reserve management issue to pursue in greater depth for a classroom presentation. Similar to the other seminar, the students kept a journal in which they chronicled their observations about conservation rules and how they were observed by the officials and local residents.

Faculty leading the 2009 seminars also produced a guidebook summarizing the material studied in each course; this served as a resource not only for the Continuing Studies participants but also for students in the other seminar. Further, both 2009 seminars were part of the UNCW Evolution Learning Community- a campus- and community-wide celebration of the 200th anniversary of Darwin's birth and the sesquicentennial anniversary of the publication of *Origin of Species*². The students had the opportunity to attend lectures by noted Darwin Scholars throughout the semester, including Eugenie Scott, David Buss, Peter Carruthers, Kevin Padian, David Quammen, and David Mindell.

The 2002 Honors Enrichment seminar, *Galápagos: Exploring Evolution* (taught by KEB and MG), centered around the study of the animal life of the Galápagos with attention to island biogeography, behavioral ecology and current examples of evolution. After going over the basics of evolutionary terminology, we assigned two longer readings for discussion over the next few class meetings- Weiner's *Beak of the Finch*, and a section on the Galápagos and island biogeography from Quammen's *Song of the Dodo*. We also viewed and discussed the film companion to *Beak of the Finch*—"What Darwin Never Saw", which highlights the Grants' research on observable evidence of natural selection in the medium ground finch on Daphne Minor. Similar to the other seminars, students chose and researched different species (e.g., lava lizard, marine iguanas, Galápagos penguins, Galápagos tortoises, waved albatross, finches, mockingbirds, boobies, fur seals, and introduced mammals), presented mini field guides to the class before the trip, and served as the "experts" on the species on the trip. Students also kept journals in the Galápagos--part field notes and part personal reflections.

A highlight during the semester was having noted author and nature-writer David Quammen as a featured speaker on campus; the students were able to spend time talking with him informally after his lecture. At the end of the semester, we gathered to share photos and journal entries over an Ecuadorian pot-luck dinner.

² <http://library.uncw.edu/web/outreach/evolution/index.html>

Itineraries

2009 Island-Based Tour

The visit began with a tour of the capital city of Quito. During the tour group members witnessed a common political event, a protest, outside the Presidential Palace. The next day we traveled two hours north to the indigenous community of Otavalo. In our trip through the Ecuadorian countryside, all group members saw the development process, examples of land invasions, examples of incomplete home construction, as well as the various types of national industry. All of these factors provided the background to understanding the context of the management challenges in Galápagos, which include mainland problems with access to land and jobs in a predominantly agricultural economy.

The combination of high population density and land pressure has resulted in migration to the Galápagos in search of tourism-related jobs, which has led to a population explosion. In the 1990s this population growth was also driven by the international fishing industry interest in sea cucumber. Although that fishery is largely depleted, fishing interests have focused on other species for extraction and park, research station and national government officials have increased efforts to divert employment away from marine reserve extraction to tourism. Because the tourism industry has long been foreign-dominated, officials are now promoting what they call a domestically-sustainable model that puts tourism revenues in the hands of Ecuadorians. This means more island-based tours with day trips.

The island of Santa Cruz served as the base for the Galápagos visit, from which day cruises were taken to Floreana and Isabela, as well as to smaller islands for bird-watching (e.g., Daphne Major, Enderby). Exploration of Santa Cruz included the highlands (the Primicias tortoise reserve and volcanic features such as craters and a lava tunnel), as well as Bachas Beach with its marine iguana population. A brief visit was also made to the Charles Darwin Research Station to observe the tortoise breeding program. Floreana offered the giant tortoise reserve and highland springs and caves. On Isabela, a hike to Sierra Negra volcano yielded spectacular views of the caldera. Each day trip also provided opportunities for snorkeling, including deep-water snorkeling in an area frequented by sea lions.

The itinerary thus enabled students in the *Shaping of Darwin* seminar to observe the geology and recognize the role of plate tectonics in creating “evolution’s workshop” in the Galápagos. Students were excited to witness the organisms they had researched and to make observations of the fauna and flora similar to those made by Darwin in the *Beagle* diary and *Voyage of the Beagle*. Such experiences allowed them to consider the role of the Galápagos in the development of Darwin’s thought.

Students in the *Managing Evolution’s Workshop* seminar had the opportunity to discuss park rules and regulations with the tour operator, the naturalist guides, and members of the Galápagos community. Through their experiences during the tours and after hours

around Puerto Ayora, they confirmed and discovered new aspects of the status of the management model and the conservation process.

Each evening at dinner there was a discussion of what students had learned from their tour guides, the boat operators, or locals they had encountered. In addition during the tours and at dinner, the Continuing Studies participants in the tour frequently made use of the student resource persons.

2002 Boat-based tour

As most flights to Ecuador arrive late in the evening, the day following arrival in Quito was scheduled for an introduction to South American bird life. This involved an early morning drive into the Andean forest exploring West Slope cloudforest sites of Mindo and Bellavista. The incredible biodiversity of this region stands in marked contrast to the relative paucity of species in the Galápagos; indeed we recorded more bird species in a single morning in the cloudforest than we were to see during the entire week in the islands. This contrast set the stage for a deeper understanding of the principles of island biogeography that were course themes.



Figure 1. Students and faculty disembark from the panga and try to avoid stepping on sea lions at Isla Lobos, Galápagos.

We boarded our economy-class boat for our six-night cruise after an early morning flight to the island of Baltra, and by early afternoon were hiking on South Plaza Island. Life on the boat generally involved cruising to the next site at night so that we woke up at the day's destination. Morning hikes were followed by mid-day snorkeling (sometimes with penguins or sea lions) and then a brief cruise to a second site for an afternoon hike. Evenings were spent debriefing the day's sightings under the stars; highlights each night were the construction of a bird, mammal and fish list by the group and discussion of the significance of what we had seen. The on-board presence of an Ecuadorian park guide enhanced the value of experience by providing a cultural window, as well as through his expertise as naturalist and the local crew gave us additional perspective.

Our itinerary included South Plaza, San Cristobal, Espanola, Floreana, Santa Cruz, Bartoleme and North Seymour Islands—completing a more-or-less clockwise route from Baltra. By visiting these and numerous smaller islands we were able to observe most of Darwin's finches and all four of the endemic mockingbirds that were perhaps even more crucial to Darwin's thinking than the more famous finches, as each is recognizably like the mainland mockingbird, yet quite distinctive.



Figure 2. Students and faculty enjoy the view from the summit of Bartoleme Island, Galápagos.

On South Plaza Island we had our first views of land iguana and aerial views of red-tailed tropicbirds, swallow-tailed gulls and the ubiquitous frigate birds. San Cristobal allowed us to see two of the three booby species at Punta Pitt (masked and blue-footed), the sea lion colony on Isla Lobos, and the spectacular Kicker Rock. Espanola provided good looks at marine iguanas, Galápagos hawks, and the Hood mockingbird. In addition to Floreana, we visited nearby Champion Island to see the Charles mockingbird. While we did not go to Isabela, Bartoleme afforded impressive views of Pinnacle Rock and an introduction to the more vulcanized geology characteristic of the western islands.

In the middle of the week, we anchored at Puerto Ayora on Santa Cruz, and spent a day touring the Charles Darwin Research Center. The students also had a chance to spend an evening in the city and meet local residents, similar to the 2009 experience.

The six-night cruise allowed us to see most of the endemic Galápagos species and to closely observe and consider many of the clues that influenced Darwin's thinking. Returning to Quito, we toured the colonial city, and then had a memorable dinner at a traditional restaurant



Figure 3. UNCW students approach Kicker Rock, Galápagos.



Figure 4. Students, adult learners, and faculty enjoy the ride between islands in the Galápagos, encountering dolphins.



Figure 5. Students and a tortoise at the Charles Darwin Research Center on Santa Cruz Island, Galápagos.



Figure 6. Students, community members and faculty watch giant tortoises roaming freely on Santa Cruz Island, Galápagos.

Learning Objectives and Student Responses

Instruments

In addition to a standard open-ended response instrument used to record student comments about the class, the 2009 seminar instructors designed a survey to administer on the flight home. Questions were identical for the two seminars except for one question geared specifically for each seminar topic. The 2002 seminar instructors utilized the open-ended feedback instrument only, but added comments from three students seven years later.

2009 Seminars

The learning objectives for the *Managing Evolution's Workshop* course were to develop an understanding of the process of international environmental policy-making, evaluate the impact of scientists on domestic political environments, and understand the obstacles to conservation in the Galápagos. For the *Shaping of Darwin* course, objectives were to understand the scientific and social context of the development of Darwin's ideas, compare Darwin's views on evolution with those of his predecessors, analyze the development of Darwin's thought as revealed in his writings, evaluate the factors influencing the development of Darwin's thought, particularly the role of his visit to the Galápagos, and reflect on Darwin's influence on science and culture.

How well did the travel experience relate to the topics covered in class? Most students noted the strong relation between the travel experience and the topics covered in the class. In some cases, they offered suggestions. Comments included:

- Our class covered mainly the political science of the Galápagos and Ecuador's involvement. The travel experience allowed me to see the management issues that we discussed in class and what "sustainable tourism" implies. However, the experience didn't really relate to the solutions to the issues and all the groups interested in exploiting, profiting or managing the islands.
- The topics covered in class such as information about geological and evolutionary theory wonderfully overlapped with our tour of the Galápagos. The readings of Darwin's essays and journals gave us the chance to witness the things personally described by Darwin.
- I think it related really well to all of the stuff we read by Darwin. I was able to pick up on many of the same characteristics and observations as he wrote about as well as seeing the immense diversity of organisms on the island.
- In-class discussion focused on the shaping of evolutionary thought, but the Galápagos trip focused more on observing the fauna than on discussing its evolution.

What did you expect to get out of this trip and were your expectations fulfilled? Most comments were very positive- "an experience to remember" and "my expectations were far exceeded." Some suggestions were also mentioned:

- I expected to learn about a foreign culture, get up close to the nature of the Galápagos and learn more about the conservation. I didn't learn much about conservation/management but my expectations were more than fulfilled in terms of culture and nature, especially marine life/shore animals.
- I was expecting to have a wonderful experience being in a foreign country, witnessing a different culture, and seeing a unique flora and fauna that I may never be able to see again. Although I, and others, became ill during the trip, my expectations were more than fulfilled.
- The time we spent in the Galápagos was amazing, but there was so much that we did not see and I would have liked to of spent more time in the Galápagos and less time on the mainland.
- I expected to enjoy the trip and continue to learn about the Galápagos. Both of these were fulfilled. However, I was also expecting to discuss a little more about Darwin while we were down there, which we did not do.

What experiences did you find most memorable? What might be the long-term impact of this trip, for you personally? All students mentioned interacting with the animal life, particularly the marine mammals (snorkeling with sea lions, having a large group of dolphins swim with our boat).

- Riding in the front of the boat with the dolphins and swimming with the sea lions. This trip has reminded me how beautiful nature can be when it's unspoiled and given me more drive to want to work to conserve these animals.
- It enhanced my interest in marine biology and may have an impact on my future plans.
- One thing I did not expect was how much I bonded with the other students on this trip. I hope we all stay in touch. I won't forget this trip and all the people who were with me. It was (also) very refreshing to experience a new culture.
- I also learned a lot not just from being in a new place but experiencing all new things with people who were strangers a week ago but are now [my] friends. Hearing other people's ideas and thoughts was really mind opening and realizing I can have so much in common with people who are so different from me was really the most lasting impact on me, as well as taking in true natural beauty of the world and how well it can work in harmony as one.

How well did the travel experience enhance your knowledge of the current management problems in the Galápagos National Park and Marine Reserve?

- The travel experience allowed me to see firsthand the management problems that exist, mostly from tourism, and the issues that Ecuadorians need to address.

How well did the travel experience enhance your knowledge of how Darwin's ideas were shaped by the Galápagos?

- Really well, it made me have a deeper appreciation for his inferences because while after having all the facts it is easy to conclude with natural selection but vis-

- iting Galápagos made me see how difficult it must have been to pick out all the right and relevant information.
- Actually observing differences among the tortoises helped me see the role of natural selection.
 - It is hard to make the connection to the shaping of Darwin's ideas when many of the plants, especially, and to some extent the animals that we saw are not native of the Galápagos. [commenting on the large number of recently introduced species]

Thus, the survey results for both sections of the 2009 seminars indicated that the travel component clearly enhanced the overall learning experience of the course, both intellectually and in terms of broadening student perspectives. Student comments suggest that these gains will be long-term. A few comments indicated that more deliberate review during the trip of the material covered during the semester (e.g., on evolution and the evolution of Darwin's thought) would have been helpful. Such discussions were held with individual participants or in small groups, but the opportunities for group discussion were hampered by having to divide participants into two groups based on the limited capacity of the boats used for day trips. Some "recapping" of daily experiences was done at meals, but the large size of the group made it difficult to include all participants in these discussions. In addition, 21 of 22 participants were sick by trip's end, hindering the "wrap-up" activities. Had it been possible to make the trip before the end of the semester, such a review would have been built into the course.

2002 seminar

Learning objectives for the animal behavior and evolution seminar were to understand basic concepts of evolution, especially adaptive radiation, biodiversity, and ecological niche, with an appreciation for current examples of natural selection in process. Similar positive responses were made by students in the 2002 seminar on the open-ended feedback instrument. All but one student commented that the class met their expectations; this student did not like keeping a journal and thought the workload was too heavy. All the other students noted that the assignments and readings complemented the visit to the Galápagos, and allowed them to express what they learned in class. As above, several noted that this was the "trip of a lifetime." One student recommended that additional class time be allotted for reviewing travel guides (several were recommended to the students), and one suggested scheduling a hike to practice using binoculars before future trips. Other particular comments and insights are included below, and reflect the positive experience of experiential learning and the benefits of travel to another country.

- It was great to see the evolution we learned about in class in a first-hand situation.
- I would recommend this course to everyone; the style of learning can not be duplicated in a classroom.
- The workload for the class was just right. It was challenging in the sense that the more knowledge you gained [before the visit], the more beneficial the trip to Ecuador was [for you].
- The experience I gained by seeing what life is like outside the U.S. is priceless.

- This course challenged me to learn about a place very different from what I know. In learning about the Galápagos, I unexpectedly learned a great deal about myself and my country.

Long-term impact

We (MG and KEB) contacted three students who traveled on the 2002 trip to ask about long-term impact of the class. While majors of the students in the class ranged from biology, psychology, and geology to education and business, we were able to contact only three students who are currently in doctoral programs in biology. While clearly not a representative sample, the comments from these students are revealing.

Thoughts about experiential learning

- I feel like I never truly understood endemism and how special it is until visiting the Galápagos. The fact that these animals strutted in our path made it even better. I did not have to hunt to find the elusive blue-footed booby, I had to side-step it on the trail. I loved the fact that I had to step over sea lions during hikes...The thought of the trip, even though it was more than 7 years ago, brings a smile to my face to this day.
- One of my favorite parts of the trip was the nightly "list-making" sessions. I loved spending time every evening listing the birds, mammals, fish, reptiles, etc. that we saw each day. I still have my journal and animal list ... at my parents' house and I read it nearly every time I visit. I loved that trip and throughout all of my travels have never come close to experiencing a better outdoor classroom.
- The trip to Galápagos was more than a once in a lifetime experience. It was a chance to see first-hand everything that we had read about in texts in action. I had always dreamed of being able to see the famous tortoises, mockingbirds, and finches, but honestly didn't think that was something that could become reality.
- And talk about active learning--going to the Galápagos Islands to see where Darwin first imagined the concept of evolution, seeing the animals he saw, witnessing first-hand the differences in finch beaks and the incredible adaptations (and fearlessness) of island animals is as active as you can get! Before the trip, we all specialized in a particular area, becoming experts and teaching our peers. The upcoming trip made us especially eager to learn all that we could...On the trip, our prior knowledge allowed us to observe not as tourists, but as scientists. We asked more informed questions and understood more fully the differences between the islands when we were there than any tourist could, and we took our understanding of evolution to a [higher] level.

Relation to other Academic Experiences

- I read *Beak of the Finch* for the first time in your class (and have since re-read it twice for other courses). What we got to do that I believe was truly unique was to read this book and then go to the islands and see the finches. Though I regret that I was not the birder then that I am today, I felt so connected to ...the process of

evolution as we looked at ...the finches on the various islands. Seeing Daphne Minor and knowing the great science that occurred on that tiny island... I will never forget that sensation. Last year I heard Rosemary Grant speak [at a conference] and felt so close to her work...like I had been there all along, measuring beaks or avoiding giving water to thirsty birds in times of drought. I think I was able to feel so close to her talk because I had been to the islands and seen "her" finches. When she showed pictures, I felt my chest puff out a little as in "Ah yes, I too have seen that."

- The course started and expanded my deep interest in evolution, natural selection and sexual selection. I have seen things that many other scientists have never experienced because I saw what nature can do when left to its own devices. Since taking the course I have read many books on natural and sexual selection and Darwin. Every time I read about the iguanas or boobies or tortoises I feel truly lucky that I have seen those things with my own eyes. It is one thing to read about a frigate bird's mating display in a book, it is another to see an island with bushes "bleeding" with the red throats of displaying males so rowdy you can barely hear yourself think.
- Since I was young, I knew that I wanted to become a scientist, but in a way that trip opened my eyes to the many possibilities that I could pursue for a research career. I went from studying fish behavior as an undergraduate to behavioral resistances to disease in honeybees in graduate school. I could've gone to any number things, and it was the experience in Galápagos that gave me that insight. I started thinking more outside of my niche and became more interested in a variety of organisms and systems.
- As a PhD student, I am now a behavioral ecologist ... a field that draws strongly from evolutionary biology. I have also taken several courses and been involved in several other efforts to better train graduate students in teaching pedagogy and bringing creativity into the college classroom. As I explore both of these fields of interest, I constantly call back on my experiences from my honors seminar that taught evolutionary biology with the capstone experience of traveling to the Galápagos Islands. In fact, this early experience during my sophomore year of college contributed very strongly to my decision to pursue animal behavior and evolutionary biology further, both as an undergraduate and now as a PhD student.
- ... This trip ... made me dedicated to offering similar experiences for my future undergraduate students when I am a professor.

Importance of Study Abroad

- The trip to the Galápagos was my first experience abroad, the first stamp in my passport. Since then I have been bitten by the travel bug and go everywhere I can afford to go.
- Traveling abroad gave me a greater perspective in my education that I likely wouldn't have been able to achieve otherwise.

Advice

Traveling with students is a gift. However, as can happen with any trip, unexpected situations arise. Participants in each of the seminars experienced unforeseen illnesses and lost passports. The value of scheduling a lay-over in Quito was brought home when one of the students lost her passport and was forced to remain in Miami with one of the group leaders. The passport was recovered and both flew into Quito the next day in time for the Galápagos flight. One of the 2002 participants recounted that she has taken this to heart:

- I carry thoughts of that trip and the lessons I learned with me in my daily life--lessons which also include keeping track of my passport, not eating things I am allergic to, always carrying Dramamine, and not jumping off of a ship with my snorkel in my hand.

Conclusions

The experiential learning component of these seminars, the visit to the Galápagos, was clearly the capstone for the classes. As many of the students commented, while they had read a good bit about evolution, actually seeing the animals, flora, and geology of the islands made the concepts come alive. In all seminars, the students commented that their prior research of the fauna or the park system added depth to their visit to the Galápagos. It is noteworthy that students in all seminars represented a variety of majors. Further, the faculty represented three different disciplines, and each was able to connect discipline topics to the teaching of evolution and its impact on biology, animal behavior, geology, and politics. An important innovation in the 2009 seminars was the inclusion of adult scholars from various walks of life. Their presence underscored the importance of life-long learning to the college students, while offering richness to the discussions that took place on the trip.

While the value of using travel and experiential learning as a foundation for evolution-related classes is evident, the same model can be used effectively for teaching other topics as well. Still, the unique experience of walking the Galápagos Islands in the footsteps of Charles Darwin offers a perspective that is unsurpassed.

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