

WHAT'S WRONG WITH THE "TEACH THE CONTROVERSY" SLOGAN?

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ABSTRACT. Teachers are often exhorted by creationists to "teach the controversy." Although such encouragement sounds on the surface like a proposal for critical thinking instruction, the history of the creationist movement in North America belies this claim. Rather than teach students to analyze and evaluate actual scientific controversies, the intent of "teach the controversy" exhortations is to have teachers instruct students that evolution is weak or unsubstantiated science that students should not take seriously. Such instruction in alleged "evidence against evolution," or "critical analysis of evolution" would seriously mis-educate students, and should be resisted by teachers and administrators.

EN QUOI LE SLOGAN « ENSEIGNER LA CONTROVERSE » POSE-T'IL LE PROBLÈME ?

RÉSUMÉ. Les créationnistes encouragent souvent les professeurs à « enseigner la controverse ». Même si au premier abord de tels encouragements peuvent ressembler à la proposition d'une méthode de pensée critique, l'histoire du mouvement créationniste en Amérique du Nord dément cette affirmation. Plutôt que d'enseigner aux étudiants comment analyser et évaluer des controverses actuelles scientifiques, la finalité des exhortations à « enseigner la controverse » consiste à faire en sorte que les professeurs enseignent aux étudiants que l'évolution est une science faible ou non corroborée et que les étudiants ne devraient donc pas la prendre au sérieux. De telles directives quant à la présumée « preuve contre l'évolution » ou l'« analyse critique de l'évolution » contribueraient à sérieusement inculquer aux étudiants des connaissances erronées, et les professeurs et les administrateurs doivent résister à ces directives.

Teach the Controversy" is a phrase that teachers may encounter in many venues: in newspaper and magazine articles, in letters to the editor, in conversations with neighbors, or even in the supermarket checkout line. Where teachers are unlikely to encounter "Teach the Controversy" is in the science education journals, or the journals of professional scientists. So what does this phrase mean in the context of science curriculum and instruction?

“Teach the Controversy” might mean that teachers should teach controversies taking place in science. And of course, science is full of controversies. In a recent issue of *Science*, biologists debated dangers associated with the chemical dioxin, while astronomers discussed competing theories about a long-standing problem concerning the shape of the moon, its orbit, and its motion. Also in this issue, there was a debate over the risks of human and avian flu organisms swapping genes: how dangerous would this be? Yet proponents of “Teach the Controversy” have a very selective – even myopic – focus: they are only interested in teaching what they describe as the controversies concerning biological evolution.

Real scientific controversies, not creationist pseudoscience

Finding genuine controversies within the evolutionary sciences is not difficult; evolution is a very rich and active scientific field, and like all such fields, is full of contending ideas. There are numerous controversies concerning how evolution happens, having to do with both the patterns and processes of evolution. Controversies concerning the patterns of evolution revolve around questions such as: How closely related are Neanderthals to modern humans? Which group of mammals is most closely related to whales? What is the relationship between birds and dinosaurs? Controversies about the processes of evolution involve such issues as the relative importance of natural selection to genetic drift and other mechanisms of evolution, the evidence for and against allopatric speciation, and the adaptive value of sex compared to asexual reproduction. Yet the slogan “Teach the Controversy” does not concern teaching students about the fascinating controversies about pattern and process within the rich field of evolutionary biology.

Rather, what’s concealed behind the slogan “Teach the Controversy” is the idea that teachers should teach students that there is a controversy among scientists over whether evolution, descent with modification from common ancestors, takes place. Scientists find this claim baffling. To scientists, evolution, the most important organizing principle in the biological sciences, is not a “theory in crisis.” Statements from scientific societies from across the globe reflect the view of the Royal Society of London:

Since being proposed by Charles Darwin nearly 150 years ago, the theory of evolution has been supported by a mounting body of scientific evidence. Today it is recognized as the best explanation for the development of life on Earth from its beginnings and for the diversity of species. Evolution is rightly taught as an essential part of biology and science courses in schools, colleges and universities across the world.

Issues of *Science*, *Nature*, and other well-respected scientific journals contain numerous articles about evolution, and whole journals, and even academic departments, are devoted to research in the evolutionary sciences. Arguably the most exciting new area in biological research is developmental evolution-

ary biology – “Evo-Devo” – which brings together developmental biology, based upon cellular and molecular processes, and traditional evolutionary concerns of phylogeny (Carroll, 2005). Biology, long fragmented into hyphenated subspecialties, is reuniting because of the power of evolution to bring together different areas of study within the discipline.

In fact, it appears that more scientists are involved in evolutionary studies than ever before. Contrary to what “Teach the Controversy” proponents assert, there is no long line of scientists questioning whether living things had common ancestors. There are many scientists arguing about pattern and process, but that is quite different from questioning the big idea of evolution. To teach students that there is a controversy where none exists would seriously mis-educate them.

The history of “Teach the Controversy” and “Intelligent Design”

“Teach the controversy” is a phrase promoted by members of the Discovery Institute and other supporters of the neo-creationist movement called Intelligent Design (ID), a relatively recent movement which began in the mid-1980s. It did not become generally known to the public, however, until the late 1980s and early 1990s. In 1989, a high school supplemental textbook, *Of Pandas and People* (Davis & Kenyon, 1989), was published by a small Christian ministry called the Foundation for Thought and Ethics. Although FTE had published some earlier works expressing most of the same general ideas (Thaxton, Bradley, & Olsen, 1984), *Of Pandas and People*, sometimes referred to as simply *Pandas*, was the first book to use the phrase “Intelligent Design” in its current sense.

Pandas was intended to supplement standard high school biology textbooks to provide “the other view.” Traditionally in creationist publications, evolution is one view with the other view being “special creation,” the belief of some Christians that God directly created things (from stars and galaxies to living beings) in their present form. This belief is incompatible with evolution since evolution describes the universe as having had a history rather than springing forth full-blown in its present form. Biological evolution is the inference that living things have descended with modification from common ancestors. In the 1960s, “creation science” was developed as a means of promoting the teaching of special creationism in the public schools. *Creation science* contends that biblically-related claims – such as a young Earth, an historical Noah’s Flood, and the sudden appearance of all plants and animals at one time – can be supported by scientific evidence. Needless to say, such views are roundly rejected by the vast majority of scientists (Matsumura, 1995).

By the late 1980s, creationists in the United States had learned to be very careful about using the term “creationism” in the public schools because

of the defeats creation science received at the hands of the courts. In the United States, the First Amendment of the Constitution requires that public institutions be religiously neutral: a governmental body, such as a public school, may neither promote nor denigrate religion. In the late 1970s and early 1980s, creationists tried to pass laws requiring equal time for evolution and creation science. Citing the First Amendment, courts repeatedly struck down such laws. Creation science adapted by evolving into ID, which is much less explicit about its religious underpinnings. *Of Pandas and People* was published shortly after the release of a Supreme Court decision, *Edwards v. Aguillard*, declaring that laws requiring equal time for creation science are unconstitutional.

Pandas, then, was very careful to avoid identifying the “other view” as creationism. It did not include traditional, young-earth creationist arguments about a 10,000 year-old earth, or of the coexistence of humans and dinosaurs, or the ubiquity of catastrophic geological processes. The *Pandas* authors were unable to avoid at least veiled references to the Creator, however: a reference is made to a “master intellect” (p. 58, 85) that in context must be transcendent, and there is even a nod to the Bible’s version of the creation of the “kinds” in a reference to “the role of intelligence in shaping clay into living form (p. 77). But there are no references to creation science; instead, *Of Pandas and People* attempted to strike hard at the validity of the theory of evolution itself. And in truth, previous creation science publications similarly had argued that evolution was a weak theory; the bulk of creation science content consists of “proving” creationism by “disproving” evolution.

The authors of *Pandas* – two university-level biology professors with creation science affiliations – tried to make the case that the evidence was stacked high against evolution. The fossil record, they contended, has too many gaps, and the Cambrian explosion causes “difficulties” for evolution by natural selection. Furthermore, the biochemical similarities and differences among organisms, ordinarily considered to be solid evidence for common ancestry, were presented as refuting evolution. Rather than directly asking students to choose between creationism and evolution, as is typical in creation science publications, *Pandas* presented a choice between “natural causes” (evolution) and “intelligent causes.” If evolution supposedly could not explain something like the Cambrian explosion, students were encouraged to conclude that therefore “intelligence” explained it. In this dichotomy, if “natural” evolution didn’t cause something, then the only other choice was that it was caused by an intelligent agent.

But there is no true distinction between “natural” and “intelligent” because natural agents such as humans and higher mammals are intelligent. If intelligent extraterrestrials exist, they also would be natural agents. So the natural/intelligent dichotomy is spurious. The true distinction is between natural

causes and supernatural causes, not natural causes and intelligent causes. Of course the authors of *Pandas* wanted students to infer that the intelligent agent was God, a supernatural, rather than a natural agent. However, too much explicitness here would doom ID to the same unsuccessful legal fate as creation science; God had to be concealed under the inadequate disguise of "intelligent cause."

The chapter on biochemistry in the second edition of *Pandas* was written by biochemist Michael Behe, the author of the later ID book, *Darwin's Black Box* (Behe, 1996). In both of these books, Behe proposes that certain cellular structures are "irreducibly complex" – a type of complexity that by definition cannot be explained through natural processes. They therefore have to be explained by the actions of an intelligent agent. A structure like the bacterial flagellum cannot have evolved, he claims; it had to have been assembled as a "purposeful arrangement of parts" by an intelligent agent. The intelligent agent is not named, but despite token references to the possibility of extraterrestrials or time traveling designers, it was clear that a supernatural agent – God – was intended. The basic argument of ID, here and elsewhere, is that natural causes are insufficient to explain a biological phenomenon, and hence it is necessary to posit an intelligent designer. The content of ID, then is a list of "problems" or "weaknesses" of evolution.

Another seminal book promoting intelligent design was published in 1991 by Phillip Johnson, a University of California, Berkeley, law school professor. In content not much different from previous creationist screeds, *Darwin on Trial* received wide attention, primarily owing to the novelty of creationism being promoted by a well-credentialed professor at an elite university – in famously ultra-liberal Berkeley, at that! *Darwin on Trial* took the same approach as *Pandas*: criticize evolution, present it as weak or inadequate science, attack the restriction of science to natural causes, and imply without stating directly that God created. Subsequent ID books and articles have not veered far from this approach. ID's mission is to discredit evolution.

During the mid-1990s, a Seattle-based think tank known as the Discovery Institute took the place of the Foundation for Thought and Ethics as the leading proponent of ID. During the late 1990s, fellows of the Discovery Institute promoted teaching ID in public schools: they claimed it was pedagogically, scientifically, and legally proper to do so (DeWolf, Meyer, & DeForrest, 1999; 2000). In the early 2000s, the Discovery Institute began to alter its strategy of encouraging districts or states to require ID be taught. The main reason for this change of tactics, in my opinion, was the unlikelihood of ID surviving a legal challenge. Presented with the standard ID argument that evolution cannot provide adequate answers, and thus an intelligent designer must be postulated, one can well imagine a judge asking "who is the designer"? It becomes quite clear that the designer is God, and therefore ID cannot law-

fully be taught in American public school science classes which, because of the First Amendment, must remain religiously neutral. God is too large to be hidden behind the vague “intelligent agent.” And, in fact, in December 2005, in *Kitzmiller v. Dover*, a federal district court in Pennsylvania declared that ID was not science but a form of creationism and therefore to advocate it in the public schools is unconstitutional.

During the early 2000s the Discovery Institute refocused its efforts from promoting ID to concentrating on the “weaknesses of evolution.” This required little change in content: ID reflects a dichotomous belief that demonstrating the inadequacies of evolution suffices to prove ID correct. *Of Pandas and People*, *Darwin on Trial*, and *Darwin’s Black Box* all consist of lists of “evidence against evolution.” ID proponents (correctly) feared that teaching ID would result in legal problems; they believed they could avoid such challenges by merely denigrating evolution. Since the dichotomy that underlies creationism in all its forms is widely shared, their expectation is that students who are told that evolution is flawed will conclude that God created – without the school or teacher becoming entangled with the First Amendment.

This was the origin of the “Teach the Controversy” slogan, which implies that evolution is a controversial – and weak and unsupported – scientific theory that students should reject. Proponents of creation science broached a similar “evidence against evolution” strategy in the wake of the Edwards decision (ICR, 1987), but failed to pursue it in any systematic and effective way. Since the emergence of intelligent design, however, “Teach the Controversy” is an approach that has been promoted widely.

Ohio ID proponents supported by the Discovery Institute succeeded in 2002 in persuading the Ohio State Board of Education to include in its state science education standards a benchmark requiring teachers to have students discuss how scientists “investigate and critically analyze” evolution. A series of model curricula was to accompany the state science education standards, and the lesson plan developed for the “critical analysis” benchmark reflected “Teach the Controversy” topics originally developed by Discovery Institute fellow, Jonathan Wells in his book, *Icons of Evolution* (2000). These topics included the familiar ID complaints about homology, the Cambrian explosion, embryology and evolution, the fossil record – a regular laundry list of “arguments against evolution.”

Icons of Evolution was excoriated by the scientific community in a series of reviews (Scott, 2001; Coyne, 2001; Padian & Gishlick, 2002; Gishlick, 2003). Scientists criticized Wells’s presentation of science as misleading or wrong. To present the *Icons*-based content of the Ohio lesson plan as accurate science would truly have been a disservice to the students of Ohio. Fortunately, in the spring of 2006, a more moderate Board of Education,

apparently prompted by the *Kitzmiller* decision and an incriminating paper trail of public documents, rescinded the "critical analysis" benchmark and the lesson plan.

"Teach the Controversy" has had other successes in the last few years. In the state of Kansas, creationist state Board of Education members in 2005 infused the science education standards with *Icons of Evolution*-inspired wording. However, in the August 2006 primary election, the seats of four creationist members of the school board were challenged by moderates. A 6-4 moderate majority took office in January 2007. They promptly overturned the "Teach the Controversy"-inspired standards.

Unfortunately, the situation is not as positive in the state of South Carolina, where in 2005 a conservative state legislator pressured the Department of Education to insert Ohio-type "critically analyze" language into the science standards. As other state science education standards come up for revision in the next few years, it is certain that there will be many challenges to the inclusion of evolution. "Teach the Controversy" has also emerged as a problem in local school districts, where local creationists use it to encourage school boards to disclaim evolution, teach the "evidence against" it, or even to teach ID.

In Canada, provinces vary regarding how religion is reflected in the curriculum, but – as many religious schools in Canada receive at least some governmental funding – there is more religion taught in Canadian publicly-supported schools than in the United States. There is no strict Canadian equivalent to the First Amendment of the US Constitution. Thus far, provincial education ministers have not promoted the teaching of ID or the "Teach the Controversy" approach. Canada is rather more "top-down" in its educational policy than the US, which means that local school boards do not have as much authority to determine curricula. It also means that should a provincial minister become convinced of the validity of ID or its recent manifestation, "Teach the Controversy," there could be substantial changes in educational policy. The growth of Intelligent Design in Canada, as in the United States, needs to be monitored.

"Critical analysis" and conclusion

An argument that has been persuasive in both the United States and Canada is the claim that having students decide between ID and evolution, or to have students "critically analyze" evolution, is pedagogically sound critical thinking instruction from which students would benefit. Of course, all teachers want students to be critical thinkers! It might be a useful critical thinking exercise for students to debate actual scientific disputes about patterns and processes of evolution, as long as they have a solid grounding in the basic science required. (For further discussion, see Alters & Alters, 2001; Scott

& Branch, 2003; Dawkins & Coyne, 2005.) It would, however, not be a good critical thinking exercise to teach students that scientists are debating whether evolution takes place: on the contrary, it would be gross mis-education to instruct students that the validity of one of the strongest scientific theories is being questioned. It would, therefore, be gross mis-education to teach students the inaccurate science presented in *Icons of Evolution*, and other Intelligent Design literature.

Teachers therefore need to be on guard against “Teach the Controversy” policies and proposals that may appear in the district or province, because some exhortations to improve students’ critical thinking abilities are actually anti-evolution proposals. “Teach the Controversy” is not a pedagogically sound, critical thinking-promoting teaching strategy in which legitimate scientific controversies are discussed and evaluated by students. On the contrary, “Teach the Controversy” is a pedagogically unsound approach that promotes ignorance about the true nature of evolution and its importance in biology. It is also a cleverly-worded attempt to smuggle creationism into science. It does not belong in any classroom.

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