

Chapter 10: What should be the role of religion in science education and bioethics?

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[...] discussion of religious beliefs between a believer and a non-believer can seem superficial to the former and frustrating to the latter.

Hinde 1999

In much of Europe the importance of religion has been waning for at least a hundred and fifty years, probably much longer. However, somewhat to the surprise of many people, religion continues to be important in much of European social life and politics. In certain areas, including aspects of education and bioethics, it may, if anything, be increasing in influence in some countries. This chapter will concentrate on the relevance of this to science education and bioethics. What role, if any, should religion play in these matters and how should we decide this question? I shall argue that science education and bioethics need to respond quite differently to the issue of religion, and that the reason for this difference stems from the different aims of science education and bioethics and the different ways in which the two disciplines arrive at their claims about valid knowledge.

The role of religion in science education

For many science educators, whether or not they have any religious beliefs themselves, the relationships between science and religion, i.e. the “science/religion issue”, appears somewhat outside the scope of science education. However, a range of factors, including a greater awareness of the benefits of dealing explicitly in the school classroom with the nature of science and the increasing influence of creationism in schools, suggests that this perspective may be too narrow (Reiss 2008).

The function of school science education is principally to introduce learners to the methods that the sciences use and to the different forms of knowledge that the sciences have produced. While historians tell us that what scientists study changes over time, there are reasonable consistencies:

1. Science is concerned with the natural world and with certain elements of the manufactured world – so that, for example, the laws of gravity apply as much to aeroplanes as they do to apples and planets.

2. Science is concerned with how things are rather than with how they should be. So there is a science of nuclear fission and *in vitro* fertilization, without science telling us whether nuclear power and test-tube babies are good or bad.

The argument in favor of including religion in science education is then a very specific one: aspects of religion should be included if they help students to learn science better. (Precisely the same argument holds, I would argue, for teaching science students about history: this too should be done if it helps students to learn science better.) So, under what circumstances might the learning of science be helped by a consideration of religious issues? Perhaps the most obvious instance is when teaching the topic of evolution to students who are creationists or, at any rate, have creationist sympathies.

The importance of creationism for science education

Creationism exists in a number of different versions, but something like 50% of adults in Turkey, 40% in the USA and 15% in Norway reject the theory of evolution: they believe that the Earth came into existence as described by a literal (fundamentalist) reading of the early parts of the Bible or the Qu'ran and that the most that evolution has done is to change species into closely related species (Miller *et al.* 2006). For a creationist it is possible, for example, that the various species of mice had a common ancestor but this is not the case for mice, squirrels and horses – still less for monkeys and humans, for birds and reptiles or for fish and pine trees.

Until recently little attention has been paid in the science classroom to creationism. However, creationism appears to be on the increase, and there are indications that there are more countries in which schools are becoming battlegrounds for the issue. For example, while the USA has had several decades of legal battles about the place of creationism and (more recently) intelligent design in schools (Moore 2007), school-based conflicts over these issues are becoming more frequent in a range of other countries (e.g. Graebisch & Schiermeier 2006).

As a result, there has been a growth in the science education literature examining creationism (e.g. Jones & Reiss 2007, Reiss 2011). Most of the literature on creationism (and/or intelligent design) and evolutionary theory puts them in stark opposition. Evolution is consistently presented in creationist books and articles as illogical (e.g. natural selection cannot, on account of the second law of thermodynamics, create order out of disorder; mutations are always deleterious and so cannot lead to improvements), contradicted by scientific evidence (e.g. the fossil record shows human footprints alongside animals supposed by evolutionists to be long extinct;

the fossil record does not provide evidence for transitional forms) and the product of non-scientific reasoning (e.g. the early history of life would require life to arise from inorganic matter – a form of spontaneous generation rejected by science in the nineteenth century. Radioactive dating is said to make assumptions about the constancy of natural processes over eons of time whereas we increasingly know of natural processes that affect the rate of radioactive decay), and evolution in general is portrayed as the product of those who ridicule the word of God, and a cause of a whole range of social evils – from eugenics, Marxism, Nazism and racism to juvenile delinquency, illicit drug use and prostitution (e.g. Baker 2003, Parker 2006, Watson 1975 and countless articles in the publications of such organizations as Answers in Genesis, the Biblical Creation Society, the Creation Science Movement and the Institute for Creation Research).

By and large, creationism has received similarly short shrift from those who accept the theory of evolution. In an early study the philosopher of science Philip Kitcher argued that “... in attacking the methods of evolutionary biology, Creationists are actually criticizing methods that are used throughout science” (Kitcher 1983: 4-5). Kitcher concluded that the flat-earth theory, the chemistry of the four elements and mediaeval astrology “... have just as much claim to rival current scientific views as Creationism does to challenge evolutionary biology” (*ibid.* 5). An even more trenchant attack on creationism is provided by geologist Ian Plimmer whose book title *Telling lies for God: Reason vs creationism* (Plimmer 1994) indicates the line he takes.

The scientific worldview is materialistic in the sense that it is neither idealistic nor admits of non-physical explanations (here, “physical” includes, as well as matter, such “things” as energy and the curvature of space). There is much that remains unknown about evolution. How did the earliest self-replicating molecules arise? What caused membranes to exist? How key were the earliest physical conditions – temperature, the occurrence of water and so forth? But the scientific presumption is either that these questions will be answered by science or that they will remain unknown. Although some scientists might (sometimes grudgingly) admit that science cannot disprove supernatural explanations, scientists do not employ such explanations in their work (the tiny handful of seeming exceptions only attest to the strength of the general rule).

Whereas there is only one mainstream scientific understanding of today’s biodiversity, there are a considerable number of religious ones. Many religious believers are perfectly comfortable with the scientific understanding, either on its own or accompanied by a belief that evolution in some sense takes place within God’s holding (compass or care), whether or not God is presumed to have intervened or

acted providentially at certain key points (e.g. the origin of life or the evolution of humans). But many other religious believers adopt a more creationist perspective or that of intelligent design (Reiss 2008).

The response of science education to creationism

Given all this, how might raising the issue of religion in science lessons help? Might it not just make the situation even worse? The response by science education to the range of positions held about evolution needs, I believe, to take account of the following (Reiss, in press):

1. Among scientists, the theory of evolution is held to be a robust, well established and, at its core, a scientifically uncontroversial theory.
2. Within biology, evolution occupies a central place. There is much in biology that has been discovered and can be studied without accepting the theory of evolution, but an evolutionary framework is what enables biologists to provide coherence to the diversity of life that we see around us and to situate today's life in an historical context.
3. In common with many scientific theories, evolution is not easy to understand. It has contra-intuitive elements and, in addition, is actively rejected by many people for religious reasons.

Few countries have produced explicit guidance as to how schools might deal with the issues of creationism or intelligent design in the science classroom. One country that has is England (*ibid.*). In the summer of 2007, after months of behind-the-scenes meetings and discussions, the then DCSF (Department of Children, Schools and Families) Guidance on Creationism and Intelligent Design received Ministerial approval and was published (DCSF 2007). The Guidance points out that the use of the word "theory" in science (as in "the theory of evolution") can mislead those not familiar with science as a subject discipline because it is different from the everyday meaning, when it is used to mean little more than an idea. In science the word indicates that there is a substantial amount of supporting evidence, underpinned by principles and explanations accepted by the international scientific community.

The DCSF Guidance goes on to say: "Creationism and intelligent design are sometimes claimed to be scientific theories. This is not the case as they have no underpinning scientific principles, or explanations, and are not accepted by the science community as a whole" (DCSF 2007) and then states:

Creationism and intelligent design are not part of the science National Curriculum programmes of study and should not be taught as science. However, there is a real difference between teaching "x" and teaching *about*

“x”. Any questions about creationism and intelligent design which arise in science lessons, for example as a result of media coverage, could provide the opportunity to explain or explore why they are not considered to be scientific theories and, in the right context, why evolution is considered to be a scientific theory (*ibid.*).

This seems to me a key point and one that is true for all countries, whether a country permits the teaching of religion (as in the UK) or does not (as in France, Turkey and the USA). Many scientists, and some science educators, fear that consideration of creationism or intelligent design in a science classroom legitimizes them. For example, the excellent book *Science, evolution, and creationism* published by the US National Academy of Sciences and Institute of Medicine asserts “The ideas offered by intelligent design creationists are not the products of scientific reasoning. Discussing these ideas in science classes would not be appropriate given their lack of scientific support” (National Academy of Sciences and Institute of Medicine 2008: 52).

As I have argued (Reiss 2008), I agree with the first sentence of this quotation but disagree with the second. Just because something lacks scientific support doesn’t seem to me a sufficient reason to omit it from a science lesson. Indeed, good science teaching typically requires consideration of students’ ideas when these do not agree with scientific knowledge. Nancy Brickhouse and Will Letts (1998) have argued that one of the central problems in science education is that science is often taught “dogmatically”. With particular reference to creationism they write:

Should student beliefs about creationism be addressed in the science curriculum? Is the dictum stated in the California’s *Science Frameworks* (California Department of Education, 1990) that any student who brings up the matter of creationism is to be referred to a family member or member of the clergy a reasonable policy? We think not. Although we do not believe that what people call “creationist science” is good science (nor do scientists), to place a gag order on teachers about the subject entirely seems counterproductive. Particularly in parts of the country where there are significant numbers of conservative religious people, ignoring students’ views about creationism because they do not qualify as good science is insensitive at best (Brickhouse & Letts 1998: 227).

It seems to me that school science lessons should present students with the scientific consensus about evolution and that parents should not have the right to withdraw their children from such lessons. Part of the purpose of school science lessons is to introduce students to the main conclusions of science – and the theory of evolution is one of science’s main conclusions. At the same time, science teachers should be

respectful of any students who do not accept the theory of evolution for religious (or any other) reasons. Indeed, nothing pedagogically is to be gained by denigrating or ridiculing students who do not accept the theory of evolution.

My own experience of teaching the theory of evolution for some thirty years to school students, undergraduate biologists, trainee science teachers, members of the general public and others is that people who do not accept the theory of evolution for religious reasons are most unlikely to change their views as a result of one or two lessons on the topic, and others have concluded similarly (e.g. Long 2011). However, that is no reason not to teach the theory of evolution to such people. One can gain a better understanding of something without necessarily accepting it. Furthermore, recent work suggests that careful and respectful teaching about evolution can indeed make students considerably more likely to accept at least some aspects of the theory of evolution (Winslow *et al.* 2011).

The role of religion in bioethics

Ethics is the branch of philosophy concerned with how we should decide what is morally wrong and what is morally right. Bioethics is specifically concerned with the application of ethics to the whole of nature, not just to humans (as in medical ethics and much traditional ethics). Much of my argument about the importance of religion holds for all aspects of ethics but I ground what I claim with reference to the particular field of bioethics.

Ethics is a branch of knowledge just like other intellectual disciplines, such as science, mathematics and history. Ethical thinking is not wholly distinct from thinking in other disciplines but it cannot simply be reduced to them. In particular, ethical conclusions cannot be unambiguously proved in the way that mathematical theorems can. However, this does not mean that all ethical conclusions are equally valid. After all, most philosophers of science would hold that scientific conclusions cannot be unambiguously proved, instead remaining as provisional truths, but this does not mean that my thoughts about black holes are as valid as Stephen Hawking's. Some conclusions – whether in ethics, science or any other discipline – are more likely to be valid than others.

One can be most confident about the validity and worth of an ethical conclusion if three criteria are met (Reiss 1999). First, if the arguments that lead to the particular conclusion are convincingly supported by reason. Secondly, if the arguments are conducted within a well established ethical framework. Thirdly, if a considerable

degree of consensus exists about the validity of the conclusions, arising from a process of genuine debate.

It might be supposed that reason alone is sufficient for one to be confident about an ethical conclusion. However, there are problems in relying on reason alone when thinking ethically. In particular, there still does not exist a single universally accepted framework within which ethical questions can be decided by reason (O'Neill 1996, Parfit 2011). Indeed, it is unlikely that such a single universally accepted framework will exist in the foreseeable future, if ever. This is not to say that reason is unnecessary but to acknowledge that reason alone is insufficient. For instance, reason cannot decide between an ethical system which looks only at the consequences of actions and one which considers whether certain actions are right or wrong in themselves, whatever their consequences. Furthermore, feminists and others have cautioned against too great an emphasis upon reason. Much of ethics still boils down to views about right and wrong, informed more by what seems "reasonable" than what follows from formal reasoning.

The insufficiency of reason is a strong argument for conducting debates within well-established ethical frameworks, when this is possible. Traditionally, the ethical frameworks most widely accepted in most cultures arose within systems of religious belief. Consider, for example, the questions "Is it wrong to lie? If so, why?". There was a time when the majority of people in many countries would have accepted the answer "Yes, because scripture forbids it". Nowadays, though, not everyone accepts scripture(s) as a source of authority. Another problem, of particular relevance when considering the ethics of contemporary science and technology, is that while the various scriptures of the world's religions have a great deal to say about such issues as theft, avarice, killing people and sexual behavior, they say rather less that can directly be applied to the debates that surround many of today's bioethical issues, for example those involving modern biotechnology (genetic engineering, cloning, stem cells, etc.). A further issue is that we are more conscious nowadays that we live in multicultural or pluralist societies. Within most countries there is no longer a single shared set of moral values.

Nevertheless, there is still great value in taking seriously the various traditions – religious and otherwise – that have given rise to ethical conclusions. People do not live their lives in ethical isolation: they grow up within particular moral traditions and their subsequent ethical views are shaped by those whom they meet, read about or hear. Even if we end up departing somewhat from the values we received from our families and those around us as we grew up, none of us derives our moral beliefs from first principles, *ex nihilo*, as it were. In the particular case of moral questions

concerning contemporary biology, a tradition of ethical reasoning is already beginning to accumulate. Many countries have official committees or other bodies looking into the ethical issues that surround at least some aspects of biotechnology. The tradition of ethical reasoning in this field is nothing like as long established as, for instance, the traditions surrounding such questions as war, abortion, euthanasia and trade protectionism. Nevertheless, there is the beginning of such a tradition and similar questions are being debated in many countries across the globe.

What then is the specific place for religion?

In a recent book titled *Dishonest to God: On keeping God out of politics*, Mary Warnock (2010), despite having a certain affection and sympathy for the Church of England, lists many examples where religious arguments have in her view inappropriately been used in parliamentary debates in attempts, some successful, some unsuccessful, to influence national legislation. She concludes: “The danger of religion, any religion, lies in its claim to absolute immutable moral knowledge which, if justified, would indeed give its adherents a special place in instructing others how to behave, perhaps even a right to do so” (Warnock 2010: 165).

My position is close to that of Warnock’s but let me finesse it slightly. First of all, we do not need to determine whether or not any particular religion has access to “absolute immutable moral knowledge”. As it happens, my understanding of both theology and the human condition is that no one has access to such knowledge. Our concern here is not so much with knowledge as with how one makes practical decisions in a world with a multiplicity of values, religious and otherwise. And here religion has a place at the table. In just the same way as consequentialists have to learn to accept that many deontologists are not going to accept the consequentialist understanding of ethics as being decisive, and vice versa, so ethicists of no religious persuasion need to accept that significant numbers of people have religious beliefs and hold that these beliefs help shape what is deemed morally right and morally wrong.

In this sense, those of no religious persuasion need, I would argue, to take the same sort of account of religious believers as those who eat meat need to take account of vegetarians. We would deem it unacceptable, nowadays, for the authorities in charge of a prison, a hospital or any other residential establishment to fail to provide vegetarian food on the grounds that vegetarianism is unnecessary, a minority lifestyle choice or a fad. In the same way, a secular society that respects its citizens needs to take account of religious views. Of course, precisely the converse holds too. A theocracy that respects its citizens needs to take account of the views of those who have no religious faith or belong to a minority faith.

This may sound rather neat and tidy. How would it work out in practice? Well, in fact it pretty much is working out in practice in a number of countries. In modern democracies we are used to the idea that the best approach to determining what to do when there are deep, genuine differences of opinion (whether in ethics or anything else) is to strive to obtain consensus (Moreno 1995). It is true that consensus does not solve everything. For a start, what does one do when consensus cannot be arrived at? Nor can one be certain that consensus always arrives at the right answer – a consensus once existed that women should not have the vote and that beating was good for children.

Nonetheless, there are good reasons both in principle and in practice for searching for consensus. Such a consensus should be based on reason and genuine debate and take into account long established practices of ethical reasoning. At the same time, it should be open to criticism, refutation and the possibility of change. Finally, consensus should not be equated with majority voting. Consideration needs to be given to the interests of minorities, particularly if they are especially affected by the outcomes, and to those – such as young children, the mentally infirm and non-humans – unable to participate directly in the decision-making process. At the same time it needs to be born in mind that while a consensus may eventually emerge, there is often an interim period when what is more important is simply to engage in valid debate in which the participants respect one another, so far as is possible, and seek for truth through dialogue (cf. Habermas 1983, Martin 1999).

In the case of bioethics, many countries now have well respected bodies that seek to arrive at consensus with regards to contentious ethical issues. Examples include the Norwegian Biotechnology Advisory Board (www.bion.no/) and the Nuffield Council on Bioethics (www.nuffieldbioethics.org/). It seems to me perfectly appropriate that the degree of religious involvement in such bodies should vary from country to country (depending on the extent and depth of religious belief in the population) and from topic to topic (depending on the strength of the connections between religion and the topic in question).

I am well aware that to many with a religious faith this may seem like “selling out”. To this objection I would respond as follows. First, it’s as good as you are going to get nowadays in an increasing number of countries! Secondly, if a religious viewpoint has sufficient validity, it should be capable of holding its own in arguments with those who have no religious faith. For example, while Roman Catholic arguments about the unacceptability of contraception are very difficult to defend to non Roman Catholics, more broad-based arguments about the sanctity of human life and therefore the unacceptability of euthanasia can receive a more sympathetic hearing among a

secular audience so long as “the sanctity of human life” is not seen as a trump card but is translated into religiously neutral language about respect and the protection of the vulnerable. Thirdly, my own reading of the Christian scriptures is that God’s nature is such that there are rarely voices from heaven. Usually, determination of what is morally right and morally wrong, while influenced by the reading of scripture and an understanding of the traditions of the church, needs supplanting by broader reflection and study and should be informed, in the case of bioethics, by on-going advances in the biosciences.

A few closing points. One problem with religious viewpoints in ethics is that there are rather a lot of them! A practical consequence of the argument I have advanced is that it may not suffice to have a single religious expert on a bioethics committee. I have occupied such a role more than once and while one can strive to represent the views of absent others, it is better not to have just the one voice. Of course, a bioethics committee, as is the case for almost any committee, cannot grow too large, so it may be necessary to have a system for ensuring that the views of others can feed in in other meaningful ways. But this is simply good practice for dealing with a plurality of viewpoints even if we weren’t considering the role of religion in bioethics.

And then there is the objection that the line I have been advancing is a relativistic one that depends on the specifics of history and geography. This is a common objection – not just in theology and bioethics but in other disciplines including science and aesthetics – and a standard response, and one that I hold, is to assert that to deny absolute immutable knowledge is not necessarily to slide inexorably into relativism. One can occupy a middle ground. Indeed, as Parfit (2011) concludes, there are considerable commonalities between the main secular ethical frameworks (Kantian deontology, consequentialism and contractualism) once one gets down to specifics.

Finally, there will be some, who may or may not be atheists, who are not convinced that religion has any role to play in bioethics. Religion, it might be maintained, rests on irrational beliefs in the supernatural and while notions of respect may require us to tolerate such views, nothing should be done that might allow them to influence public policy. It’s fine for people to have freedom of expression (e.g. freedom to attend worship) but that is entirely separate from granting religion a public role. If religion were to enjoy such privileges, we would have to extend them to other odd belief systems, such as those who believe they have been abducted by aliens (Clancy 2005) or those who hold that Elvis Presley is still alive (e.g. Brewer-Giorgio 1988, *Elvis Is Alive* 2012).

There are several reasons why this line of argument does not work. First, the proportion of the population, even in more secular countries, who have some religious beliefs is considerably higher than the proportion of the population who believe in alien abductions or Elvis's longevity. Secondly, religious faith has been around for all of human time whereas conspiracy theories and fads come and go. Thirdly, religious beliefs are often core to a person's being in a way that alien abduction (however upsetting) and Presley mania are but rarely. Fourthly, there is a close connect between many bioethical issues and religious faith which there isn't between bioethical issues and alien abduction or Elvis Presley. Of course, if the state were to set up a publicly-funded museum about aliens, then there might well be a case for granting a voice to those who believe they have experienced such abductions.

Conclusions

The role of religion is therefore, I would argue, different in science education and in bioethics. In science education, a teacher needs to be sensitive to religious objections to aspects of the science curriculum for two reasons: first out of respect for students; secondly, because not to be sensitive is to make learning in science less likely for some students. However, it is not the case that a science teacher should alter the science that is taught because of the religious views of students or anyone else. Scientific knowledge is independent of religious views. In the case of evolution, science teachers may decide not to try to persuade creationist students that they are mistaken but all students, including creationists ones, should be introduced to what science teaches about evolution. At the same time, well-designed examination material should be able to test student knowledge of science and its methods without expecting students to have to convert, or pretend that they have converted, to a materialistic set of beliefs. So, for example, it is appropriate to ask students to explain how the standard neo-Darwinian theory of evolution attempts to account for today's biodiversity but it is not appropriate to ask students to explain how the geological sciences conclusively prove that the Earth is billions of years old.

In bioethics, though, religious views, while they should not have the power that some religious believers would like, nevertheless can, indeed often should, have a place in decision making. A well argued religious viewpoint is neither privileged nor disqualified simply by virtue of its being religious. The same point holds equally for agnostic and atheistic views. In a multicultural society we need to hear a diversity of well argued viewpoints. Much then depends on how those with a religious viewpoint and those without one treat one another and deal with the questions that are being debated, whether in bioethics or elsewhere. When this is done well, all parties can learn

from one another without necessarily shifting from their own positions – though, of course, all of us should be open to the possibility of such intellectual growth.

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