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Wootube your way to better results in mathematics



Eddie Woo's simple innovation opened up the classroom for one sick child, then some curious students, and then a global online audience; below, filming a Wootube tutorial at school. Picture: Hollie Adams

STEFANIE BALOGH THE AUSTRALIAN 12:00AM October 7, 2016

It was the simplest of ideas.

Maths teacher Eddie Woo was concerned that one of his students, stricken with cancer and missing large chunks of school, was falling behind. So he stood his smartphone on a classroom desk and pointed it at the whiteboard.

That was four years ago.

Now, the head mathematics teacher at Cherrybrook Technology High School in Sydney's northwest and his Wootube channel is an internet sensations. The site has received more than two million hits and has 20,000 followers here and overseas.

Fans even request selfies with the 31-year-old teacher.

"I think 'who am I?' " Woo says. "I'm not like Niall from One Direction or something like that. I'm just a maths teacher but I think it speaks to how wide this has gone, and how many people are finding use out of it. It is helping them revise things they've learned in the past and to attempt courses they may not have been confident to do before."

Each week, Woo films his maths lessons, splices them into bit-sized pieces and posts them on YouTube.

"If students are spending huge hours in this whole other world, then one of the things I think has been valuable about it is it inhabits their world. It is in the seven to eight-minute chunks of time that is almost their native medium. I think that's one of the many reasons they've found it useful."

Woo, a teacher for nine years, this year won a Teacher Excellence Award at the Australian Mathematical Sciences Institute's national Choose Maths awards.

The awards are one component of the Choose Maths project — a five-year, \$22 million partnership between AMSI and the BHP Billiton Foundation to strengthen maths teaching, encourage students to study maths and educate girls about the importance of the subject in preparing them for future careers.

Woo's award also recognised his peer-tutoring scheme, MathsPASS (Peer-Assisted Study Sessions). This revolutionised maths for Year 7 students at Cherrybrook last year, matching self-identified strugglers with Year 11 mentors in a bid to boost skills and confidence. The program now extends to Year 8.

At first glance, Woo appears your typical mathematics teacher geek. But seconds into the video and his command of the classroom is evident. His enthusiasm leaps off the screen.

Many instructional videos are recordings of actual lessons. In a neat shirt and tie, sleeves rolled up, Woo is never still, ranging back and forth in front of a whiteboard as he instructs his students. You can't but feel slightly sorry for the unseen, tongue-tied Harry who, in front of the whole internet, is skewered by the unfailingly polite Woo for failing to listen to a question about ordering fractions. "Ah yes, let's pay attention next time, and this will not happen."

The internet tutorials reach beyond maths. There are whiteboard presentations on harder trigonometry intervals and technology decision support systems, playground chats about Christianity, and an empty classroom is the forum for answering that perennial student bugbear: why are exams so hard?

Woo's efforts stand as a counterpoint to the steady decline in Year 12 students taking up subjects such as calculus. AMSI's latest report card for 2006 to last year is a stark reminder of the depth of the problem. Enrolments in Year 12 nationwide in advanced and intermediate maths continue a nearly 30-year decline. Since 2006, Year 12 advanced maths enrolments have fallen 9 per cent. Intermediate maths enrolments are down 12 per cent.

"Without immediate action, a deepening mathematical skills gap will put the brakes on industry innovation in Australia," AMSI director Geoff Prince says.

The percentage of students studying maths for the NSW Higher School Certificate has fallen to its lowest level in 50 years. Of more than 69,000 students expected to complete their HSC, 77.6 per cent study at least one maths subject, but 30 years ago 95 per cent of students studied the subject.

The waning interest comes despite nationwide efforts to increase the student uptake of science, technology, engineering and maths to future-proof student skills. It's one of the many challenges dogging the education sector, which again finds itself front and centre of political debate after Education Minister Simon Birmingham reopened old wounds in the name of equity.

Last month, his state and federal counterparts cried "ambush" after the minister announced he wanted to rip up one of the pillars of former Labor prime minister Julia Gillard's Education Revolution — the Gonski school funding agreements.

With the exception of Western Australia, short-changed under its funding deal, the other states want the Turnbull government to commit to funding the fifth and sixth years of the needs-based arrangements. Labor back-end-loaded the model so most of the money is meant to appear in the final two years of the agreement.

The Gonski model was designed to fund schools according to need, taking into account socio-economic circumstances and providing additional loadings for indigenous students, remote locations and children with disabilities.

But the question of whether the vision in the original Gonski review, by a panel headed by eminent businessman David Gonski, can survive the harsh realities of real-world political funding deals continues to divide the sector.

Birmingham wants a new schools funding deal from 2018, replacing the patchwork of 27 deals that advantage some states over others. Backed by modelling showing the arrangements mean the commonwealth is due to provide \$4224 per Northern Territory student next year but only \$2629 for West Australian students, Birmingham says the deals are inequitable and the funding playing field must be levelled. By 2019, this gulf between the equivalent schools in the Northern Territory and Western Australia grows to \$2109 a student.

Such political arguments about efficient and effective funding models seem a world away from the classroom coalface, where teachers such as Woo provide an invaluable piece of the puzzle in encouraging students into maths as well as lifting Australia's stagnating academic performance.

Woo has spent time trying to wrap his head around why his Wootube proved such a hit and reckons he could name at least 100 maths teachers who are "smarter, clearer, more articulate, better teachers than I am. It's a bit of a perfect storm of different factors," he says. It resonates with students because it connects with them in one of their favourite mediums.

"Kids are on YouTube every day anyway and literally if they are scrolling around through Justin Bieber videos on their feed, suddenly mine is up there too," Woo says. "A phrase I used to hear when I was in teacher education was, 'If students aren't learning the way we teach then maybe we should start teaching the way they learn.'"

Woo remains an advocate for what happens in the classroom and doesn't believe technology will ever replace traditional teaching methods, but innovative approaches such as Wootube can be a valuable weapon in the education armoury.

Woo, born in Australia to Chinese Malay immigrant parents, attended the NSW government-run selective James Ruse Agricultural High School at Carlingford in Sydney's north, which this year again topped *The Australian's* Your School tables for the nation's best performing secondary school in the national literacy and numeracy tests.

"Growing up, I was given a world-class education for free," he says in one video. "And now through the wonder of the internet, I want to share that with you too. So I hope you find these videos helpful. Consider subscribing and happy learning."

Woo always knew he wanted to have a "people kind" of job and was inspired by his own outstanding teachers, both in the classroom and those who took him for extra-curricular activities. "As teenagers, parents are the last person we listen to, so I had a really strong sense of the positive influence a teacher can have and then secondly, while I was involved in those extra-curricular groups, I had the opportunity to become a leader.

"I realised rapidly that I just fell in love with seeing another human being come to that realisation — that sort of light bulb moment — where something that seems vague, and nebulous, and confusing just clicks in their mind. I just fell in love with experiencing that and helping other students experience that."

But like many high achievers in his field, when Woo announced he was going into education, "you could have heard a pin drop", he says. "People thought I was kind of joking and then when they realised I was serious they were like: 'Really? Why would you not go and study law, or be a scientist or go and do medicine?'"

It is these types of prejudices that AMSI schools program manager and Choose Maths director Janine McIntosh works to reverse. "Our work is concerned with trying to get the public school students, from tiny tots right through to senior secondary students, and their parents and their teachers and careers advisers to see that maths is a really good thing to stick with," she says.

Teachers such as Woo are secret weapons in breaking down the stereotypes that dog maths education.

Last year, only 6.9 per cent of Year 12 girls studied advanced maths compared with 12.6 per cent of boys, despite more girls studying Year 12 across Australia, AMSI figures show. The gender divide is slightly narrower at the intermediate level: 18 per cent of girls to 20.5 per cent of boys.

“We don’t know why that is but I suspect it is all of those people with influence — their parents, peers, the careers advisers, their teachers,” McIntosh says. “They’re just getting incorrect or very little information about where the careers are and how much maths they need to be able perform in one of those areas, so it’s real mismatch.”

The Choose Maths program works with about 120 schools nationwide. Project officers visit schools to build up teacher knowledge, change public perceptions of maths and increase the number of girls studying the subject. AMSI runs a mentoring program and is planning a careers awareness campaign.

The Choose Maths awards are also vital.

“It gives us our stories. They’re great teachers,” McIntosh says. “And it is also rewarding those teachers for doing a really great job because teachers don’t single themselves out.”

Woo found himself one of those stories by accident when he set out to help his student who was spending large stretches away from class because of illness.

“Mathematics is very coherent, it’s kind of like building this huge pyramid, and if you miss a day you might miss a crucial concept that forms the building blocks for hundreds of ideas and skills you develop later,” he says.

“I really felt for this student because he was just racking up gaps left, right and centre.”

Surely, Woo thought, he could do better than just telling the student to look at chapters at home.

“I just knew that was completely inadequate so I thought: ‘Technology has moved along; I wonder if this could help.’ I literally got my phone out. I popped it up on top of the table. It started with one boy and other students in my class noticed.”

Other students who missed lessons through representative sport commitments also found the recordings useful to catch up.

“So it just really spread from there, Woo says. “I’m constantly surprised by how many people find it useful and valuable.

“Even teachers are using it to help wrap their head around a course that maybe they haven’t taught for a while or they just want another way of explaining it.

“That surprised me. That was never the intended audience but if people can find it useful, I’m happy.”