Epistemic insight: teaching about science and RE in secondary schools

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ABSTRACT This article reports on a teaching intervention for year 9 or 10 students (age 13–15) in secondary school biology and religious education (RE) lessons that was partly intended to deepen students' reflections, empathy and literacy when considering the similarities, differences and relationships between religion and science. The intervention proved to be generally successful in meeting its aims for the students and also led to a number of the participating teachers changing their views in ways that were more positive about the worth of examining such issues in the classroom.

The four nations of the UK are somewhat unusual, from a global perspective, in the way that they deal with science and religion issues. Some countries have no formal teaching about religion, either because their constitution is officially atheistic (e.g. China, Albania, North Korea) or because for historical reasons religious education (RE) has specifically been excluded from the curriculum (e.g. France, Turkey, the USA), except in so far as some limited knowledge of religion is essential for subjects such as history and literature. Then there are countries (theocracies) where just one religion (or denomination) is taught, and taught in a way that presumes it alone of all religions is valid. In England, Northern Ireland, Scotland and Wales, however, RE is taught but not, except in some faith schools, in a way that maintains that any one religion, indeed any religion, is valid to the exclusion of other ways of understanding reality.

Perhaps precisely because RE is a mandatory part of the curriculum, there is virtually no consideration of religion in science lessons in UK schools. In RE lessons, on the other hand, the relationship between science and religion is quite often considered. Most science teachers are, we suspect, content with this state of affairs, holding that religion has no place in science and that they, as teachers of science, aren't really qualified to deal with religious matters (Billingsley, Riga, Taber and Newdick, 2014).

Nevertheless, the omission of any consideration of religion from school science lessons has certain disadvantages. For a start, it erects strict subject boundaries in a way that may suit many teachers but may frustrate or even mislead some students. This is particularly apparent in primary schools where typically it is the same teacher who teaches all subjects. There is an analogy here with the teaching of ethics in science (Reiss, 1999); it is clear that we reach ethical conclusions in very different ways to the ways that we reach scientific conclusions and yet it can be perfectly appropriate to consider ethical issues in science lessons. We may do so for a number of reasons. Such teaching can, for example, motivate many (not all!) students and it can help students better appreciate the moral issues that may arise when science is put to use.

In much the same way, there are arguments for, as well as against, addressing the science/religion issue in school science lessons (Reiss, 2008). One argument is that of encouraging students to think about how we arrive at scientific knowledge (part of the nature of science/'working scientifically') in different ways from how we arrive at religious knowledge. The most important differences are the greater objectivity of scientific knowledge and the way in which science has no scripture; science never gives canonical status to texts, such as Darwin's *On the Origin of Species* or Newton's *Principia*, however outstanding such texts are. A second argument is that there are a number of mainstream science topics where some (not, of course, all) students perceive that science and religion interact. The causes célèbres are evolution and aspects of cosmology (principally, the start of the universe), but interaction can

also be found in issues to do with causation, determinism, reductionism and free will.

This article considers a project of which the aim was to see whether biology might be taught in years 9 or 10 in a way that would be less reductionist. The main focus of the project was not, therefore, specifically on science and religion but, as described in the lessons below, issues to do with science and religion were addressed – though more in RE lessons than in biology lessons.

Our baseline survey

Before we started the intervention (i.e. before students were taught the project lessons), we developed an 'Attitudes to Science and Religion' survey. We piloted an initial version of this with 1085 students using a mixture of items (statements) from the existing literature (though many of these had not previously been validated) and items that we devised. After validation, a final version (available, as are the science and RE lesson plans, at www.issr.org.uk/projects/the-new-biology/) was completed by 1102 year 9/10 students across 18 schools.

One part of the survey looked at the extent to which students felt that science and religion were compatible. They were presented with six items that together made up this construct:

- '*Science explains things in one way; religion explains them in another*';
- '*Religion and science both explain the origin of the world in different ways*';
- '*Evolution is God's way of bringing species into existence*';
- '*I believe science and religion are compatible*';
- '*My family believes science and religion are compatible*';
- '*It is possible to believe in God and still hold the view that life on Earth, including human life, evolved over time as a result of natural selection*'.

For each item, students were asked to respond by ticking one of six boxes from 'Strongly agree' to 'Strongly disagree'. Unsurprisingly, students who felt that science and religion were compatible were more likely to believe in God. However, what is perhaps more interesting – and which we had not predicted – is that students who felt that science and religion were compatible were generally very positive about science and scored more highly on a measure of their critical thinking. Critical thinking skills enable students to be reflective and form judgements, to think independently and, most importantly for this project, make links and understand connections between different concepts.

The bullet points below show the correlation coefficients (r, and the significance values p) between a student's score on the construct that measures their view about the compatibility between science and religion and each of ten constructs (in descending order from the highest correlation):

- Value of science to improve the world ($r=0.42$, $p<0.001$);
- Value of science to society ($r=0.39$, $p<0.001$);
- Awareness of environmental issues ($r=0.38$, $p<0.001$);
- Critical thinking skills ($r=0.36$, $p<0.001$);
- Extrinsic motivation ($r=0.33$, $p<0.001$);
- Existence of God ($r=0.31$, $p<0.001$);
- Interest in doing science ($r=0.30$, $p<0.001$);
- Perception of science lessons ($r=0.30$, $p<0.001$);
- Science self-concept ($r=0.29$, $p<0.001$);
- Competitiveness ($r=0.24$, $p<0.001$).

Perhaps the most interesting thing about these data is that they do not support the widely held presumption that students see a conflict between science and religion. Furthermore, it is the students who are *less* convinced about the compatibility of science and religion who are *less* positive about the contribution and worth of science.

The biology lessons

Six biology lessons for year 9/10 students were prepared and two sessions of short continuing professional development (CPD) (typically each about 30–45 minutes in duration) were provided to teachers, almost always on a one-to-one basis, via *Skype* (occasionally via *FaceTime* or telephone).

Biology Lesson One: When genes do not determine what cells look like

We are very used to thinking that there is a close relationship between the genes an organism has (its genotype) and its appearance (its phenotype). And yet, for a multicellular organism, almost all

the various cell types it has have the same genes despite looking very different. This lesson gets students to appreciate this and to think about its implications.

Biology Lesson Two: Top-down and bottom-up effects in an ecosystem

School biology books and examinations often give the impression that it is straightforward to predict the consequences of changes in an ecosystem. This lessons helps students to appreciate two things: firstly, that this is not always the case; secondly, that changes at the top of a food web affect the organisms lower down the food web (a top-down effect) as well as that changes lower down the food web affect organisms higher up the food web (a bottom-up effect).

Biology Lesson Three: Managing a new disease

The aim of this lesson is to help students realise that attempts to use biology to make decisions fail if they do not consider the various levels involved. Students participate in a role play (intensive farmer, free-range farmer, government scientist, animal welfare campaigner, reporter) that takes place in the context of a new type of bird flu that is spreading disease among chickens. The reality is that most new infectious diseases, whether of animals or humans, need to be dealt with at a number of levels. Research is needed to find out how to prevent the disease as well as how to cure it. Cultural practices also need to be changed, which takes time but can often be crucial in reducing the spread of diseases.

Biology Lesson Four: Dealing with ADHD

Students study the causes of attention deficit hyperactivity disorder (ADHD) and come up with proposals for how to deal with it in their school. The intention is to get students to realise that there is uncertainty about what causes ADHD and how best to 'treat' it.

Biology Lesson Five: Do we have free will?

The aim of this lesson is for students to consider whether humans have free will or whether all our actions and thoughts are determined. Using *The Truman Show* or *The Matrix*, students think about how we know, or whether we know, that the world in which we live is 'real' and not just a computer program, film or game. They then consider what the implications of being in such an 'unreal' world would be for our free will. Finally, students should think about whether what they have learned at school about genetics, hormones and the nervous system is compatible with free will or not.

Biology Lesson Six: Becoming human

In the sixth biology lesson, students reflect on what it is to be human and the extent to which this is determined by our biology. Students are asked to imagine that they are living in a tribe of 100–150 individuals before the dawn of civilisation. Fire has been discovered and agriculture has been invented. However, writing does not yet exist and tools are only made from wood and stones. Their main problems are starvation, the climate, infectious diseases and being attacked by individuals from other tribes.

Students should first of all, in small groups, think about what would be the likely consequences of such a life for life expectancy, childhood mortality and the number of people one knows. They should then draw up an ethical code for life in such circumstances. Once they have done this, and shared their ethical codes, the teacher gets them to think about how similar or dissimilar their ethical codes are nowadays to the rules that operate within their families, the rules that operate at school and the laws of the land.

Finally, students should be encouraged to think about the extent to which features of humanity such as our moral codes, our language and our ways of life follow from our biology and are common to all of us or differ among different peoples.

The RE lessons

The intention of the RE lessons for year 9/10 students was to deepen their reflections, empathy and literacy when considering the similarities, differences and relationships between religion and science. Lessons were informed by personal reflection and dialogic approaches to facilitate students' explorations of epistemic differences. The reflexive and social dimension of the lessons reflect our view that interdisciplinary relationships demand dialogue as subjects don't interact themselves; rather, they are the products of historical and ongoing human reflection and interaction.

This process of discovery through stimuli and interaction involved students and teachers in poignant and enduring debates and was an alternative to the study of epistemology and the established relationships associated with

Barbour's (2000) taxonomy. Indeed, the content sought to approach new areas of intrigue and controversy that were not as prone to popular opinion. While not seeking to teach the 'right answer', the lessons aimed to develop students' flexibility and reflexivity. CPD for the teachers was provided in the same way as for the biology lessons.

RE Lesson One: Religion and science: two windows?

Drawing on Freeman Dyson's acceptance speech for the 2000 Templeton Prize, in which he identified the metaphor of religion and science as two windows through which we can understand the world, the first lesson in the sequence introduces the possibility of epistemic differences and similarities between religion and science. As individuals and as pairs, and through the creation of diagrams and group discussions, students are invited to consider the natures of and relationships between science and religion and to reflect on the extent to which each view is a distinct but an incomplete view of existence.

RE Lesson Two: Can we survive death?

Initially, students reflect on the nature of personhood from scientific and religious perspectives. The stimulus for the lesson is Pojman's (2001) thought experiment of a successful brain transplant. In response, students investigate the criteria by which we define death and survival. There is a plenary exercise to review initial thoughts and the possibility is raised that, while science and religion provide different explanations, they may also be considered in combination.

RE Lesson Three: Soul survivor

Definitions and explanations of the soul range from a misnomer to a divine gift. Rather than a deliberation on the ontological existence of the soul, the focus of this lesson is a philosophical one in which students evaluate and establish criteria regarding the soul to gain epistemic insights into the different methods and discourses employed. Duncan MacDougall's 1907 experiment, in which he attempted to determine the mass of a human soul (21 g, in case you are wondering, though even at the time MacDougall's work was widely criticised), is an initial stimulus to invite students to consider the suitability of the scientific method for investigating the soul. Students go on to examine a variety of religious, philosophical and scientific explanations of the existence, non-existence and nature of the soul in order to evaluate the arguments for themselves and reflect on the impact of scientific and religious perspectives.

RE Lesson Four: Ethics of cloning

The scene in Joseph Wright's 1768 *An Experiment on a Bird in the Air Pump* (Figure 1) is a dramatic candle-lit setting in which the viewer is faced with various attitudes, ranging from intrigue to disgust, to the bird being deprived of oxygen. In this lesson, students engage with the ethical questions surrounding scientific progress and move on to reflect on the case of Dolly the sheep and the contentious issue of 'unused' embryos in stem cell treatment. Students are then invited to make correlations between the emotions of Wright's characters and the divergent views expressed in humanist and religious perspectives on the soul's destiny and medical ethics.

RE Lesson Five: Seeing is believing

The fifth lesson asks students to reflect on their understanding and experience of different types of knowledge and belief and their respective sources of authority. Through discussions, enactments of their ideas and conversations on paper, they explore their own and other students' views on authority according to scientific method and religious doctrine. The figure depicted in the *Flammarion Engraving* (Flammarion, 1888) (Figure 2) straddles two worlds – idyllic Earth and a sky of cogs and wheels – and students are invited to consider this as a metaphor for contrasting worldviews and their compatibility.

RE Lesson Six: What is the relationship between science and religion? Does it matter?

The last lesson serves as a plenary for the learning and reflections that have occurred during the sequence of lessons. Students are reacquainted with contrasting statements and texts from previous lessons and are asked to create a representation of their understanding of the relationship between science and religion (and their own process in reaching an agreement) in a genre they feel is appropriate. Finally, they are asked to apply their reflections to the context of society and reflect on the pertinence of studying this relationship.

Figure 1 The painting *An Experiment on a Bird in the Air Pump* by Joseph Wright (1768) can be used to help students think about ethical issues that science may raise

Teacher and student feedback

Students' perceptions of the relationship between religion and science are important for science education as they relate to how they engage with science at school. Some research indicates that young learners do not believe science and religion can complement each other (e.g. Billingsley, 2013; Brickhouse, Dagher, Letts and Shipman, 2000; Francis, Gibson and Fulljames, 1990; Hokayem and BouJaoude, 2008). However, other research indicates a positive association between attitudes towards science and attitude towards religion, but only after controlling for students' views about creationism and scientism (Astley and Francis, 2010; Francis and Greer, 2001).

The findings reported here come from the qualitative element of our study. They are based on observations of RE and science lessons, six group interviews with students (six to nine students per group, with a total of 41 students) before and after the teaching intervention, and interviews with RE and science teachers before and after the intervention. We sought to answer the question 'What are students' perceptions of the relationship between science and religion and what influence does this have on their perceptions of science?'

Interviews were semi-structured and, both before and after the intervention, asked students about their perceptions of science, of religion and of the relationship between the two; the post-intervention interviews also asked students whether, as a direct result of the lessons, their views about the relationship between science and religion had changed and whether they were more open to the idea of non-scientific ideas (such as creationism) being discussed in the science classroom.

Audio files were transcribed and thematic coding was used to undertake analysis. Our findings support those of Taber, Billingsley, Riga and Newdick (2011), who identified five categories of responses when students talk about science and religion. These five categories, along

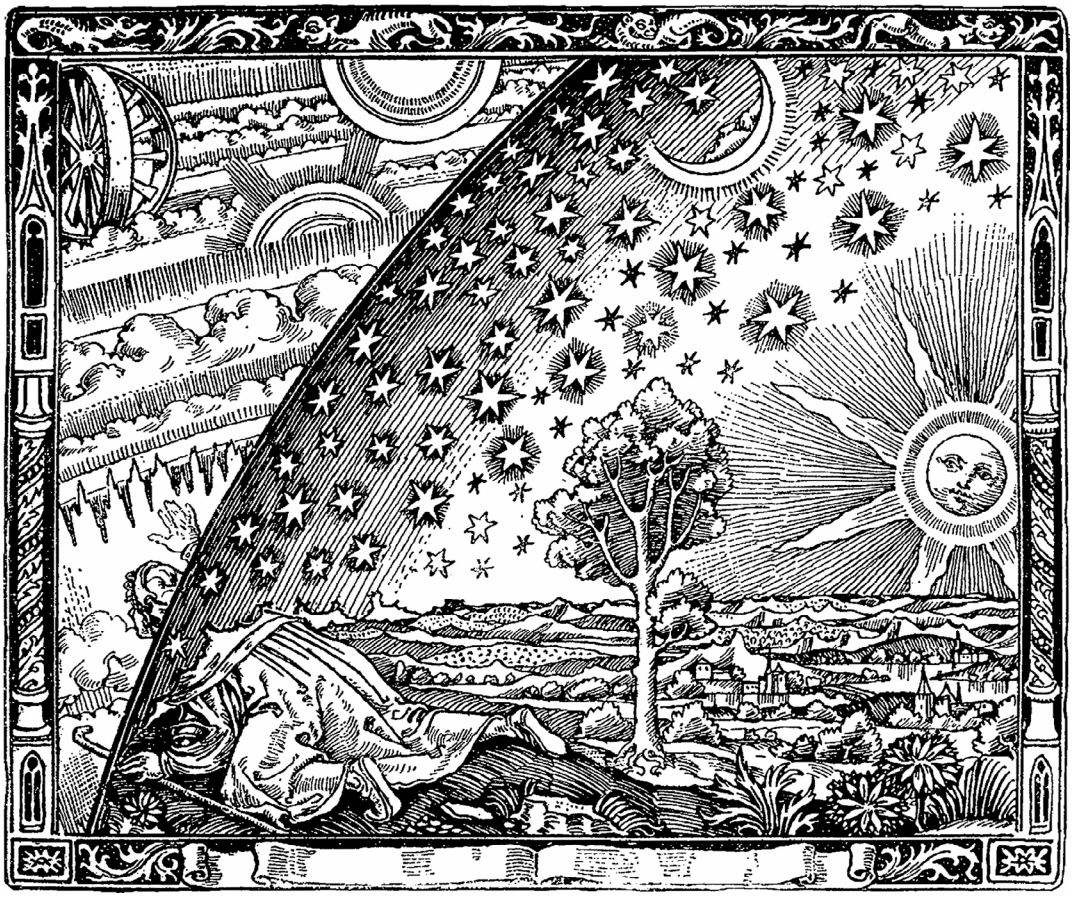

Figure 2 The *Flammarion Engraving* (1888) can be used to help students think about the different ways in which humans can understand the world

with the number of students in each category and an example of a student statement within each category, are as follows (one additional student was categorised as 'don't know'):

- **Open to science supporting faith** – expressing views that in some areas there is a conflict between science and religion but that these can be reconciled and science supports ideas derived from religion ($n=5$):

Science is what we know and religion fills in blanks. (white, Christian, male)

- **Religion takes precedence** – expressing views that there is a conflict between science and religion in some areas with religion providing the final answer in any areas of conflict ($n=3$):

Can't come to an agreement. They are two different things – religion has the answers. (ethnic minority, Muslim, female)

- **Compartmentalising science and religion** – expressing views that there is a conflict between science and religion but they work in different domains as science is based on fact and religion on beliefs ($n=15$):

Science is based on evidence and religion based on beliefs. (white, agnostic, female)

- **Choosing science over religion** – expressing an awareness of the conflict between science and religion but ultimately aligning views with the scientific position ($n=11$):

I would think that science has more of a say over religion on certain concepts of the world. (ethnic minority, Muslim, male)

- **Multiple frameworks** – where students make a context-dependent choice between science and religion ($n=5$):

. . . where science can't explain, religion fills gap and the other way around. (white, atheist, female)

After the intervention, some students and some teachers were more inclined to report that science and religion were compatible or, at the very least, that the lessons had made them think about issues. In the post-intervention interviews, there appeared to be some consonance between science and religion, particularly for those who were more amenable in their initial interviews to a positive relationship between science and religion.

Better understanding of how science links to RE post-intervention

Students were asked in the second set of group interviews, after delivery of the 12 science and RE lessons, whether having engaged in the lessons they 'have a better understanding of how science relates to RE'. Students who were categorised as 'choosing science over religion' had, in general, not changed their views about the relationship between science and religion, for example:

I have the same understanding as I did when I did before. (ethnic minority, Muslim, male)

However, such students indicated certain changes, such as a greater interest in science and how it relates to subjects other than just religion. For example:

I have a much greater interest in science because of what's – because of certain topics that have been taught which could be done for A-level and university, for example psychology. (ethnic minority, Muslim, male)

Students who were categorised as possessing 'multiple frameworks' or being 'open to science supporting faith' were more likely to indicate that they had a better understanding of how science relates to RE after having participated in the lessons. For example:

I think I do have a better understanding of how science relates to RE because it's almost – it's how it works together and how they both go hand in hand at times and then also how we can be different in terms of the viewpoints and things. (white, Christian, female)

Students who were originally categorised as 'compartmentalising religion and science', although they did not see a greater connection between science and RE at the end of the intervention lessons, did indicate that it gave them an opportunity to start thinking about the connection between science and RE. For example:

Well, I feel as though they like didn't really help us understand but they did make us think about it more, to help us come to our own conclusions more because we didn't really think about it like before we had these lessons. (ethnic minority, atheist, male)

On the other side of the coin, we had students with a strong religious standing who did change their perspective about how science and religion relate to one another. The student below, who was categorised as 'religion takes precedence' in her initial interview, developed a more conciliatory perspective about the role of science by the time she had her second interview:

Yes, I think that I have changed my opinion because before I used to be strongly – no, I used to be strongly for the idea that my religion was the right way but, after those interviews and the lessons, I started to think that maybe there is room for science and I can respect people's opinions in science as long as they can respect mine but it's my religion, I won't be – I won't be so protective about it and I won't be so against you but rather I'd be intrigued to know what your opinion is on my faith and my religion; that's the kind of person I am. But, I still believe that I can still have room for both (science and religion) in my life but there's one where I'm still more for than the other one; I believe one more than the other one but I still can believe both. . . (white, Christian, female)

Stronger interest in science than religion

We found that both students and science teachers had, overall, a stronger interest in science than in religion, a finding that we had expected. However, for some (but not all) students, there was a slight shift in the way they thought about the two subjects after the lessons, in particular if they were categorised as 'compartmentalising science and religion', 'choosing science over religion' or 'open to science supporting faith' in their pre-intervention interviews. The following post-intervention quotation illustrates how a student who previously had no interest in religion came to

appreciate how religion might be usefully linked to science:

I think it's incredibly useful to understand the world around you and, without it [science]*, we would probably understand less… Well, I think religion is what people used before science developed enough to be able to be used in everyday society… I think they both* [science and religion] *sort of give society a way of looking at life but in very different ways.* (white, agnostic, male)

One student indicated in her initial interview that she did not really feel that what she learns in RE has an impact on her decisions. After the intervention, her views about the purpose of RE had somewhat changed:

I also think that science is really interesting; it's one of my favourite subjects and I'd be interested in taking it further when I leave school… it [taking part in the intervention lessons] *helped me debate different points and different sides to it.* (white, agnostic, female)

More likely to agree that religion and science can explain the world in different ways post-intervention

After the intervention, we found that some students and teachers had changed their views as to whether religion and science can explain the world in different ways. For example, one RE teacher indicated that not only had she developed her views about the links between science and religion but that she had seen it develop within her RE classes; students were independently and unprompted raising links with science as she taught RE:

Well, until this project, I didn't really think they related to each other at all, if I'm honest… I do think they [science and RE] *can really support each other with lessons now and realise, you know, the links that were trying to be made between the two of them. I think it's something that could be explored further. And I quite like the idea of students being aware of what's going on in one subject, what's going on in another subject and all that, whether they understood that we were teaching maybe different parts of it, but at the same time these two subjects were linked, maybe make them realise, I mean so students who are not on board with religion, it will make them think about it in a different aspect maybe… I mean, especially from my teaching of it* [RE]*, it* [the link between science and religion] *came up in quite a few conversations that we had in the lessons about this relating to science or science relating to this* [instigated by the students]*. So, I think that, yeah, I think they* [students] *definitely realised that there was a* [link]*. Was it linked? It should be now.* (white, atheist, female)

Students too indicated a slight change in viewpoints, even those from the 'religion takes precedence' category. One student said:

I agree with that statement [more likely to believe both science and religion can explain the world] *but, again, I'm more biased to say that religion explains creation more than how science does… it* [science and religion] *does explain the world in different ways, just religion is the best one.* (ethnic minority, Christian, female)

Support an alternative viewpoint being discussed or taught alongside scientific theories in the classroom, such as creationism

We asked students and teachers towards the end of the study whether they would support non-scientific ideas being discussed as alternatives to scientific theories in the science classroom. The responses from both teachers and students were related to the positions adopted in the categorisation of how they viewed science and religion. Students who were classified as 'choosing science over religion' were not supportive of discussing non-scientific theories in the science classroom:

No, I don't think so [discuss such ideas in science]*. I don't really think creationism is a science; a science is more factually based.* (white, atheist, male)

Students of a 'religion takes precedence' position were keener on to the idea of discussing non-scientific ideas in the science classroom:

Yes, I was going to say that I don't mind it being taught together… it's two different parts of the spectrum. (ethnic minority, Christian, female)

Students who were in the categories of 'compartmentalising science and religion' and 'multiple frameworks' were also open to the possibility of discussing non-scientific ideas in the science classroom:

Yeah, because it widens people's horizons and you can see other people's views on different things. (white, Christian, male)

I think it is good to do it in the classroom but not like every single science lesson so maybe just like once in a while, just to like hear everybody's views on things. (white, agnostic, female)

Conclusion

The survey that was conducted before the teaching intervention revealed that the students who were more sure about the compatibility of science and religion were more positive about the contribution and worth of science. This result is an interesting one, given the popular discourse that science and religion are in conflict.

Originally, we had intended to hold conventional face-to-face CPD training with the teachers. However, very few of them said they would be able to obtain release from their schools, which is why we switched to brief, distance learning sessions provided out of school hours. Given the relatively modest amount of CPD that was therefore provided (typically about 60–90 minutes for each teacher), it is encouraging that the intervention led to changes among students in the way that was broadly intended.

In particular, the findings suggest that students who are taught biology in a less reductionist way and are taught RE in a way that explores the links with science are more likely to support the notion that science and religion are compatible. Finally, the project was not designed to change the views of teachers but it is noteworthy that some of the participating teachers did indeed also change their views.

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References

Astley, J. and Francis, L. J. (2010) Promoting positive attitudes towards science and religion among sixth-form pupils: dealing with scientism and creationism. *British Journal of Religious Education*, **32**(3), 189–200.

Barbour, I. G. (2000) *When Science Meets Religion*. New York: HarperCollins.

Billingsley, B. (2013) Students' perceptions of apparent contradictions between science and religion: creation is only the beginning. In *Science Education for Diversity*, ed. Mansour, N. and Wegerif, R., pp. 329–338. Dordrecht: Springer.

Billingsley, B., Riga, F., Taber, K. S. and Newdick, H. (2014) Secondary school teachers' perspectives on teaching about topics that bridge science and religion, *The Curriculum Journal*, **25**(3), 372–395.

Brickhouse, N. W., Dagher, Z. R., Letts, W. J. and Shipman, H. L. (2000) Diversity of students' views about evidence, theory, and the interface between science and religion in an astronomy course. *Journal of Research in Science Teaching*, **37**(4), 340–362.

Flammarion, C. (1888) *L'atmosphere: meteorologie populaire*. Paris: Hachette.

Francis, L., Gibson, H. and Fulljames, P. (1990) Attitude towards Christianity, creationism, scientism and interest in science among 11-15 year olds. *British Journal of Religious Education*, **13**(1), 4–17.

Francis, L. J. and Greer, J. E. (2001) Shaping adolescents' attitudes towards science and religion in Northern Ireland: the role of scientism, creationism and denominational schools. *Research in Science and Technological Education*, **19**, 34–53.

Hokayem, H. and BouJaoude, S. (2008) College students' perceptions of the theory of evolution. *Journal of Research in Science Teaching*, **45**(4), 395–419.

Pojman, L. P. (2001) *Philosophy of Religion*, pp. 91–92. Illinois: Waveland Press.

Reiss, M. J. (1999) Teaching ethics in science. *Studies in Science Education*, **34**, 115–140.

Reiss, M. J. (2008) Should science educators deal with the science/religion issue? *Studies in Science Education*, **44**, 157–186.

Taber, K. S., Billingsley, B., Riga, F. and Newdick, H. (2011) Secondary students' responses to perceptions of the relationship between science and religion: stances identified from an interview study. *Science Education*, **95**(6), 1000–1025.

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