

# Chapter 8

## Evolution Education in Galápagos: What Do Biology Teachers Know and Think About Evolution?



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**Abstract** In Galápagos, whose economy is based on tourism, the idea of evolution is common throughout society—including in school curricula. Biology teachers in Galápagos love the idea of evolution and are confident that they understand evolution. However, this confidence is not accompanied by a corresponding knowledge of evolution or an acceptance of several evolutionary principles. For example, although all biology teachers in Galápagos are familiar with Charles Darwin and his book *On the Origin of Species*, most favor Lamarckian explanations for life's diversity over those proposed by Darwin. The cognitive dissonance of accepting evolution, often alongside a literal interpretation of Genesis, suggests that biology teachers' ideas about evolution have been decoupled from economic priorities in the archipelago.

### 8.1 Introduction

Over 180 years after Charles Darwin set foot in the Galápagos archipelago—and put in motion ideas that would culminate in publication of *On the Origin of Species* (1859) almost 25 years later—these islands have been greatly transformed. Once a barren, rocky landscape host to overwhelming endemism and characteristically unafraid fauna, today they house thousands of non-native species, more than 25,000 human residents, and over 170,000 visitors annually (Moore & Cotner, 2013). Four of the archipelago's major islands—Santa Cruz, San Cristóbal, Isabela, and Floreana—have towns or villages (notably Puerto Ayora, Puerto Baquerizo Moreno, Puerto Villamil, and Puerto Velasco Ibarra, respectively) large enough to demand medical facilities, food markets, and schools. These schools are the focus

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of the work described below. Here, in the cradle of evolutionary thought, what do biology teachers—who work in these schools—know and think about evolution?

### *Darwin in Galápagos*

HMS *Beagle* visited Galápagos for five weeks in 1835, a late addition to the ship's five-year voyage. The *Beagle's* primary intent was to map the coastline of South America. However, along the way, Charles Darwin—the ship's 26-year-old unofficial naturalist—took several hikes to study geology and collect plants and animals. While in Galápagos, Darwin visited four islands and collected hundreds of specimens, including several varieties of mockingbirds. These mockingbirds (or “mocking-thrushes”) fascinated the young Darwin, who commented on their place-specific features: “In the Galapagos Archipelago, many even of the birds, though so well adapted for flying from island to island, are distinct on each: thus there are three closely-allied species of mocking-thrush, each confined to its own island” (Darwin, 1859, p. 402).

After he returned to England, Darwin gave the specimens he collected in Galápagos to several prominent naturalists (e.g., ornithologist John Gould), whose observations helped Darwin formulate his ideas about evolutionary mechanisms. After decades of deliberation, Darwin published *On the Origin of Species*, among the most—if not *the* most—important books in science (Laddaran, 2015; Moore, Decker, & Cotner, 2009). In *Origin*, Darwin presented his theory of evolution by natural selection, whereby heritable variation and differential reproductive success lead to adaptive evolutionary changes. While Darwin's conclusions were (Bowler, 2003; van Wyhe, 2008), and continue to be (Moore et al., 2009), societally controversial, in the 150-plus years since publication of *Origin*, copious compelling evidence has established natural selection as the only scientifically supported explanation for adaptive change (Larson, 2004).

Today's visitors to Galápagos often feel overwhelmed by Darwin and evolution. For example, vendors sell t-shirts, backpacks, stickers, books, DVDs, and other merchandise adorned with images of evolution, and most of the inhabited islands feature statues and busts of Darwin in prominent places (Fig. 8.1). In Puerto Ayora, the archipelago's largest town, and on Isabela, the archipelago's largest island, branches of the Charles Darwin Research Station lure thousands of visitors per month. Streets, buildings, businesses, and other sites named in honor of Darwin are abundant in Galápagos.

Tourism constitutes roughly 70% of the economy in Galápagos (Honey, 2008), and much of this tourism is linked—via place-names (e.g., Darwin Bay), merchandise (t-shirts featuring Darwin images and quotes from *The Origin*), and tour boats (Yaté Darwin)—with Darwin's visit and subsequent work. Therefore, one might hypothesize that people living in the archipelago would be better versed in evolutionary theory, and more accepting of Darwin's conclusions, than people elsewhere. Indeed, Darwin made the islands famous, and the livelihoods of the islands' residents depend on tourists who come to Galápagos to learn more about Darwin's visit and see the organisms that contributed to Darwin's ideas.

**Fig. 8.1** Darwin and evolution are everywhere in Galápagos. This bust of a young Charles Darwin is at a public plaza along Avenida de Charles Darwin in Puerto Baquerizo Moreno on San Cristóbal. (Sehoya Cotner and Randy Moore)



### *Evolution education and acceptance, around the world*

In many parts of the world, teaching about evolution has been, and continues to be, controversial, in most cases contributing to a populace that is relatively ill-informed about evolutionary biology. Several factors correlate with acceptance of evolution, among them the extent to which one is an “analytical” thinker (Gervais, 2015), and whether one was taught evolution but not creationism in high school (Moore & Cotner, 2009). Other factors correlate with denial of evolution, such as religious beliefs (Gervais, 2015; Moore & Cotner, 2009; National Center for Science Education, 2010), and political conservatism (Cotner, Brooks, & Moore, 2014). At the population level, acceptance of evolution can be predicted somewhat by Gross Domestic Product (the United States being a notable exception; Heddy & Nadelson, 2012). The situation is likely complicated by biology educators who themselves perceive a conflict between the biology they are teaching and religious convictions (Barnes & Brownell, 2016).

Yet rather than being extinguished by an ever-growing and overwhelming body of compelling evidence, creationism is globally pervasive (e.g., Blancke, Hjernistslev, & Kjaergaard, 2014; Clément, 2015; Miller, Scott, & Okamoto, 2006). Creation museums have become commonplace in the United States

(Creation Museums and Learning Centers, 2017), and they are now expanding elsewhere (Visit Creation, 2017). In 2007, the Council of Europe responded to the spread of creationism by passing Resolution 1580, which urges educational authorities in member states to “promote the teaching of evolution as a fundamental scientific theory” and to “oppose the teaching of creationism as a scientific discipline” (Blancke et al., 2014; Council of Europe Parliamentary Assembly, 2007). Similarly, the Interacademy Panel (IAP, a global network of science academies) issued a statement on the teaching of evolution, in which the signatories—from over 60 countries throughout Europe, Africa, Asia, Oceania, and South America—asserted that certain scientific truths have been well established, such as “our Earth formed approximately 4.5 billion years ago” and “Commonalities in the structure of the genetic code of all organisms living today, including humans, clearly indicate their common primordial origin” (IAP, 2006). In the United States, numerous scientific organizations support the teaching of evolution and reject creationism, most states’ educational standards mandate the teaching of evolution, and numerous court-decisions have ruled that the teaching of creationism (e.g., as “creation science,” “intelligent design”) is unconstitutional.

Despite these endorsements, creationism remains surprisingly popular. Moreover, the rejection of evolution is not restricted to a particular region or religious group. For example, in Iceland, a relatively small percentage (20%) are either unsure, or reject outright, the scientific validity of evolution, but in Turkey, 75% reject evolution. The United States lags behind all western European countries, yet ahead of Turkey, with ~40% of adults accepting evolution (Miller, Scott, & Okamoto, 2006).

A recent (2014) PEW study, “Religion in Latin America,” reports that throughout Latin America and the Caribbean, the percentage of people who agree that humans and other living things have evolved over time varies from 41% (in the Dominican Republic) to 74% (in Uruguay). Ecuador, which includes Galápagos, falls in the middle of this spectrum. Fifty percent of Ecuadorans surveyed agree that humans and other living things have evolved over time, and 44% think living organisms have existed in their present form since their creation. Similarly, 50% of those surveyed perceive a conflict between science and religion. In Ecuador, as in other countries, education influences these perceptions. For example, among adults with secondary education or higher, 58% agree that humans and other living things have evolved over time; in comparison, 43% of those with less than secondary education agree with this statement.

### *Evolution education in Galápagos*

Given that evolutionary theory is typically taught in biology class, we wanted to learn—from biology teachers in Galápagos—answers to the following questions:

1. What do biology teachers in Galápagos know about the basic aspects of evolutionary thought?
2. To what extent do biology teachers accept the theory of evolution?
3. Charles Darwin is closely associated with Galápagos. What do biology teachers in Galápagos know about this connection?
4. How do biology teachers perceive their role as evolution educators, and do they value the role that Galápagos has played in the history of evolutionary thought?
5. How does the knowledge and acceptance of evolution by biology teachers in Galápagos compare with that of college students in the United States?

## 8.2 Methods

We addressed these questions by administering a survey to teachers on the three most populated islands in the archipelago: Santa Cruz, San Cristóbal, and Isabela. We did not survey teachers on Floreana Island (population < 300 people) because that island has only an elementary school.

We measured teachers' knowledge of evolution with the Knowledge of Evolution Exam (KEE; Moore & Cotner, 2009; Rissler, Duncan, & Caruso, 2014), a 10-item, multiple-choice quiz that assesses basic concepts of evolution. We measured the teachers' acceptance of evolution with the Measure of Acceptance of the Theory of Evolution (MATE; Rutledge & Warden, 1999), a survey that identifies the extent to which individuals accept or reject key principles of evolution. We also created several novel, Likert-scale response items to help us understand teachers' knowledge and perceptions specific to Darwin in Galápagos (e.g., approximately when Darwin was in Galápagos).

The survey was created in English and translated into Spanish. Three native Spanish-speaking people in Galápagos (and others elsewhere) examined the survey to refine the survey and ensure its accuracy and clarity. The full survey, titled "La Enseñanza de la Evolución en las Islas Galápagos" ("The Teaching of Evolution in the Galápagos Islands"), is available from the authors.

We obtained a list of Galápagos' schools and their directors from the Ministry of Education. At each school, we were given lists of the secondary-school teachers who teach biology. These teachers, who are the teachers we surveyed, are college graduates who had earned their degrees from colleges on the mainland. Although there is no specific requirement for teaching evolution in Galápagos, the topic is common in biology and other courses, exhibits, murals, and conversations in the schools and elsewhere in Galápagos (see below).

At least one of us met with each teacher to explain (and answer questions about) the survey, and we stayed with each teacher until he or she completed the survey. Teachers who completed the survey were offered a \$25 honorarium and a certificate

of completion. All teachers signed consent forms and were aware that they were free to omit any items on the survey. Christian Bastidas Bustos, the District Analyst for Support, Monitoring, and Regulation in Ecuador's Minister of Education office, approved our survey and granted us permission to visit all of the archipelago's schools and administer the survey. There was no time-limit for teachers taking the survey.

To provide an external comparison-group to help contextualize the teachers' responses, we have also included responses to the KEE and MATE from 535 undergraduate students in introductory biology courses for non-majors at the University of Minnesota. These surveys were given a week before the start of classes so that we could assess the students' knowledge and perceptions before their biology courses began. This survey and its administration were approved by the University of Minnesota's Institutional Review Board.

In addition to scoring the KEE, we calculated the percentage of respondents who agreed or disagreed with Likert-scale items, and the average score for each scaled (1–5) response. We used the Student's *t*-test to determine significant differences in mean responses between biology teachers in Galápagos, and non-biology students at the University of Minnesota.

### 8.3 Results

#### *Respondents*

The biology teachers in this survey ranged, roughly, between 30 and 50 years of age (we did not specifically ask for their ages); 42% were male, and 58% were female. All of the teachers we contacted agreed to take the survey. On Santa Cruz, three teachers were not included in our survey; two of these teachers were on the mainland (i.e., not in Galápagos), and we could not find the other teacher. In San Cristóbal, two teachers were not included in our survey; both of these teachers were on the mainland. Thus, 38 of 43 (88.4%) of all of the targeted teachers (i.e., natural-science or biology teachers in Galápagos who might be expected to teach evolution) completed the survey. Teachers took an average of 40 min to complete the survey. No teacher expressed any reservations about the survey before, after, or while taking the survey.

*What do biology teachers in Galápagos know about the core tenets of evolutionary thought?*

Table 8.1 summarizes the teachers' responses to the KEE. The teachers' average score on the KEE was 36%. Most (i.e., 71% of) teachers could identify the definition of natural selection, but only 42% could identify the definition of evolution. Only about one-third (i.e., 32%) of the teachers could identify the most-fit individual from a group exhibiting a range of reproductive success (Table 8.1).

**Table 8.1** A summary of teachers' responses to the Knowledge of Evolution Exam (KEE)

KEE Item #	Knowledge of evolution revealed	Percent of respondents
1	Can identify that several lines of evidence support the theory of evolution	39
2	Can identify the occurrence of evolution by natural selection in an altered environment	45
3	Understand that fitness is measured by reproductive success	32
4	Can isolate the steps leading to adaptation	5
5	Can select the correct definition of natural selection	71
6	Realize that genetic evidence suggests common ancestry for all organisms	50
7	Understand that natural selection is not a random process	37
8	Can identify the definition of evolution	42
9	Understand that mutation is the ultimate source of genetic variation	11
10	Realize that natural selection is simply one mechanism that results in evolutionary change	24

*Note* Numbers in the table are the percentages of respondents who chose the correct answer for each of the 10 questions

Teachers' incorrect answers also revealed important information. For example, on item five of the KEE, in which respondents are asked to select from several scenarios leading to an adaptation, over half (21/38) selected the Lamarckian explanation—that is, the teleological based on adaptations arising to meet an explicit need (in Darwin's words, "adaptations from the slow willing of animals"). Similarly, only 11% of the teachers identified mutation as the ultimate source of genetic novelty; far larger percentages attributed variation to recombination, natural selection, or hybridization. For comparison, the undergraduate students' average score on the KEE was 51%.

*To what extent do biology teachers in Galápagos accept the principles of the theory of evolution?*

Teachers' average responses to the MATE items are illustrated in Table 8.2. Some data are difficult to reconcile; for example, 14% (5 of 37) of the respondents agreed that "evolution is not a scientifically valid theory," yet 92% (34 of 37) agree that "evolution is a scientifically valid theory." These inconsistencies aside, certain themes emerge: the numbers of young-Earth advocates—that is, those agreeing that Earth is less than 20,000 years—is relatively low (20%), albeit significantly higher ( $p < 0.05$ ) than the same numbers in a comparison population of United States undergraduates (7%). Also, the 30% of Galápagos teachers who agree that "the theory of evolution cannot be correct since it disagrees with the Biblical account of creation" is significantly greater ( $p < 0.05$ ) than the 12% agreement in the U.S. comparison group. Nevertheless, significantly more Galápagos teachers (86%)

**Table 8.2** The average amounts of agreement with items on the Measure of Acceptance of the Theory of Evolution (MATE)

MATE Item	Biology teachers in Galápagos		College students (non-biologists) in the United States	
	Percent who agree/strongly agree	Average on 5-point scale	Percent who agree/strongly agree	Average on 5-point scale
Modern humans are the product of evolutionary processes that have occurred over millions of years	76	2.3	76	2.05
The theory of evolution cannot be tested scientifically	32	3.42	12	3.65
Organisms existing today are the result of evolutionary processes that have occurred over millions of years	84	1.81	75	2.13
The theory of evolution is based on speculation and not valid scientific observation and testing	19	3.7	13	3.69
Most scientists accept evolutionary theory to be a scientifically valid theory	84	1.87	72	2.13
The available data are unclear as to whether evolution actually occurs	26	3.39	16	3.52
<b>*The age of the earth is less than 20,000 years</b>	<b>20</b>	<b>3.6</b>	<b>7</b>	<b>4.11</b>
There is a significant body of data that supports evolutionary theory	72.9	2	72	2.12
Organisms exist today in essentially the same form in which they always have	17	3.97	12	3.81
Evolution is not a scientifically valid theory	14	3.89	9	3.82
<b>**The age of the earth is at least 4 billion years</b>	<b>50</b>	<b>2.88</b>	<b>66</b>	<b>2.21</b>
<b>*Current evolutionary theory is the result of sound scientific research and methodology</b>	<b>86</b>	<b>1.95</b>	<b>60</b>	<b>2.35</b>
Evolutionary theory generates testable predictions with respect to the characteristics of life	78	2.27	58	2.40
<b>*The theory of evolution cannot be correct since it disagrees with the Biblical account of creation</b>	<b>30</b>	<b>3.32</b>	<b>12</b>	<b>3.92</b>
Humans exist today in essentially the same form in which they always have	19	3.78	14	3.76
Evolutionary theory is supported by factual historical and laboratory data	76	2.14	62	2.35

(continued)



**Table 8.2** (continued)

MATE Item	Biology teachers in Galápagos		College students (non-biologists) in the United States	
	Percent who agree/strongly agree	Average on 5-point scale	Percent who agree/strongly agree	Average on 5-point scale
<b>*Much of the scientific community doubts if evolution occurs</b>	<b>33</b>	<b>3.25</b>	<b>7</b>	<b>3.78</b>
<b>**The theory of evolution brings meaning to the diverse characteristics and behaviors observed in living forms</b>	<b>92</b>	<b>1.7</b>	<b>68</b>	<b>2.21</b>
With few exceptions, organisms on earth came into existence at about the same time	42	3.12	18	3.40
<b>**Evolution is a scientifically valid theory</b>	<b>92</b>	<b>1.73</b>	<b>66</b>	<b>2.23</b>

*Note* Numbers in the table are presented as percentages of teachers or students who agree or strongly agree with the statements and as averages on a 5-point Likert scale. The averages were calculated by assigning numeric values to each survey option, with 1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, and 5 = strongly disagree. Bold denotes items in which biology teachers ( $n = 34\text{--}38$  per item) in Galápagos agreed, on average, significantly ( $*p < 0.05$ ;  $**p < 0.01$ ) more or less than college students in the United States ( $n = 529\text{--}535$  per item)

agreed that “current evolutionary theory is the result of sound scientific research and methodology” than did U.S. undergraduates (60%;  $p < 0.05$ ).

*What do biology teachers in Galápagos know about Charles Darwin’s connection to the archipelago?*

Several of teachers’ responses to questions about Charles Darwin’s link to Galápagos are presented in Table 8.3. All of the teachers identified *On the Origin of Species* as Darwin’s masterwork on natural selection. However, none knew that mockingbirds (i.e., not finches) were the birds that most impressed Darwin during his time in Galápagos. Indeed, Darwin’s arguments about adaptive radiation are based on mockingbirds; finches, meanwhile, are not mentioned in *Origin*.

Again, teachers’ incorrect answers are telling. Many teachers chose 1535, not 1835, as the year Darwin visited the islands, and “his ship was blown off course from Peru,” not “as part of a voyage to survey the coast of South America,” as the reason for Darwin’s visit. In fact, Panamanian Bishop Tomás de Berlanga, in 1535, visited the islands when his ship was blown off course from Peru.

*How do biology teachers perceive their role as evolution educators, and do they value the role that Galápagos has played in the history of evolutionary thought?*

Table 8.4 summarizes teachers’ views of their roles in evolution education and the potential conflict of religion and science. Almost all (i.e., 97%) of biology teachers

**Table 8.3** Summary of teachers' responses to questions regarding "Darwin in Galápagos"

Darwin Item #	Knowledge of Darwin revealed	Percent of respondents
1	Can identify when (roughly) Charles Darwin visited the islands	50
2	Can identify why Darwin visited the islands	53
3	Are aware that mockingbirds—not finches—were the birds that most impressed Charles Darwin	0
4	Know that Darwin visited four islands during the <i>Beagle's</i> stopover in the archipelago	32
5	Can identify <i>The Origin of Species</i> as the book Darwin wrote, describing his theory of evolution and using examples from Galápagos	100

*Note* Numbers in the table indicate the percent of respondents (out of 38) who chose the correct answer for each of the questions

in Galápagos claimed to be "confident in my understanding of evolution." A large majority (i.e., 87–95%) of biology teachers in Galápagos enjoys teaching about Galápagos and the history of evolutionary thought. However, a comparable majority (79–82%) of the teachers are uncomfortable with teaching about evolution

**Table 8.4** Teachers' views of their roles as evolution educators and the potential conflicts between science and religion

"Value of Evolutionary Thought" Item	% Agree or strongly agree	Average on 5-point scale
There is a conflict between religion and science when it comes to teaching about evolution	82	2.11
I am uncomfortable teaching about evolution	79	2.16
My students tell me that they cannot agree with the science of evolution because of their religious beliefs	47	3
My students' parents tell me that they cannot agree with the science of evolution because of their religious beliefs	29	3.34
I am confident in my understanding of evolution	97	1.66
Galapagos is closely connected to the history of evolutionary thought	95	1.53
I am proud of the connection between Galapagos and evolutionary thought	89	1.74
I enjoy teaching about evolution	87	1.93
I enjoy teaching about Galapagos and the history of evolutionary thought	95	1.62
I would like to know more about Galapagos and the history of evolutionary thought	95	1.63

*Note* Numbers in the table are percentages of teachers (n = 38) who agreed, or strongly agreed, with each statement. The averages were calculated by assigning numeric values to each survey option, with 1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, and 5 = strongly disagree

and perceive a conflict between religion and science. According to these teachers, smaller percentages of students (47%) and students' parents (29%) have expressed a similar conflict.

## 8.4 Discussion

Galápagos is part of the Republic of Ecuador, a representative democracy in northwest South America. Ecuador's Gross Domestic Product (GDP) is approximately \$20 billion, and Spanish (Ecuador's official language) is spoken by most of Ecuador's 16 million residents. Ecuador, a secular country, is predominantly Catholic. In 2008, Ecuador's constitution became the first in the world to formally recognize "Rights of Nature," thereby acknowledging that people have the legal authority to enforce the rights of nature and all of life to exist, persist, maintain and regenerate its vital cycles. Ecosystems themselves can be named as defendants in legal challenges.

Prior to interpreting any findings, we must first caution against reckless comparisons or excessive extrapolation. The University of Minnesota population is one that has been discussed, in light of the MATE and the KEE, in other work (e.g., Walker et al., (2017); Cotner, Brooks, & Moore, 2010; Moore & Cotner, 2009), and these metrics have been validated for this population. However, it is not possible to know, after the fact, exactly how all the MATE and KEE items were interpreted by the Galápagos teachers; the validity of the MATE, for example, has been questioned for cross-cultural comparison (Wagler & Wagler, 2013). In fact, some of the inconsistencies we found may reflect problems with the instruments themselves (e.g., Ashgar, Wiles, & Alters, 2014). We can, however, make note of trends observed in these 38 biology teachers, and attempt to make sense of any confusion by considering the interesting example posed by Galápagos itself.

Although biology teachers in Galápagos are exceedingly confident that they understand evolution, their average score on the KEE (i.e., 36%) is the lowest yet reported for any group (e.g., see Moore, Brooks, & Cotner, 2011). This "disconnect" may be due to the interaction of religiosity with public welfare in Galápagos. Indeed, Galápagos is heavily religious and predominantly (79%) Catholic (PEW, 2014). Catholics have, in recent history, made allowances for evolution (e.g., Pope Francis, 2014); for example, in 1996, Pope John Paul II told the Pontifical Academy of Sciences that "truth cannot contradict truth" (Pew Advent, 2017). However, a literal interpretation of the Bible usually predicts young-Earth creationists' claim that Earth is only about 6,000 years old (Abelson, 1982). One of the earliest modern proponents of this idea was George McCready Price, a Seventh-Day Adventist (Moore & Decker, 2008; Whitcomb & Morris, 1961). Until recently in Galápagos, tourists and every student at the Seventh-Day Adventist school in Puerto Ayora were greeted by a large billboard proclaiming Genesis 1:1. How can it be true that

“in the beginning”—six thousand years ago—“God created the heavens and the earth,” while it is also true that we are all the product of over 3 billion years of slow, sometimes gruesome and often capricious natural laws? This prominent billboard, which stood for decades on Charles Darwin Avenue, supports our earlier claim that Earth’s age may be the issue on which the evolution-creationism controversy balances (Cotner, Brooks, & Moore, 2010).

Although creationists’ claims are often interwoven with ignorance and rejection of evolution (Moore et al., 2011), the status of evolution education in Galápagos is more complicated. The Seventh-Day Adventist church is the largest anti-evolution organization in Galápagos. However, creation museums and creationism-based tourist sites (e.g., Ark Encounter), which reject (and usually vilify) evolution by presenting claims contradicting those of modern science, are not present in Galápagos (or South America, for that matter; Visit Creation, 2017). Nor are anti-evolution organizations such as Answers in Genesis and the Institute for Creation Research, which produce a vast number of television shows, radio shows, books, magazines, home-school curricula, conferences, DVDs, and other materials in which Biblical literalism replaces evolution as the explanation for life’s diversity. Rather, in Galápagos, the economy is based on tourism, and this tourism is closely linked with evolution; teachers and other residents of the islands are proud of their archipelago’s link with evolution, and evolution is taught in virtually all of the public and private schools. Indeed, several travel agencies bring their tour groups to K-12 schools in Galápagos, where the tourists are entertained by student presentations showcasing Darwin, evolution, and the islands’ biodiversity. Thus, while the failure to teach and learn the basics of evolution are often linked to religiosity (*a la* Rissler et al., 2014), religiosity (except for Seventh-Day Adventism) in Galápagos may not be connected to the outright rejection of evolution itself. Most teachers in Galápagos accept that evolution is supported by scientists and is closely connected to the islands’ economy that sustains themselves and their families.

Interestingly, the love of *the idea of* evolution by Galápagos’ biology teachers is not accompanied by clear knowledge of evolution or an acceptance of certain evolutionary principles. This acceptance of evolution, *alongside* a literal interpretation of Genesis, in Galápagos is fascinating, and suggests that ideas about evolution have been decoupled from social and economic priorities in the islands. In attempting to shed some light on this sort of cognitive dissonance, we may find clues in the Identity Protective Cognition (IPC) work of Walker et al., (2017), Kahan (2010), Kahan, Braman, Gastil, Slovic, & Mertz (2007), and McCright & Dunlap (2011). According to the IPC hypothesis, individuals may exhibit a form of *motivated cognition*, in which they are motivated to [mis]interpret scientific findings in a way that protects their in-group identities (Kahan et al., 2007). In the Galápagos context, biology teachers may have competing identities at work—that of their religious affiliation, and that of a biologist teaching evolution at a site known for evolutionary thought.

## 8.5 Conclusion and Suggestions for Improving Evolution Education in Galápagos

In June 2013, scientists from around the world convened on San Cristóbal for the third World Evolution Summit (Paz-y-Miño-C & Espinosa, 2013). Given the omnipresence of evolution in Galápagos, few attendees probably suspected that the archipelago's teachers—virtually all of whom are enthusiastic about evolution—know so little about evolution. Although this is concerning, we are encouraged by the fact that these teachers enjoy teaching about Galápagos and evolution, and 95% of the teachers want to learn more about the islands and the history of evolutionary thought. For a discussion of how teachers' views of evolution align with those of guides in Galápagos National Park, see Cotner et al., (2017).

Biology teachers in Galápagos would benefit greatly from pre-service and in-service workshops and other training programs focused on identifying and correcting the teachers' misconceptions about evolution. These workshops, which virtually all of the teachers said they would welcome, would be an important way for other teachers, researchers, and scientific organizations—presumably in coordination with the Charles Darwin Research Center and/or Galápagos Conservancy—to help the archipelago's biology teachers and, in the process, improve evolution education in Galápagos.

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