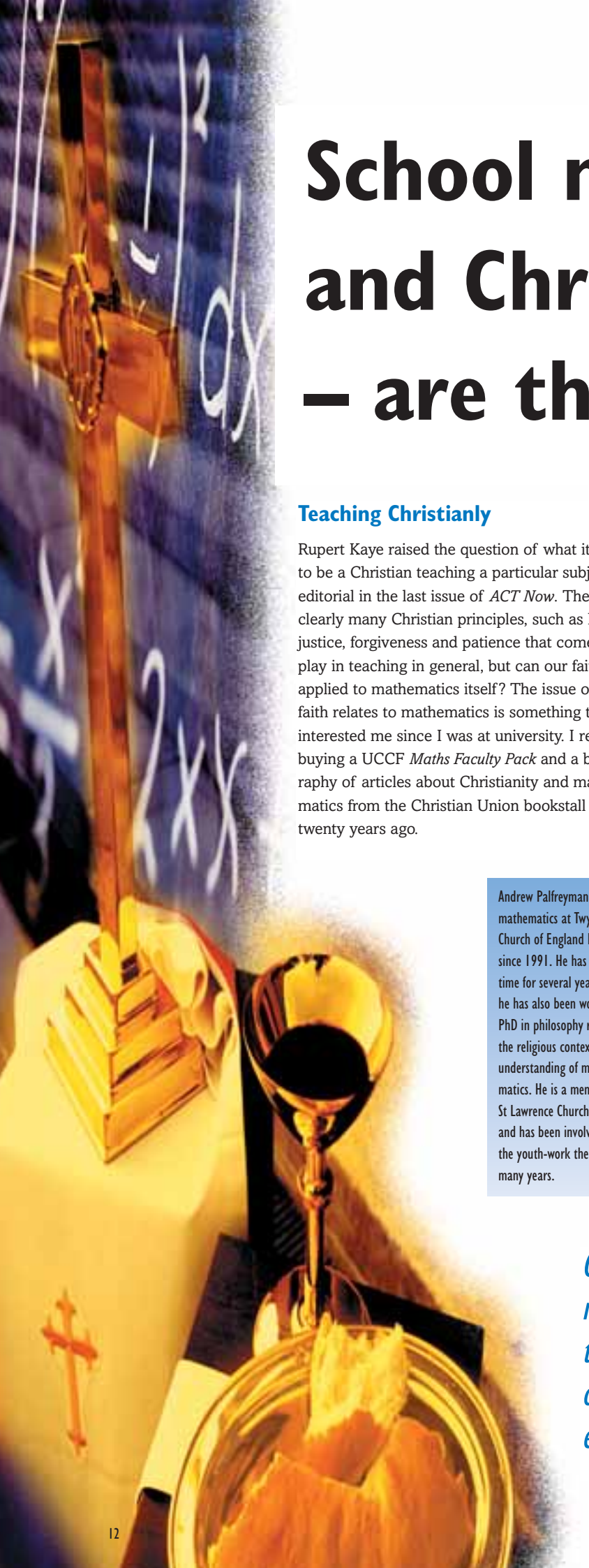

School mathematics and Christian faith – are they related?

Teaching Christianly

Rupert Kaye raised the question of what it means to be a Christian teaching a particular subject in his editorial in the last issue of *ACT Now*. There are clearly many Christian principles, such as love, justice, forgiveness and patience that come into play in teaching in general, but can our faith be applied to mathematics itself? The issue of how faith relates to mathematics is something that has interested me since I was at university. I remember buying a UCCF *Maths Faculty Pack* and a bibliography of articles about Christianity and mathematics from the Christian Union bookstall nearly twenty years ago.

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Some *ACT Now* readers may well be surprised by the notion that mathematical truth can be affected by faith. Surely, 9 + 4 = 13 and that is it. Well, although all truth is God's truth, it depends which truth you are pointing to. After all, 9 + 4 = 1 is true if you are using 'clock arithmetic' in considering four hours past nine o'clock! Given that Christ is Lord of all of our lives, it is important to see what interaction there is between our faith and a subject that, taken at face value, may appear to be neutral with respect to faith. Now there are, of course, various philosophies of mathematics and it is important that these are investigated from a Christian perspective. However, critiques of logicism and intuitionism will not be the first priority for a Christian teacher when trying to pass on the merits of removing brackets from algebraic expressions to Year 9 after lunch!

Subject-centred

Another Christian commented to me recently that, as Christian teachers, our approach should be subject-centred rather than teacher-centred or pupil-centred. Why? Because, if God has created a world with a mathematical dimension to it, it is right and proper that this aspect of His reality is considered worthy of study. In focusing upon the quantitative and spatial aspects of God's creation, mathematics is understood as being bigger than either the teacher or the student, rather than being

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understood as separate from the world or merely as an economic tool.

I found this viewpoint helpful because it moves us away from a rather sterile debate between the stereotypes of traditional methods versus self-discovery. To make the teacher the source of all knowledge reduces the pupils to uncreative passivity and, no doubt, boredom. However, an approach where pupils are encouraged consistently to discover for themselves the formulae that they are going to use, not only does not value the contributions of others down the ages, but, more practically, will not work, as the syllabus will not be covered in time!

As Christians we believe that Christ will come again, so it cannot have a probability that implies that death is a certainty

Underlying assumptions

However, it is not just in communicating the subject that faith is relevant; sometimes the resources we use can contain errors or a hidden agenda when judged against a Christian perspective. A simple example that comes to mind is raised by the question: is the probability that we will die equal to 1? Well, everyday experience says that everyone dies, but as Christians we believe that Christ will come again, so it cannot have a probability that implies that death is a certainty.

Another issue is raised by the common type of question which asks, for example, which bag of potatoes is the better buy. Such a question seems to presume that cost per kilogram is the only relevant criterion. However, if I live on my own I may not want to buy a large bag of potatoes. In fact, I might want my small bag of potatoes to be locally grown and/or organic and/or fairly traded. A 'better buy' or 'value for money' mentality simply ignores issues of ethical responsibility such as reducing waste, caring for the environment, eating healthily and making sure that growers in the Two-Thirds World are not exploited.

Having said that, pupils do need to learn to think about financial aspects of reality as well if we are to use God's resources wisely; obviously it is a money-centred mentality that is wrong, rather than questions about money per se. It is worthwhile checking that there is a balance in the questions set so that they deal with a variety of situations, rather just than reinforcing one underlying assumption or a single set of values.

Measuring God's creation

On the positive side, pupils often seem interested in the very large or very small, and this is possibly due to a sense that here is a glimpse of something that transcends their everyday experience. Pupils are fascinated by the fact that after a trillion you don't just get 'zillions' but quadrillions, quintillions, sextillions, and even as far as centillions with 303 zeros! Similarly, I believe prefixes such as nano-, pico-, giga- and tera- give some sense of God's creation being larger than pupils' everyday experience of kilograms and centimetres!

It is a money-centred mentality that is wrong, rather than questions about money per se

Pupils are also intrigued by puzzles, and I have evolved my own collection of starters over the years. Some are games that can be repeated more than once such as 3D Noughts and Crosses. (Draw four 4x4 grids on the whiteboard and treat the first grid as the bottom layer, the second and third grids as the layers above it with the fourth grid as the top. A line of four noughts or crosses can occur in one grid, but there are also various diagonal lines across the whole collection of grids that are the tricky ones to watch out for!)

Given that I have always loved the subject, I personally keep a file of research of questions that interest me. Some questions occur to me independently and I find that sharing these with pupils can work as good starters. Other questions

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occur in lessons and I sometimes take them further in my own time. (Question: take any number eg 38. Multiply its digits together to obtain 24. If you repeat this with 24, you get 8. Consequently we have a chain of three numbers 38 – 24 – 8 as you cannot now go any further. What is the longest chain that you can find? I became interested in this activity recently and found a chain of nine numbers starting with 2,677,889 and e-mailed some university friends to help. One of them then found 34,888,999 which gives a chain of ten! Can anyone do any better? I'd be interested if anyone knows more about this problem!)

Worthy examples

Starters can quite easily be novel, but it is harder to influence the general syllabus in a state school. Although one can introduce topics in a way that may be influenced by our faith, it would be very off-putting to pupils and counterproductive if we felt that we should make most of our percentage examples about donating or tithing money, rather than perhaps using such questions as occasional examples! In addition, we do not have the time to write a textbook's worth of examples ourselves. Even if we did, then there is the issue that if we do produce lots of our own sheets, we either have to photocopy them or use an interactive whiteboard which seems to be rather a waste of either paper or electricity, when a textbook already has thousands of questions. If particular examples appear to be sub-Christian in their assumptions they can always be omitted, or, on those occasions when there is enough time to do so, discussed.

There are various other issues that could be addressed including classroom management, assessment and general relationships, but I am not planning to write about these as they are common to all teachers rather than merely Christian teachers of mathematics. (The way that data is used in schools is, of course, something that Christians could have opinions upon; the temptation is to use the quantitative rather than the qualitative merely because it is easier to use. However, has the model involving the data been interpreted correctly before calculations are made, and have the most important features been included rather than merely the easiest to model? Are we valuing the measurable when we should be attempting to 'measure' the valuable?)

Praying by numbers

As a Christian teacher I make one further use of numbers that does not appear in the syllabus – praying by numbers! Given that I do not find formulae and other abstract information difficult to remember, in the last few years I have decided to learn the registers of my form groups off by heart so that I know which pupils are denoted by, say, no. 7 or no. 23. This has been very useful in praying for pupils so that, for example, on the 5th June I will pray for the fifth person in the register. Such an approach avoids a vague praying for the class without specifically prayed for individual pupils, or merely praying for the same pupils over and over again whilst forgetting that their classmates need prayer too. Given that we have a pastoral responsibility for our form group, perhaps 'praying by numbers' is a mathematical practice that others may find helpful.

■ Andrew Palfreyman