

Inspirational teachers creating more young computer scientists than ever

Two like-minded teachers got together to talk over ways of improving their subject – they embarked on a journey with STEM Learning’s support and the results have been outstanding - students reaching or exceeding the school target rose from 50 to 100%.

York-based Computer Science Heads Pete Dring from Fulford School and Dan Tait from All Saints shared a belief in collaboration and were both involved in training events with other teachers. So applying for one of STEM Learning’s ENTHUSE Partnerships was a natural progression for them.

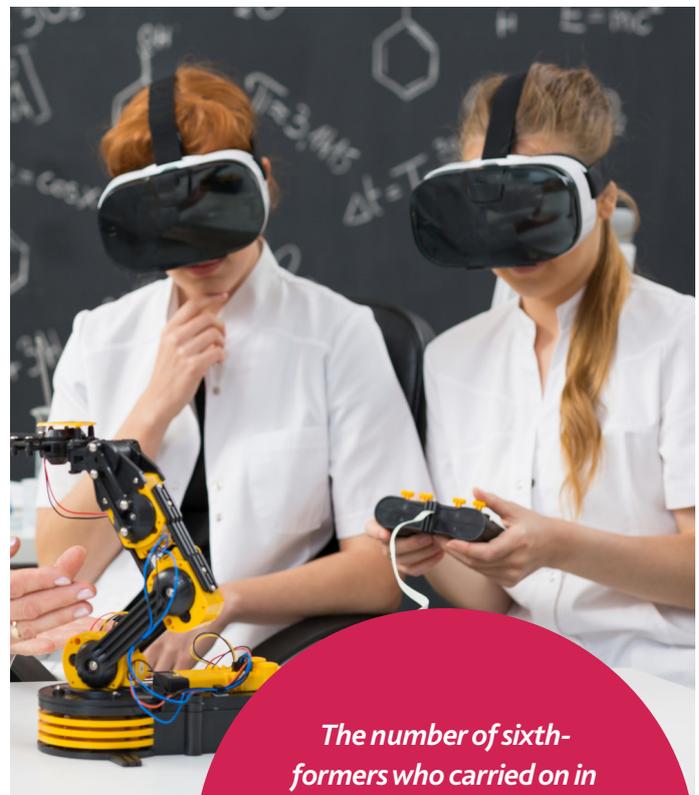
“In teaching, it can feel like everyone is in their own silo, doing their own thing and even competing against each other,” said Pete. “But Dan and I share the mentality that if we can save some time, maybe help another teacher or they can help us – we’re all for it.”

Dan and Pete’s main aim in applying to ENTHUSE was to help their sixth form students improve their attainment. They also hoped to increase the number of pupils taking computer science GCSE and A Level, to improve the gender balance, and to make the subject more accessible and appealing to all students.

They also wanted to see more students carrying on STEM subjects after leaving school - going on to a university course, vocational qualification or employment.

Pete believes it is essential to get pupils interested in computer science as soon as possible and certainly from the start of secondary school. *“If we leave it until the students have made their GCSE subject choices, it’s too late,”* he said. *“There are also a lot of initiatives out there that aim to address the gender and ethnicity imbalance but they tend to have impact too late. We need to get them hooked at a young age, with hands-on problem solving and engagement with local companies to help open their eyes to all the potential.”*

“It’s our job to promote curiosity, collaboration and even compassion. It’s not just about making money or robots – it’s also about the impact you can have on society.”



The number of sixth-formers who carried on in STEM after leaving school went up from 21% to 74% and the proportion of girls choosing to go further in STEM rose by 17%.

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Pete is currently teaching two Year-9 girls who are creating an app to help teenagers gain and maintain good mental health. They have entered a national competition which requires a working prototype but are keen to make and publish a fully working app.

"It's so empowering for them to think we're learning this stuff in computing – let's put it into practice and transform our life chances and hopefully help our peers," said Pete.

One of the Partnership schools runs a club for girls who compete in a variety of cyber security challenges. Sponsored by GCHQ, the teams work on mathematics, logic and word puzzles, moving on to encryption, decryption and hacking.

A highlight of the Partnership was a drone flying competition for Year 12s. *"We had kits and equipment to fly mini drones in the classroom but we also created our own 3-D drones to fly virtually,"* said Pete.

"We wrote the 3d engine software from the ground up, so the students used physics, mathematics and computer science throughout the day. Part of the programming involved Pythagoras, Trigonometry and matrices – skills that people learn but sometimes can't really see the point of. Towards the end of the day we loaded our code and models into a professional 3D game engine and saw all the pieces of the jigsaw come together for 22 very talented students."

To help meet their ENTHUSE goals, the schools needed to keep students engaged and hopefully attract some newcomers to the subject. Pete came up with a weekly coding challenge started directly after the first lockdown to help students understand and write the computer programming language Python.

"I remember having a chat with Dan about the best way to support lower ability students and to recruit more young people into KS4. We wanted to create a buzz about the subject

so that the level of participation and, dare I say, enjoyment, of their homework would rise."

This has been a huge success and now includes a fun inter-student challenge, which gives pupils a chance to battle it out for prizes and teachers the chance to track their progress. And the videos have proved popular with around 50 UK and British overseas schools tuning in.

"It's been so much fun being a part of this," said Pete. *"Some pupils are brilliant at programming and they love it – they are often better than us teachers. But for others it can initially inspire dread or boredom so we need to try to make it accessible and enjoyable."*

Pete said an extensive national survey by DfE (Department for Education) flagged up computer science as the GCSE option choice with parents, pupils and teachers all showing the least awareness of potential career pathways and lowest likelihood of students wanting to choose it.

"The findings put computer science at the bottom of the list," said Pete. *"There are so many misconceptions and preconceptions about the subject. But it's actually so enabling. If you can write Python you might end up anywhere from NASA to Netflix... Take bio-science for example. It is currently so relevant in the creation of vaccines but much of that work is actually processing data which is most efficiently done through code."*

Careers fairs and visits from industry are a great help in spreading the word and Pete says the schools take every opportunity offered them by STEM professionals willing to get involved.

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"One of the great things about ENTHUSE is having the incentive and opportunity to speak to people about their experience and feed that into our lessons. It is really inspiring."

"The RAF and RN visit running STEM workshops was brilliant – flying drones and demonstrating robotics. We try to welcome as many STEM Ambassadors as possible – they shed a light on a whole spectrum of jobs and are great at answering careers questions to which we don't know the answers," he said.

And the students from all year groups become thoroughly engaged – asking questions about everything from the gaming industry or cyber security to the government's use of data.

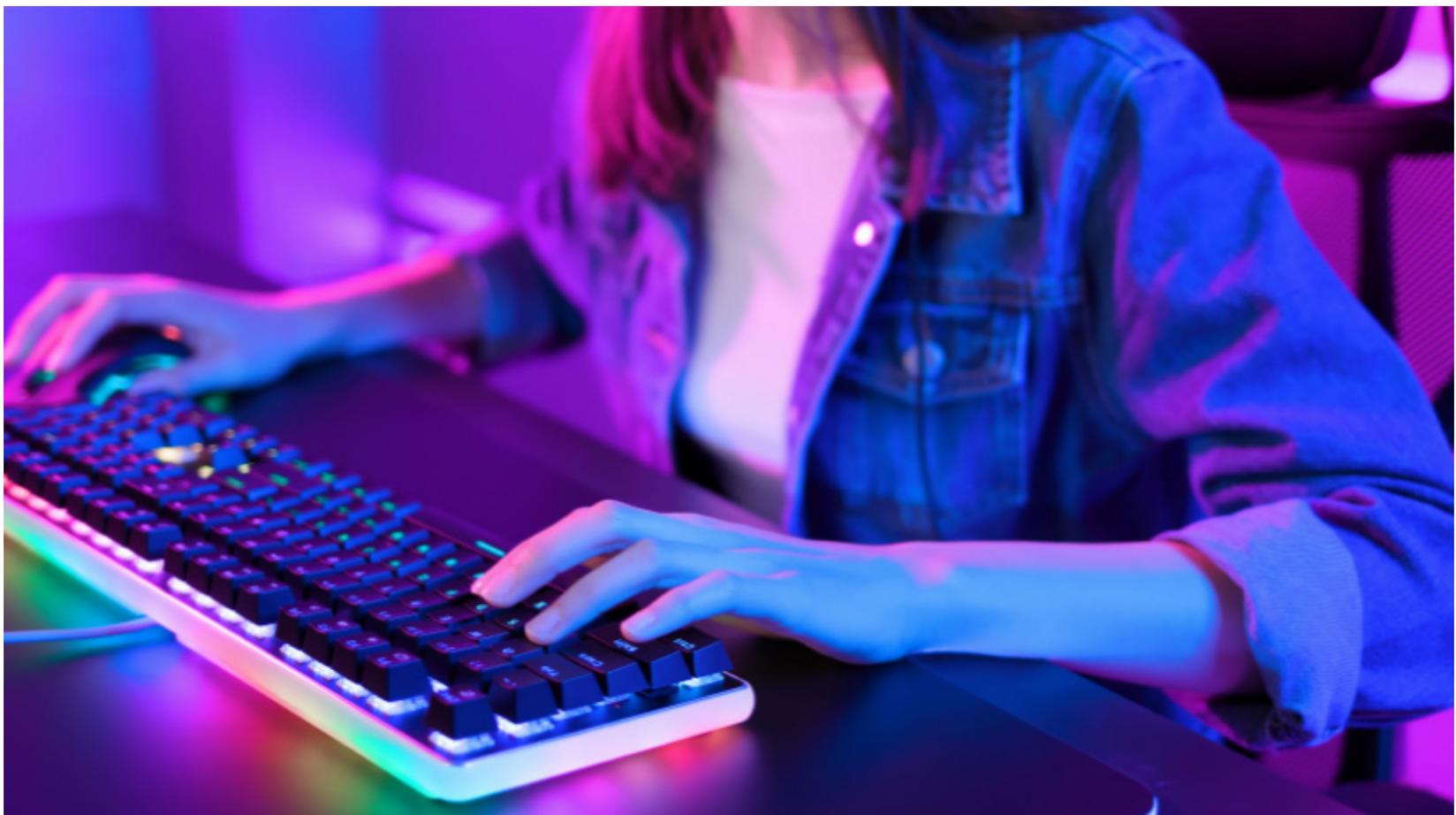
"We have added a careers questionnaire into monthly homework to try and flag up the different opportunities out there," said Pete. *"A year 9 found out that a penetration tester*

and security consultant for the FTSE 100 companies can earn more in a month than her teacher does in a year!"

Pete said the ENTHUSE Partnership had opened up many new opportunities to each of the schools involved, funding CPD, courses - and time.

"ENTHUSE has been a great catalyst for collaboration and support – it has given a focal point to the individuals and departments at each school who worked so tirelessly to bring about these superb results, sometimes under difficult circumstances," he said.

"For me personally it's renewed my love of teaching. And I know I have an open channel to other teachers I can contact for help and support and vice versa. We are doing this to help each other – it grew from an organic partnership not a paid responsibility – and we are all committed to making it work."



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