



National
Centre for
Computing
Education

Impact Report

November 2020

Welcome



Computing has been re-imagined as a foundational school subject, like maths and natural science, that all children should learn to equip them for life and work. Computer science, the subject's underlying subject discipline, is now an explicit part of the curriculum, alongside digital skills and competence. These are pretty ambitious changes. They represent a huge opportunity - and a huge challenge - that will only be met when every primary and secondary computing teacher embraces this new vision, with both enthusiasm and expertise.

The National Centre for Computing Education (NCCE) exists to support schools and teachers to meet that challenge, and to make the

new computing curriculum into a vibrant reality in every classroom in the land. I am hugely grateful to the teachers and school leaders who have supported our ambition. The first two years of the NCCE have seen spectacular progress: a Computer Science Accelerator programme that has trained over 1,300 teachers in GCSE Computer Science; dozens of teachers' professional development courses, both face-to-face and online, at every level from primary to A level; a comprehensive Teach Computing Curriculum with 500+ hours of lesson plans: an emerging project to address gender balance in computing; and much more besides; all directly rooted in the best educational research, and rigorously quality assured.

But we can't do this alone. If you fold your hands and think "the NCCE will sort it all out", we will fail. We need you - your ideas, your enthusiasm, your expertise - to make this happen. We are so grateful to our existing partners - Arm, BT, Google, IBM, Microsoft, Nationwide and Rolls-Royce - for their support, and our ambition is to broaden our base considerably.

Computing is a young and exciting subject. We have an opportunity, together, to shape how it "lands" in the classroom, so that we can be truly proud of the education our young people receive. Please join us!

Simon Peyton Jones
Microsoft Research and
Chair of the NCCE

What we've achieved

in our first two years

29,500

teachers engaged, representing **8,500** primary schools and **3,000** secondary schools.

7,600

teachers have benefitted from NCCE continuing professional development (CPD).

Teach Computing Curriculum launched, including

500

hours of learning materials from key stages **1** to **4**.

1,300

Computer Science Accelerator graduates trained to teach GCSE Computer Science.

125,000

units of work downloaded from the Teach Computing Curriculum since September 2020.

34

Computing Hubs acting as local champions for Computer Science and delivering face-to-face, in-school and remote support.

1 million

questions answered through Isaac Computer Science, supporting A level Computer Science.

275

Computing at School (CAS) Communities of Practice providing peer support and networking.

What we do

The NCCE supports schools to provide young people with an inspirational, world-class education in computing.

Our ambition is to transform the way computing is taught in schools across the country – and enable more young people to benefit from studying this important subject.

We will achieve this by developing and promoting computing as an evidence-informed school subject and focusing on teachers, supporting them with outstanding continuing professional development (CPD).



No education system can exceed the quality of its teachers. The only way to improve outcomes is to improve instruction.”

McKinsey, 2007

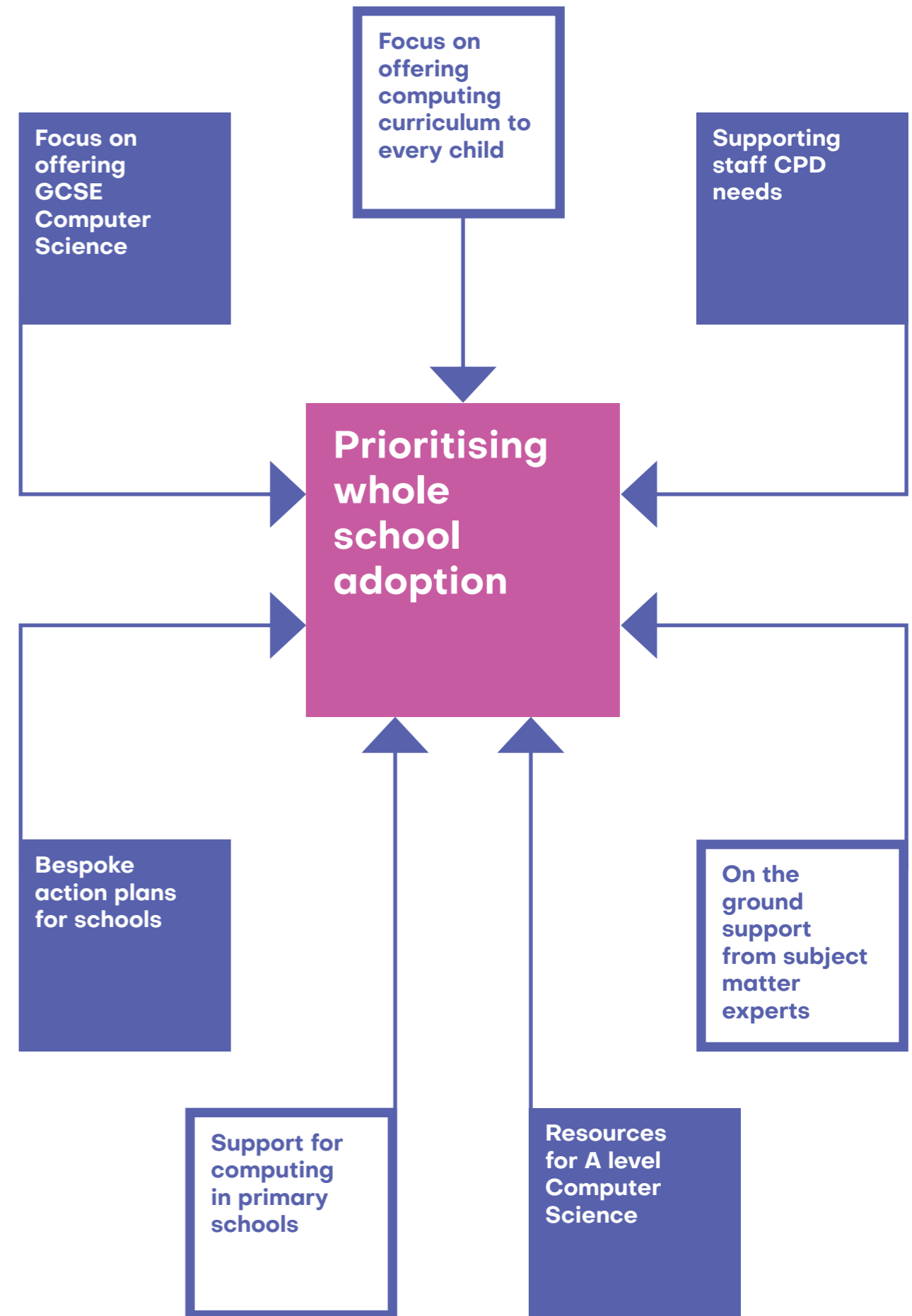
Develop great teachers

Investment in teachers is fundamental: one inspirational teacher will touch the lives of thousands of children over the course of their career.

Our first teacher CPD was delivered in January 2019 – just two months after we launched. Two years on, we are pleased to report that students are benefitting, with increased access to computing lessons and teachers brimming with knowledge, confidence and enthusiasm for the subject.

Evaluation is embedded across the NCCE. We ask for feedback from teachers at the end of every course to help us improve – right from the start, over 90% told us their course was good or very good and 98% said it would benefit their students.

We also follow up with teachers once they have had time to embed their learning and put it to use – and are pleased to find that those expected benefits are being realised back in the classroom.



The NCCE enables teachers to blend face-to-face, intensive remote and online CPD to suit their needs.

This approach is supported by evidence and appreciated by teachers – 95% of graduates from our Computer Science Accelerator programme told us they liked it.

Face-to-face CPD boosts motivation and enables teachers to focus intensively to accelerate their development. Course leaders can fine tune delivery to ensure a supportive experience, building confidence and tackling more difficult subject matter.



Computer Science Accelerator summer school, 2019

Participant feedback

“Face-to-face days were very motivating and useful to share resources and knowledge.”

“I needed to hit the ground running... I decided to go the residential route as I have three children at home, self-paced study at home was a struggle.”

“The supportive learning environment that the trainer created... a culture of exploring and supporting each other... I feel a lot more confident.”

“Very good to get together with our whole department and spend a full day away from the normal interruptions of the school day.”

Support network

“...the energy and engagement from the community was exciting and something I wanted to share with others.”

The NCCE fosters peer support for computing teachers in primary and secondary schools through a nationwide network of 275 local Computing at School (CAS) Communities of Practice. Over **740** face-to-face events were attended by over **11,000** teachers up to March 2020. Following restrictions on meeting in person, the network organised popular online events attended by over **4,000** teachers, with over one thousand teachers participating in online discussions.

“I found the CAS community meetings and online forums to be both a valuable and reliable source of support with identifying relevant computing resources and teaching approaches. It's been very motivating to be in contact with other teachers wanting to develop their computing practice.”



“I am pleased to see that the number of CAS Communities of Practice continues to increase and is also fully integrated with the NCCE programme, supporting teachers along their CPD journey.”

Beverly Clarke, National Community Manager for Computing at School (CAS)

“Working with my local CAS community in Cambridge is one of the most rewarding parts of my job. The passion and expertise that the teachers share is overwhelming and seeing how the community shares ideas, resources, research and best practice makes me proud to support CAS. Arm School Program supports me in supporting CAS and we play host to the community and organise speakers from industry to join the dots between education and employment in Computing.”

Robert Leeman, Arm School Program



Resources

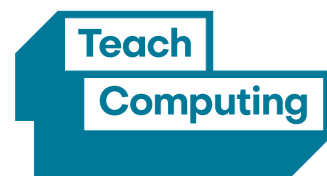
The NCCE has created the first ever free set of resources that cover the entirety of the computing curriculum for key stages 1 to 4. With over 500 hours of lessons, spread over 69 units of work, it's a fantastic resource for all teachers who teach computing.

In the first two months of launch, our lessons have been downloaded over 125,000 times, with 97% of teachers rating them as high quality.

Each unit of work includes lesson plans, slides, worksheets, homework, and assessment. The materials are designed so

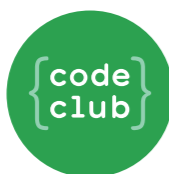
that teachers can easily adapt and make them their own by contextualising the content and responding to their students' needs. Many of the resources are also now available as direct-to-student tutorial videos as part of our work with Oak National Academy.

teachcomputing.org/curriculum



Enrichment

The NCCE has partnered with Barefoot, Code Club, CyberFirst, STEM Ambassadors and the UK Safer Internet Centre to enrich the curriculum and build engagement in schools across the country.



User feedback

“It's great that there are resources available that have everything we need. It gives a good foundation that, as we gain more confidence, we can build on.”

Primary Teacher

“I would like to start by saying your resources for the secondary department have been excellent and a great help for my students and I. They have made planning so much easier as a non-specialist computing teacher, so thank you!”

Computing Head of Department, Secondary

Primary Computing

Developing the foundations



St Mary's C.E. (VA) Primary School, Wakefield

The NCCE supports primary schools and teachers to develop the confidence and skills to give their children a great foundation in computing. CPD for primary teachers is critical, as relatively few primary teachers have in-depth prior knowledge of computing, let alone training or experience in how to teach it well.

The NCCE has partnered with **Barefoot**, which supports primary teachers to deliver the basics of computer science in a fun, accessible way. Barefoot is run in partnership by BT and Computing at School. It provides a ready-made bank of online teaching resources and ideas developed by teachers for the classroom and in the home, alongside workshops led by experienced teachers and industry volunteers.

Approximately 16,000 primary teachers have signed up for Barefoot since the NCCE launched, in addition to the 74,000 UK teachers who were already registered.



“At BT, we want to ensure children have the skills and confidence they need to become the problem solvers and digital innovators of the future. This is crucial for building a thriving economy and an inclusive society where everyone is able to unlock their potential and make the most of life in the digital world. The NCCE is an important step towards this, and I’m delighted that BT is working with the NCCE to help even more teachers and their pupils discover the fantastic resources we are creating to support every child’s right to a quality education.”

Kerensa Jennings, Director of Digital Impact, BT

“...the best part was being able to network so much more with other computing teachers and listen to their ideas and resources!”

“It really does make a difference. It’s not only about being in the classroom – it’s about getting involved with the community.”

William Barrie, Area Customer Engineering Manager and Barefoot Ambassador, BT

The NCCE encourages primary teachers to continue their professional development in computing, with support from our partners. 98% of teachers rate our primary CPD very highly and, after they have had time to put it to use in the classroom:

93%

of teachers said their NCCE CPD had significantly benefitted them.

74%

of teachers had shared what they learned with colleagues at their school.

47%

of teachers said the CPD has helped to raise the profile and/or priority of computing in their school.

68%

of teachers said the CPD had increased the motivation and engagement of their students.

Primary Certificates are awarded to primary teachers who demonstrate commitment to professional development in teaching computing, including developing their own knowledge and supporting their community. Over **2,300** teachers have enrolled since the certificate was launched in December 2019.

Participant feedback

“I have gone from having no idea how to teach my Year 5 computing (all we were doing was using Word, PowerPoint, etc and internet for research) to now feeling confident to deliver the full curriculum... It will make a massive difference to my teaching next year and will have a significant impact on the children.”

Secondary computing

Supporting every stage

The NCCE champions the development of effective teaching and leadership of computing across secondary schools. This includes focused support for GCSE Computer Science through the Computer Science Accelerator programme and for A level Computer Science through Isaac Computer Science.

The NCCE offers secondary teachers the full professional development career journey; from picking up computing as an additional subject, through growing their experience and classroom practice, then taking on responsibility for the subject, leading curriculum development and supporting other teachers to be effective.

CPD is provided - remotely and in person - by a network of Computing Hubs. A quality-assured system ensures that the best evidence-based teaching practice is available to all, regardless of location.

All CPD is led by experienced, well-trained facilitators, supported by a team of subject specialists developing high-quality CPD content.

This content is regularly updated and evolves to meet identified teacher needs, including an

increased focus on key stage 3 as an enabler of GCSE success and supporting curriculum intent, implementation and impact.

We followed up with participants to find out what impact the NCCE's secondary CPD was having once they were back in their classroom.

94%

of teachers told us that the CPD had delivered significant impact for them.

81%

of teachers reported improved subject and pedagogical understanding.

81%

of teachers had increased confidence, enthusiasm and motivation for teaching computing.

63%

of teachers had a better understanding of how to contextualise computing with cutting-edge knowledge, employability skills and careers information.



A substantial majority (75%) of participants also reported that their NCCE CPD was having significant impact on their students. 75% of the teachers reported increased motivation and engagement and half had seen improved progress and/or attainment.

Over two thirds of participants reported that NCCE CPD had led to significant impact on their school, including improved quality of teaching in computing (63%). Half of the teachers said that their NCCE CPD had helped to raise the profile and/or priority of computing in their school and most (69%) had shared what they learned with colleagues at their school.

In addition to CPD, secondary teachers can use the resources provided by the Teach Computing Curriculum.

For schools that want to set up extracurricular computing activities for students, Code Club (an NCCE national partner) provides projects and resources to help pupils develop their programming ability and problem solving by creating games, animations and webpages. Nearly 400 new clubs have started up in secondary schools since the NCCE was launched.

Schools and teachers can also call on volunteers from STEM Ambassadors, the NCCE's newest national partner, who can help to enrich their teaching with real world context and inspire young people through a wide range of different activities.

“ Seeing people who work in computing in the real world puts it into perspective. I’m going to do A level Computer Science and see where I go from there.”

Yahya, pupil, George Green’s School

75%

of the teachers also reported that their NCCE CPD was having significant impact on their students.

63%

of the teachers reported that NCCE CPD had improved the quality of their school’s teaching of computing.

50%

of the teachers said that their NCCE CPD had helped to raise the profile and/or priority of computing in their school.

75%

of the teachers reported increased motivation and engagement and half had seen improved progress and/or attainment.



Computer Science Accelerator summer school, 2019

GCSE Computer Science

The NCCE provides focused support for GCSE through the Computer Science Accelerator (CSA) programme.

Once teachers have completed sufficient CPD, they are invited to take a test and, if they pass, are awarded a certificate recognising they have the subject knowledge to teach at GCSE level. Over 1,300 teachers are now CSA graduates.

Over 90% of CSA graduates reported it had given them what they needed to become confident, able GCSE Computer Science teachers and 70% said it had increased their confidence, enthusiasm and motivation for teaching computing.

82%

of CSA graduates told us that their colleagues have benefitted as a result of their participation in the CSA programme.

Participant feedback

“ Without doubt the best CPD of my career so far and I now consider myself a Computer Science teacher – something that I would not have believed possible just six months ago.”

Graduates of the CSA programme told us that their participation had increased provision of computer science at their school:

- Over half reported more students are now studying computer science.
- Over one third said more computer science lessons are on offer.

The CSA programme also aims to tackle the shortage of teachers to teach GCSE Computer Science by upskilling teachers from other subjects, enabling them to teach computing effectively by providing a grounding in subject knowledge and effective teaching approaches.

A level Computer Science

Case study: CSA participant

“ I am a qualified English Teacher... I have always had an interest and a passion in Computer Science having grown up during the 'golden era' of the internet.

Having been given the opportunity to co-ordinate Computer Science at our school, I was delighted to be offered a place to attend NCCE's Summer School for early-career Computer Science teachers.

I cannot recommend it highly enough. The course provides all participants with the skills, knowledge and pedagogical applications for delivering a world-class computing education.

The facilitators themselves are all experts within their field

and come from a range of both professional and educational backgrounds that consolidates the ethos of the course - all are welcome.

I welcomed the opportunity to discuss current educational research and pedagogy with other participants on the course and this was tightly-woven within each facilitator-led session.

The NCCE really is a world-class computing network that is providing the background, motivation and aspiration that every child can have a world-class computing education delivered by highly-qualified and enthusiastic subject experts.”

Max Ruddock



Isaac Computer Science event at the University of Cambridge Computer Laboratory



The NCCE's Isaac Computer Science provides a platform loaded with free learning resources covering the full A level Computer Science specifications for AQA and OCR. It also runs A level CPD for teachers and workshops for students.

Isaac is designed to be used by teachers and students to upskill their knowledge independently or as part of a flipped learning resource. Teachers can also use it to set class homework and review the engagement of their students through self-marking questions.

Teacher feedback

“ I can't recommend Isaac Computer Science highly enough for A level Computer Science teachers. No other subject area has a platform this knowledge rich, this accessible, and this enjoyable. ...it has added value to our Year 11s who are transitioning onto our A level classes next year. I was asked why they didn't have this at GCSE.”

Lee Willis, Digital Technology Lead at North East Futures UTC

Looking ahead

The NCCE has achieved a great deal in its first two years, but there is much more still to do. Here are our ambitions:

- Ensure every school can benefit, regardless of circumstance.
- Continue to build capacity and demand for Computer Science at GCSE and beyond.
- Support primary schools and teachers, so that every child receives the grounding to achieve their full potential in computing and digital skills throughout their education.
- Make computing and digital skills engaging as well as academically rigorous, so all young people see this as 'something for them'.

Can you help...

Advocate – speak up for the importance and value of a world-leading computing education for every child.

Raise awareness of the NCCE with school leaders and teachers – and with colleagues and other organisations that can help us.

Volunteer – and encourage colleagues to volunteer – for Barefoot, Code Club and STEM Ambassadors.

Enrich – provide talks, mentors, visits, facilities or technology to enrich the student experience of computing in school, working with STEM Ambassadors and Isaac Computer Science Discovery events.

Funding – we need to raise £2.1 million to ensure every school in a disadvantaged area can fully and freely access CPD from the NCCE. £100,000 will support 455 teachers, benefitting over 12,500 young people each year.

Engage – follow the NCCE on our social media channels, visit our Teach Computing website to find out more and contact us by email. You can find all our addresses on the next page.

Teachers tell us that the Isaac resources are high quality.

Students also rate Isaac Computer Science – 79% said they could find what they needed.

700 students have taken part in Isaac Computer Science events, including masterclasses and “Discovery” sessions that give students an opportunity to learn about the amazing directions in which a computing career could take them.

2,000

teachers are active on Isaac Computer Science, including over 600 from state schools in England.

18,000

students are registered with Isaac Computer Science, including 3,600 from state schools in England.

90%

of teachers use Isaac resources to provide homework or revision – helping hard pressed teachers to save time.

72%

of students would recommend Isaac Computer Science to their peers.

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