



# Impact report

2018 – 2022

**National  
Centre for  
Computing  
Education**

# Welcome



# How the National Centre for Computing Education makes a difference

This impact report spans a reporting period between November 2018 and July 2022, and represents all primary, secondary and post-16 institutions in England. Teachers and educator types include trainee, supply, classroom teachers and leaders in schools and colleges. This report brings together data from individual evaluations of each element of the NCCE offer, using surveys, interviews and case studies alongside monitoring data.

Since its launch, the National Centre for Computing Education (NCCE) has created enormous momentum and opportunity for computing as a school subject. Our vision is for every child in every school in England to have a world-leading computing education – and I am grateful to the teachers and school leaders who have supported that ambition and worked to make it a vibrant reality in classrooms across the country.

With the support of the Department for Education and our partners, Arm, BT, Google, IBM, Microsoft, Nationwide and Rolls-Royce, the NCCE has already made great strides to drive forward the future of computing education, from primary through to A level. In the first four years, we have seen remarkable progress, driven by our curriculum Hub network across England, with over 60,000 teachers and educators engaging in our continuing professional development (CPD), reaching over five million young people in England.

There have been some pretty big challenges, notably the significant impact of COVID-19 on schools and the shift to remote teaching and learning during this period. Yet, the way the NCCE adapted its offer, including developing

a more accessible and flexible model of professional development for teachers, has created new ways of working which will continue to provide benefits in the future.

As we look forward, building the profile and provision of computing across the education system is more vital than ever to our society and economic growth. However, the NCCE cannot do this alone. As employers, universities, and computing professionals, we are all partners in this enterprise. We can speak up for the importance of a robust, foundational computing education for every child; we can support and value our local schools and teachers; we can volunteer our time and expertise, as individuals and as organisations, through STEM Ambassadors and the NCCE.

With your support, we can do more to engage young people in the rich and exciting world of computation and information – particularly those most in need – giving them agency in the world and control over their future lives. Please join us!

## Simon Peyton Jones

Engineering Fellow, Epic Games and Chair of the NCCE



**60,000+**  
teachers and educators have engaged in CPD, representing over 20,000 schools and colleges in England



**7,300+**  
teachers and educators have achieved 10 or more hours of subject knowledge training through our Computer Science Accelerator programme and 94%\* say it is good quality



**1M+**  
Teach Computing Curriculum resources have been downloaded by schools in England since September 2020



**54%**  
of students studying AS and A level have engaged with Isaac Computer Science, with nearly 3.5 million questions attempted by students on the platform



**1,600+**  
schools engaged with the Computing Quality Framework since its launch in spring 2022



**470+**  
volunteer leaders ran Computing at School Communities of Practice, providing peer support and networking for more than 25,500 teachers



**18,000**  
students have been supported by our physical computing kits since September 2021, which are regularly loaned to schools

# Giving students access to a quality computing education



The need to address the low uptake of GCSE and A level Computer Science, particularly for girls, is a well-recognised challenge for the teaching sector. In 2018, over 81,000 students across England entered computing subjects at A level and GCSE. In 2022 this has increased to over 93,000 students.

However, the need to develop the pipeline of skilled workers in the sector is rapidly growing as the digital economy evolves. Access to a quality computing education for all pupils will be integral to the UK continuing to build its digital workforce.

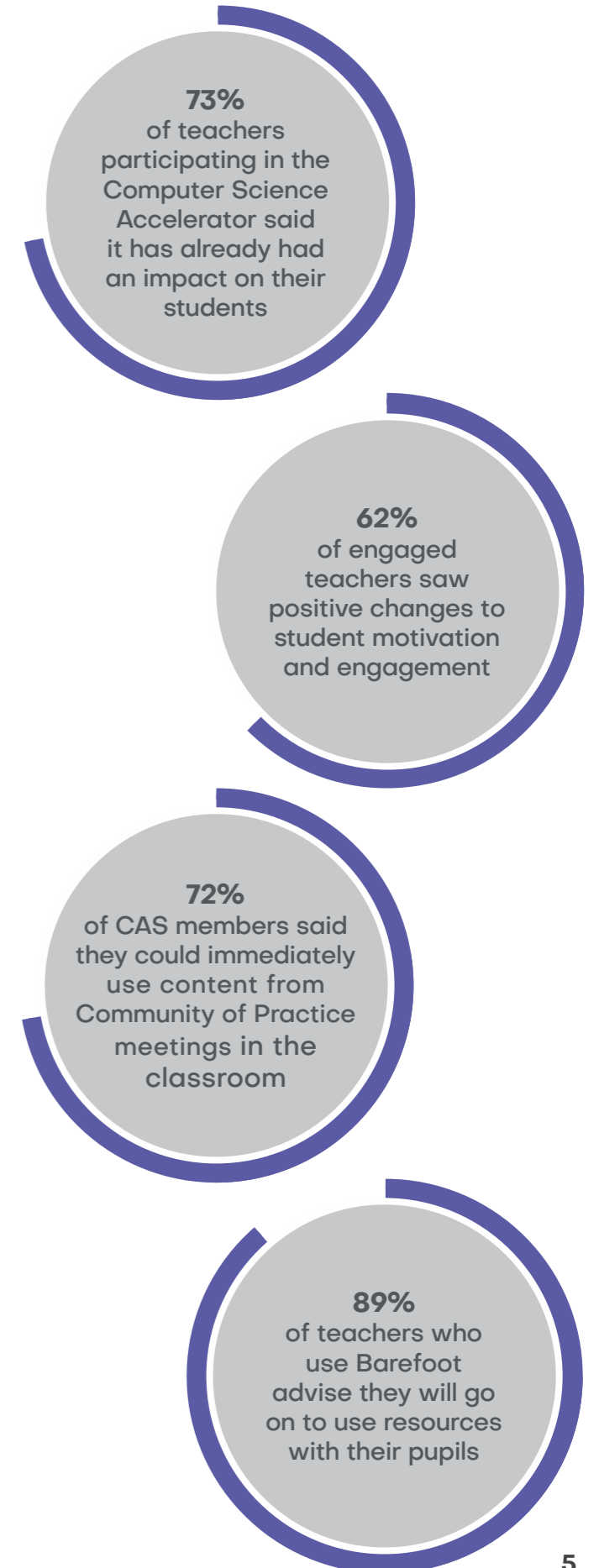
Our CPD and Teach Computing Curriculum resources support teachers to engage students across all key stages. The NCCE has reached approximately **five million students in England**, of which 700,000 are from areas of high social disadvantage.

Isaac Computer Science, our free online platform for students and teachers, has engaged thousands of students to date. It has experienced growth in numbers year on year, culminating in over **7,200 students having engaged** with the content in the 2021/22 academic year.

Access to experienced teachers and inspirational speakers has been provided to students at free Isaac events across England, with **2,700 attendances in total**.

The NCCE's enrichment activities benefit students of all key stages. Since becoming one of our national partners in March 2021, STEM Ambassador volunteers have engaged with almost **7,500 schools**. Over **10,500 registered Code Clubs** support 9 to 13-year-olds in England with computing. Barefoot Computing, run in partnership with Computing at School (CAS), has **engaged over 14,000 primary teachers** through its resources, lessons and teacher CPD.

Evaluation shows that the NCCE supports students to develop their knowledge, skills and confidence, driving positive change in their perceptions of computing.



## Isaac Computer Science: Computer science for careers and everyday life

*"I love how Isaac CS provides an easy-to-use interface for finding a variety of exam-style questions and that they have in-depth notes for all the topics."*

Isaac student panel member

Isaac Computer Science highlights the ways the NCCE adapted its offer to the challenges facing schools and students during lockdown. A level students were able to continue their studies by using Isaac materials for distance learning and attending a wide variety of events which quickly pivoted online.

Students report they use Isaac Computer Science for homework, to check their understanding of concepts, and increasingly,

for self-directed learning – almost 3.5 million questions have already been attempted on the platform! A 2022 evaluation demonstrates how NCCE interventions can impact students' skills and perceptions of computer science, particularly when considering their future careers:

**64%** agreed Isaac helped them develop knowledge that will help them earn a living

**59%** agreed it helped them to learn skills they need to achieve career goals

**49%** agreed it helped them understand how computer science plays a part in everyday life

**61%** agreed it has helped them solve more challenging problems with computer science

*"It's been really fantastic working with Year 6, watching them extend their coding skills, and seeing the delight when they do physical computing and see the results."*

Stephen, Computing teacher at Stoke Poges School, Buckinghamshire



## Improving teacher knowledge and expertise

If every child is to have access to a high-quality education, the UK needs more skilled and motivational computing teachers. The NCCE was established to help **improve teacher knowledge and expertise**, and support implementation in the classroom.

The NCCE provides high-quality face-to-face, online and remote CPD that leads to national certification to recognise teachers' achievements. Over 5,500 face-to-face and remote courses have been delivered between 2018 and 2022.

“*Those four days of CPD had such a positive impact on my knowledge, skills and confidence, and I believe that my students have been able to benefit from this.*”

Leroy David, Computer Science teacher at Wednesfield High Academy

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Computer Science Accelerator offers a route for teachers to develop their subject knowledge across the curriculum at key stages 3 and 4, with over **4,600 teachers** achieving this nationally recognised certification.

Isaac Computer Science provides topic-specific online and face-to-face training, supporting over 1,600 A level teachers. It features full curricula coverage of 51 topics, covering A level and GCSE, mapped to six different exam specifications. It also provides resources, including auto-marking questions with hints to set students for revision and homework. **93% of teachers** said the resources are high-quality and easy to access.

Promoting effective pedagogy is embedded into our curriculum resources. The Teach Computing Curriculum is a valuable repository for teachers, encompassing over 500 hours of resources, which have been **downloaded by over 13,500 schools**. In addition to supporting improved knowledge, it helps to increase capacity, with 81% of teachers reporting it is more time-saving than previous curricula they have used. Its pedagogy quick-reads have been downloaded 43,000 times and offer strategies to improve teachers' understanding of pedagogy to support outcomes for learners.

CAS has **delivered over 28,000 activities** through its Community of Practice network, which provides a safe space for computing teachers to develop, make connections and share good practice. Barefoot Computing delivers free CPD workshops for primary teachers to introduce them to programming and computational thinking.

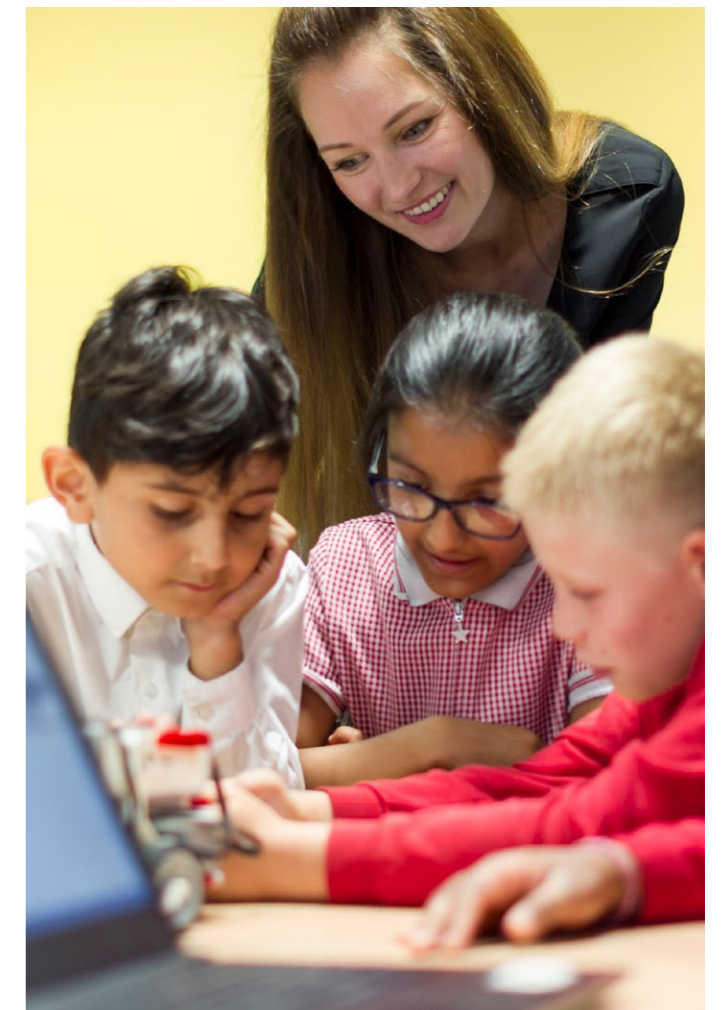
“*As teachers, we are so fortunate to have such an excellent additional resource. I would also use it with Year 11 where I believe the platform could help students achieve higher grades because of the excellent explanations.*”

Teacher, Isaac Computer Science survey 2022

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Together CAS and Barefoot have reached **more than 25,500 primary and secondary computing teachers**.

Evaluation of our programmes reflects the positive impact of engaging with the NCCE for teachers. Teachers who have engaged with the NCCE report improvements in their skills and knowledge, subject and pedagogical understanding, and confidence and motivation – all factors that support quality teaching and learning of computing.



96% of Computer Science Accelerator participants reported improved computing subject and pedagogical knowledge

84% of teachers using the Teach Computing Curriculum report it has improved their quality of teaching

62% of teachers using Isaac reported a reduction in workload - 2.6 hours is the average weekly time saved

77% of Isaac CPD participants said their subject knowledge improved

94% of teachers said they felt more confident about their role after attending a CAS event



“*As I am new to teaching, it is really helpful to meet up and speak to other teachers locally to understand what they are doing.*  
**CAS member, Community of Practice feedback**”

## Computer Science Accelerator: Closing the skills gap for specialist teachers

Computer Science Accelerator is a professional development programme for current and aspiring computing teachers. To date, 38% of state-maintained English secondary schools now have at least one upskilled graduate of the programme.

Notably, 89% of teachers report a positive impact on themselves as well as the programme’s benefits for students. A rise in progress and attainment has been reported by 57% of participants, and 68% say the quality of colleagues’ teaching has improved. As one graduate observes:

Computer Science Accelerator supports computing teachers to develop their subject knowledge and helps to tackle the shortage of computer science teachers by upskilling teachers from other subjects. It leads to a national certificate, recognising participants have the subject knowledge to teach GCSE Computer Science.

*“Computer Science Accelerator provides teachers with confidence in a subject that has a reputation for being difficult. The certificate models best practice which is passed on to the students giving them more engaging and impactful lessons.”*

**Jonathan O’Donnell, Harris Federation**

# Making an impact at a school level

Motivational and effective classroom teaching is embedded through whole-school support. The NCCE helps schools to teach computing more effectively in a crowded curriculum, alongside digital skills and competence.

The wide range of channels through which teachers can engage with the NCCE are complemented by a programme of school-level support.

Subject matter experts (SMEs) work with schools in areas of high social disadvantage in England, offering bespoke support to help develop their computing or computer science provision. A total of **97% of primary and 86% of secondary schools** report departmental knowledge has increased after being supported by an SME.

The Computing Quality Framework (CQF) helps schools review their progress in developing the computing curriculum. Since its launch in spring 2022, **1,600 schools** have committed to delivering a high-quality computing curriculum and achieving the Computing Quality Mark.

Our CPD supports school-level improvement, with 70% of engaged teachers reporting a positive impact on their school.

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*As a subject leader, I have been able to share my new knowledge and support my colleagues when they are teaching areas of the computing curriculum that they aren't as confident with.*

**Sophie Hudson, Primary teacher at Linton-on-Ouse Primary School**

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Teachers who have engaged with the NCCE report a range of wider impacts, including:

## ✔ Sharing learning with colleagues

70% of CPD participants saw a positive impact on colleagues, leading to improved quality of teaching in their school.

## ✔ Improved student attainment

Over 50% of CPD participants reported a rise in student progress and attainment.

## ✔ Improved perceptions of computing

43% of CPD participants reported the profile of computing increased in their school.

## ✔ Increased uptake in computer science

50% of secondary schools reported an increased uptake of GCSE Computer Science after SME support. Over 230 additional schools have committed to offering GCSE Computer Science.

## ✔ Increased quality and profile of computing teaching, including at senior leadership level

Over a third of Computer Science Accelerator graduates reported an increase in computer science teaching within their school. Over 1,300 school leaders have agreed action plans committing to the development of computing.

## ✔ Capacity and time saving

Almost all schools report increased capacity to teach computing or computer science after receiving support from their SME.



## NCCE Computing Quality Framework: Supporting schools to improve their curriculum

The CQF is a free online self-assessment tool that helps schools review, develop and monitor their computing curriculum, identifying strengths and areas for development in line with Ofsted's quality of education judgement.

John Palmer, Computing Lead at The Chase in Malvern, one of the first schools to receive the Computing Quality Mark, says:

*“The CQF has allowed us to gain vital external validation of our computing provision so that we know it aligns to latest best practice. Going through the CQF in detail gave me confidence that if Ofsted undertakes a computing ‘Deep Dive’, we’ll be able to demonstrate our strong computing provision.”*

### The CQF provides:

- a process for identifying strengths and areas for development
- links to NCCE's resources, targeted to a school's specific needs
- opportunities for involvement across the school, from classroom to senior leadership
- support for developing additional strategies relating to SEND, diversity and inclusion, and careers
- accreditation via the NCCE Computing Quality Mark, awarded by BCS, The Chartered Institute for IT

# A network of regional support

The NCCE's provision for students, teachers and schools is underpinned by a national network of support and resources benefiting schools at trust and system levels.

Computing Hubs provide targeted support for schools and colleges in their region to provide a high-quality computing education to all young people across England. The Hub network engages with schools and school trusts, providing quality-assured CPD and resources.

CAS Communities of Practice are regional teacher networks run throughout the UK, led by volunteers with knowledge and expertise in computing education. CAS Community Leaders facilitate community meets, strengthening regional communities of practice and supporting teachers to develop knowledge, connect with peers and re-develop their computing offer.



This model of regional delivery and system-level support has enabled the NCCE to build sustainability through ongoing relationships, and provide support and development. Its approach is helping to develop an informed and reflexive offer to meet local needs, complemented by structured central support.

## Computing Hubs: Providing strategic regional support

Led by schools and colleges with excellence in teaching computing, Computing Hubs use their local knowledge and networks to provide targeted curriculum support, addressing local needs and national priorities.

Hub support can range from assisting schools and trusts to work towards becoming GCSE providers, supporting schools in areas of high social disadvantage with computing provision and supporting co-ordinated approaches to computing across a school trust, including single and multi-academies.

Since 2019, Computing Hubs have ensured that all schools and teachers can access local, impactful CPD. Their events have reached over 43,000 participants.

Our national network allows for consistency of the quality of support across England, providing the infrastructure to ensure all young people receive a high-quality computing education.

*"I feel a lot more confident to lead the curriculum and have begun putting my learning into practice. I have been sharing what I have learned with other members of staff and have been supporting them in improving their knowledge and understanding of computing through discussions, help and links to further CPD."*

*Participant feedback from Introduction to primary computing course*

**367 CAS**  
Communities oversee a nationwide community of practice which has supported nearly every Education Investment Area across England

The majority of schools in areas of high social disadvantage in England have engaged with the NCCE

**Over 30**  
Computing Hubs act as local champions for computing, delivering face-to-face and remote support

**7 of the 10**  
largest school trusts in England are engaged at a trust level

*"Isaac CPD provided local schools and colleges with much needed A level support. The very first session, delivered at the Rutherford Appleton Laboratories in Didcot, Oxfordshire, drew teachers from as far and wide as Bradford. From that initial event, it was clear that local teachers and those further away were valuing the support. Local and regional teachers to the Hub benefited from the conversation and sharing of best practice during those events with the wider teaching community. Many of these connections have continued remotely, bringing together a larger and stronger network of professionals."*

**Peter Marshman, secondary sector expert**

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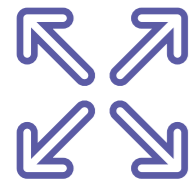
# What next

Between 2018 and 2022, the NCCE has made significant progress towards meeting the challenges it was established to address, helping to embed computing as an explicit part of the curriculum, and enhance digital skills and competence in schools.

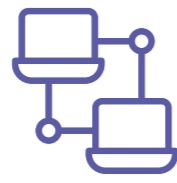
Teachers report that their engagement with the NCCE has significantly impacted themselves, their students and their schools. This is supported by national data, which shows a growing number of students choosing to study computing subjects at A level and GCSE. Together, evaluation of our programmes and the national context demonstrate that the NCCE is already starting to transform how computing is taught across the country, enabling more young people to benefit from studying the subject and helping to grow a highly skilled workforce.

As the UK's digital sector and economy grow, there is a continued, and increasing, need for us to develop a future-ready workforce, and quality computing education is key to this success. Digital skills are not integral to computing subjects and careers alone – they are increasingly essential to the wider curriculum and young people's employability.

In the future, it will be fundamental to build upon the momentum from the first years of the NCCE by:



continuing to develop the skills and passion of specialist computing teachers by providing ongoing support to both engaged teachers and those new to the NCCE to help them deliver high-quality classroom teaching



further developing student uptake and attainment in computing, encouraging more young people to study a computing subject, which in turn will continue to grow the digital workforce pipeline from school-level qualifications to future careers



engaging beyond the classroom through enrichment activities and industry engagement to help foster positive attitudes to computing, which in turn can influence the choice to seek a qualification



continuing to address inequalities, working to support schools in economically disadvantaged areas to provide an outstanding computing education and addressing the gender imbalance in computing



continuing to grow the profile of computing in schools, supporting digital skills in computing subjects and across the curriculum

The National Centre for Computing Education is run by a consortium made up of STEM Learning, the Raspberry Pi Foundation and BCS, The Chartered Institute for IT.



Collaboration and partnership is central to the National Centre for Computing Education's vision for a world-leading computing education.

Thanks to our partners and funders, who include:





**National  
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**Interested in working or partnering with us?**

Discover more at [teachcomputing.org](https://teachcomputing.org) or email [info@teachcomputing.org](mailto:info@teachcomputing.org)