Diversity in Computing

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We're nearing the tenth anniversary of computing becoming part of the national curriculum, which meant that coding and computer would be taught to all pupils, irrespective of their gender, ethnicity or home background. This inclusive vision for the subject has served us well, with close on 100% of pupils learning this now, at least up until the end of Key Stage 3. However, when pupils are given the option to choose the subjects they study for GCSEs and A-Levels, computing does not do well. The situation is improving: this year, entries are up 6.2% and 11.8% respectively, but there's an ongoing issue around under-representation of some groups of pupils. Put simply, when given the choice, girls, poorer pupils and some ethnic groups are much less likely to choose to study computer science, and some pupils in these groups are not even given the chance to do so.

Last summer, just 21% of GCSE entries are from girls, and it was only 15% of the A-level entries. For schools in the 20% of most affluent areas, 92% entered pupils for a GCSE in computing last summer, in the 20% of least affluent areas, this dropped to just 64%: one consequence of this is that 16% of pupils in these most affluent postcodes did the GCSE, but only 10% of those in the poorest areas did. Computing is a very meritocratic field, and offers lots of opportunity to address social mobility – it seems wrong that pupils who would most benefit from the opportunity to study this at GCSE are actually denied the opportunity to do so.

I'm aware that I come to this from a position of some privilege, as a while, middle class, middle aged man, but the unrepresentative nature of GCSE and A-Level computer science profoundly matters to me, as it should to us all. Partly this is because I think everyone ought to continue to study some aspects of computing until they leave school, given the impact of computing on other academic disciplines, all jobs, culture and society. It's also because computer science opens up lots of career opportunities for those who do study it. More than this, those who work in tech ought to be more representative of the society they're building tech for: if not, there's a real danger that the products we get are based too much on the needs and opinions of unrepresentative groups – as we're seeing with the misuse of AI.

There are many possible reasons for why diversity in computer science isn't all that it could be, but it's certainly not because it's a 'boys subject' – the first programmers were women, women make up more than 50% of those studying CS in Arab world universities, and girls get better grades than boys in both GCSE and A Level CS. In part, the disparity is because some pupils aren't even given the opportunity to take the subject. This could be because there just aren't enough computing teachers to go round, and it might be that it's even harder to recruit computing teachers in economically disadvantaged areas than in more affluent ones. I think there are also potential issues with the nature of the subject itself – ICT, for all its faults, had a much more diverse cohort than computer science has, and I'd love to see GCSE and A-Level computer science replaced by far broader qualifications in computing – recognising the full breadth of the national curriculum subject to take in the most useful bits of coding and computer science, alongside useful skills in IT and digital media, and critical digital literacy to help pupils think hard about the impacts of digital technologies. A broader qualification would be likely to broaden the uptake.

My 13-year old daughter put it very well: "The boys are interested in what computers can do, the girls are interested in what we can do with computers." This seems to reflect many of the opinions in the DfE's Omnibus survey last summer and the recently published Science Education Tracker. The latter reveals a

disturbing decline in pupils' interest in computing from Year 7 to Year 11, particularly among girls, and the numbers in the 2023 report are even worse than they were back in 2019. Digging into this data, the girls who choose to study computing often say they find it creative; those who do not often say it's because it's not interesting, not enjoyable or just too difficult – there are lessons to learn here for how the computing qualifications should be reformed.

Other than broadening the scope of the qualifications, what else might be done? The Raspberry Pi foundation conducted research into a number of strategies: developing non-formal learning of computing, promoting a sense of belonging for girls, focussing on the relevance of computing, working on teaching approaches such as peer instruction, pair programming and storytelling, and work on option choices and how the subject is promoted at this point. These are all really good ideas, and well worth considering in school. Alas, the research conducted during the pandemic, didn't indicate that any one of these made a statistically significant impact, but perhaps a combination of strategies might. The National Centre for Computing Education has developed an 'I Belong' project, addressing how computing can be better promoted to girls in Key Stage 3, which seems crucial to see impact on subsequent GCSE choices.

Before 2010, Becta developed a home access scheme, providing free computers and internet access to pupils entitled to free school meals. This was a great success, but it was stopped when the incoming government closed Becta. However, there's nothing to stop schools using some of the Pupil Premium funding now available to provide laptops and internet access to pupils who don't have these, as items 'necessary to overcome specific barriers to pupil attainment'. If we're serious about addressing the socioeconomic divide in computing education, and education more generally, it's hard to think of something that would have a better return on a relatively modest investment.

Culturally responsive teaching might do much to help pupils from under-represented ethnicities see computing as something for them. Again, the Raspberry Pi foundation has done much here, building on work conducted in the US. The approach includes using learners' own cultural knowledge and experiences to inform what we teach and providing opportunities for learners to pursue personally meaningful projects to express their own identities.

For all three of these issues, it's also worth exploring the role models and examples. Many pupils in these groups might not be able to see themselves in tech or tech-related roles. Brilliant as Grace Hopper, Ada Lovelace, Mary Jackson and Tommy Flowers were, pupils might not easily be able to see them following in their footsteps. Former pupils and diverse individuals working locally in creative or tech related industries might be much better at inspiring pupils, and demonstrating the relevance of computing for all.

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