



EDUCATION

Why many U.S. biology teachers are 'wishy-washy'

Future science teachers lack knowledge and role models

By Jeffrey Mervis

When two political scientists asked a group of U.S. college students preparing to become biology teachers about their views on evolution, they were shocked by the answers. “I’m, you know, pretty ignorant on this topic ... is there enough of scientific evidence to say for sure?” one replied. “Evolution is one of those subjects that I’m still a bit shaky about,” answered another.

Michael Berkman and Eric Plutzer of Pennsylvania State University (Penn State), University Park, knew from a previous study that more than half of the country’s high school biology teachers did a poor job in their classrooms with evolution. But they didn’t know why. Was the topic absent from the curriculum? Did the teachers fear a community backlash? Or were they simply choosing to avoid the subject?

Their new study suggests teachers avoid the controversial topic, and it offers a reason: Teachers lack the necessary knowledge, conviction, and role models to teach evolution properly. “Not feeling confident about your knowledge of evolution,” Berkman says, “leads to being less likely to teach it.”

“It absolutely makes sense,” says evolutionary biologist Leslie Rissler, who this winter joined the National Science Foundation after leaving a tenured position at the University of Alabama, Birmingham, where she taught

evolution to undergraduates. Even biology majors have little opportunity to learn about the topic, says Rissler, who recently surveyed 3000 Alabama students on what they think and know about evolution and found their religious faith trumps any book learning.

The Penn State paper, which labels such future teachers “Enablers of Doubt,” is one of 15 articles on “The Politics of Science” appearing this month in *The Annals of the American Academy of Political and Social Science*. The package explores why many people—regardless of their education or ideological and cultural affiliations—routinely disregard solid scientific evidence in forming their views (<http://scim.ag/scienceattitudes>).

In their earlier study, in 2007, Berkman and Plutzer surveyed a national sample of 926 high school biology teachers to better understand teachers’ role in the country’s long-running battle over evolution. They found that 13% were openly sympathetic to creationism, while 28% provided students with a thorough understanding of evolution. The rest, which the researchers label “the cautious 60%,” spent as little time as possible teaching this most fundamental concept in modern biology.

“Where is this wishy-washiness coming from?” Berkman says they asked. Everything pointed to the teachers themselves,” he says, and “we realized we didn’t know much about them.”

So in 2013 the researchers conducted focus

Poorly prepared science teachers often leave U.S. high school students with a shaky grounding in evolution.

groups with 35 teacher trainees at four Pennsylvania colleges—a large research university, a master’s granting institution, a Catholic college, and a historically black university. What they learned deeply troubled them.

“We found that the depth of their scientific understanding is not what you’d think it would be,” Berkman explains. Adds Plutzer: “These students are not the ones who were taking apart washing machines or launching rockets when they were kids. They are not driven to become scientists.”

Seeing themselves as educators, the future teachers said they planned to use their pedagogical skills, rather than their knowledge of biology, to handle any conflicts over evolution that might crop up in their classrooms. “I think that education in general is probably about 90% classroom management,” one student said. “You can learn content fairly easily. [But] it takes training and skill to actually be able to teach that content.”

Students at the Catholic college were more comfortable discussing the potential conflict between evolution and religion than were their peers at secular institutions, the researchers found. “It struck us that they probably had been wrestling with the issue their entire lives, and they seemed to do a better job of reconciling their beliefs with what they had learned about evolution,” Berkman says.

In contrast, the researchers say, students at secular institutions are unlikely to have the opportunity to explore their personal or religious views in a science or education class. “You’re not going to get a Penn State professor to talk about that with their students,” Berkman surmises.

The researchers admit that their small sample provides a range of views and is not representative of all U.S. science teacher-training programs. But they think the responses send up a red flag: “Young preservice teachers are already on a path that is likely to lead to evolution instruction that falls short of the expectations of leading scientific organizations,” they conclude.

Reversing direction will require breaking out of a “cycle of ignorance,” the researchers believe. “Many students lack good models for teaching evolution in public schools” because they weren’t taught the subject well in high school or college. More trainees also need better hands-on grounding in what the researchers call “the nature of scientific inquiry,” such as working in a research lab.

Faculty need to understand, Plutzer says, that “future science teachers are not junior versions of themselves. ... Getting them to understand evolution is not simply a matter of having them take more science courses.” ■