

## Catch-up maths for university physics students



Joe Wolfe, a physics academic at the University of NSW for 30 years.

The universities of NSW and Newcastle were forced to introduce HSC-level mathematics to their physics courses after the NSW Board of Studies dumbed down the Year 12 syllabus in 1999 in a misguided attempt to attract more girls to the subject.

In her Australia Day address on Tuesday, quantum physicist Michelle Simmons described the changes as a “disaster”, criticising the replacement of mathematical formulas with discursive questions.

She warned there was a “big cost in trying to make learning easier for children because it could reduce the expectations on them”. “If we want young people to be the best they can be at anything we must set the bar high and tell them to jump over it,” Professor Simmons said.

Joe Wolfe, a physics academic at the University of NSW for 30 years, confirmed yesterday that substantial changes were made to the university’s first-year physics course 10 years ago, to compensate for high-school graduates’ limited maths skills.

“The students suddenly had little experience at using mathematics in the context of physics, which seemed strange,” said Professor Wolfe. “It was a big change in attitude, as students were familiar with physics being a descriptive subject. I remember one student saying: ‘I was really good at physics in high school, I never dreamt it would

have all this maths in it!"

Professor Wolfe said soon after the Year 12 syllabus was introduced, "we found we were spending a lot more time on basic material and so we had to integrate HSC-level mathematics into our first-year course".

Paul Dastoor, a physics professor at University of Newcastle for 22 years, also noticed a sharp decline in HSC graduates' mathematics capabilities soon after the syllabus changed. "Certainly, after the change we noticed that our students' ability to tackle physics-based problems was reduced, particularly those with mathematical content," said Professor Dastoor. "However, their ability to write longer answers and to express concepts of physics clearly in language, I would say, improved."

He had altered components of the university's first-year content to ensure a level of mathematics capability that had been neglected at high-school level. "The challenge is that we have to create graduates that can solve mathematical problems but also scientists who are capable of writing and discussing and able to enter into discourse with the community," he said.

The NSW Education Standards Authority — formerly the Board of Studies — said new science courses would be introduced into schools from next year to "address the exact concerns" Professor Simmons had expressed. A spokesman said new physics and chemistry courses, which would be examined at HSC level from 2019, "have a greater focus on mathematical applications as a way to describe the concepts and a strong emphasis on practical investigations".

The director of the Australian Mathematical Sciences Institute, Geoff Prince, said the penetration of maths into science "has been inadequate for a very long time".