National Centre of Computing Education

Our vision is for every child in every school in England to have a world-leading computing education.

http://teachcomputing.org
The recommendations describe what is still needed – recommendations relate to
1. Computing for all & improving gender balance
2. Support for teachers & increasing supply
3. Improvement of computing education through research

https://royalsociety.org/topics-policy/projects/computing-education
<table>
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<th>Current statistics for computing education</th>
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<td>Almost a $\frac{1}{4}$ of students are not able to choose GCSE Computer Science as it is not available in their school.</td>
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<td>There are not enough computing teachers: only 53% secondary schools currently offer GCSE Computer Science.</td>
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<td><strong>87%</strong> of A Level Computer Science providers operate below the Department for Education's minimum viable A Level class size.</td>
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Government commitment

- Department for Education committed £100m in UK (£84m for England) to improve computing education
- 4 year programme (2018-2022)
- Serious support needed for computing teachers in ALL key stages

Budget 2017: £100m National Centre for Computing to train 8,000 new teachers

Freddie Whittaker

The government will train 8,000 extra computer science teachers at a new £100 million National Centre for Computing. Philip Hammond is expected to announce this week.
Our Consortium

STEM Learning:
- Lead partner for reporting and communications
- Recruitment, training, and support of 40 school-based hubs
- Materials for CPD for GCSE CS teachers

Raspberry Pi Foundation:
- Content development - the Resource Bank
- Online training courses
- Research
- A-level programme

BCS, The Chartered Institute for IT:
- Academic standards for subject knowledge
- Certification of teachers
- Community of practice
- Industry engagement
The National Centre for Computing Education

We will:
• Build on the strong foundations established by Computing At School
• Establish a system of certification, leading to chartered status
• Develop a Network of Computing Hubs, underpinned by the vibrant grassroots communities of practice
• Provide face-to-face and online training grounded in the best research and delivered in a variety of flexible ways
• Curate a comprehensive bank of educational resources
• Make CPD available at no cost to teachers in priority schools and cap charges at a low rate for others
• Make all online resources and courses free for all teachers
• Provide bursaries to schools in areas of disadvantage to enable them to release teachers to take part in professional development
• Work with industry and non-profit partners to integrate a wide range of proven curriculum enhancements
• Work with teachers to realise the vision
Working to support teachers to …

• Impact positively on their pupils future
• Improve their computing skills and subject knowledge
• Deliver engaging and inspiring computing lessons
• Save time with lesson planning
• Network with other computing practitioners
• Gain certification in to recognised their investment in their career
• Progress to be confident subject experts within their schools
Professional development courses

Types of courses
- GCSE computer science
- KS3 computing
- Primary computing
- Pedagogy

Nationwide or Online

Online examples
- Outstanding teaching of key stage 1 computing
- Representing Data with Images and Sound: Bringing Data to Life

F2F examples
- Networks and cyber-security in GCSE computer science
- Outstanding teaching of key stage 1 computing
Regional school-led “Computing Hubs”

• Opening from late 2019
• Each hub will be an “alliance” led by one school but including other partners – schools, industry, HEIs, FE, etc.
• F2F PD will be delivered locally in the regions
• Focus on priority schools
• Diversity in post-14 take up of computer science & increased gender balance
• Linked to CAS Communities of Practice (~250 and growing)
CAS Community of Practice

40 Computing Hubs
- An “alliance” led by one school but including other partners – schools, industry, HEIs, FE.
- Formal offer of F2F Certified CPD
- Focus on priority schools

Computing Hub

CAS Communities
- Create interest in Computing Hub CPD
- Support gap tasks
- Beyond formal CPD
- Share and reflect
- Test and trial
Resource repository

- We are developing a fully comprehensive resource bank to cover all computing lessons from KS1 to KS4
- Available from June 2019, and complete by July 2020
- All of our resources will be free, and available 24/7, 365 days a year
- Will be easily searchable and available to download
- Free, open and OGL

10 core areas of Computing

- Algorithmic thinking
- Creating media
- Computer networks
- Computer systems
- Data & information
- Design & development
- Effective use of tools
- Impact of technology
- Programming
- Safety and security
The resource repository will include:

- **Teacher Manual** -- 1 per key stage: A guide to teaching computing at a particular Key Stage, including pedagogy and practice.
- **Schemes of Work (SoW)** -- 6 per year group: An overview of a connected series of lessons, detailing context, background and student progression.
- **Lesson Plans** -- 6 (approx.) per SoW: Step-by-step plans, outlining the delivery of a single lesson to students of varied abilities.
- **Homework & Assessment** -- 2 (approx.) per SoW: Follow up work to be done either to extend or assess students’ learning.
- **Activities** -- multiple per lesson plan: Elements of a lesson that form a discrete “chunk” of learning. These may be online or offline, and take many varied forms.
- Includes curated, quality-assured third-party resources (including textbooks), as well as CPD opportunities offered by the NCCE.
## Timeline

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<th>When</th>
<th>Major Milestones</th>
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| Q4 2018  | Creation of computing taxonomy  
Define quality assurance criteria  
Review of existing resources against QA criteria and taxonomy |
| 2019     | 25% of curriculum-linked resources across KS available in NCCE Resource Repository (Jun 2019)  
Review panel in place (February 2019) |
| 2020     | Complete coverage of KS1-4 in NCCE Resource Repository (July 2020)  
Resource kits (physical computing) given to schools via Hubs (2019/2020 (tbd)) |
| 2021     | Review and update resource repository                                                |
| 2022     | Review and update resource repository                                                |

- The resource bank needs to be in place and contain a comprehensive set of resources by July 2020, including 5 teacher manuals, 78 Schemes of work, 490 lesson plans and 150+ homework activities.

- All content to be of high quality, guided by an appointed “Subject Expert Panel”.
Physical Computing Kit

• Each Computing Hub will be equipped with a core set of physical computing kits

• The kits will comprise of five class sets of equipment and resources. These will be used in CPD sessions and also available for loan to schools.

• The proposed equipment will include Raspberry Pi Computers, Sense HATs, and other addons; micro:bits, other microcontrollers like Crumbles; and other physical computing equipment. Curriculum linked lesson plans and other resources will also be provided.

• The core set may be added to over time and supplemented by donations.
Computer Science Accelerator Programme

• Become a certified teacher of GCSE computer science
• Highly personalised, modular programme, to improve subject knowledge
• Bursary supported for eligible teachers
• Diagnostic test to help identify gaps in knowledge
• Programme of at least 40 hours of study
• Short summative test after 40hrs
• Schools are paid bursaries up to £1750

Helping you teach computing
Certification

Following on from the existing BCS Certificate in Computer Science Teaching, the NCCE will provide a new free certification framework which recognises teacher knowledge and skills:

• NCCE Certificate in secondary computing teaching
• NCCE Certificate in primary computing teaching
• NCCE GCSE CS Subject Knowledge
A level computer science programme

- Isaac Computer Science programme
- Separate platform, hosted by the University of Cambridge
- Nationwide events for students and teachers
- Coverage of full A Level specification online
- Cost-priced workbooks
- State of the art autograded exam-like questions
- Available November 2019 (beta version May 2019)
Research & Pedagogy

• Highlighted as a gap by the Royal Society’s After the Reboot report

• There are aspects of computing that have not been taught before in the classroom and we need evidence as to what works

• The Centre will make research and evidence accessible to teachers

• Evidence-based pedagogy will be embedded in resources and professional development courses
Summary

• Next five years …. focus on teacher professional development
• National Centre for Computing Education will provide PD for existing teachers to ensure high-quality computing education in England
• Communities of teachers will be able to work together to provide peer support, through CAS Communities
• We need more new computing teachers entering the profession
• We need to encourage diversity in those choosing computing options post-14
How you can help the work of the NCCE
Host Discovery Events

- Part of A Level programme
- Capacity approx. 350 students
- Whole day incl. catering
- Role model - young developers to talk about what they do
- Cutting edge stuff - demo real things
- Engaging speakers

Can you support our 1st event?
- Where? University of Cambridge
- When? Monday 1st July
- Audience? 300 Y9, 10 & 12 students

Can you host/support other events?
- Contact fergus.kirkpatrick@raspberry.pi.org

Helping you teach computing

Raspberry Pi  STEM Learning  BCS
Communications

• We need your help to raise awareness of the NCCE amongst schools.
• We can provide templates and social media assets that you can use.

• Can you share information about the NCCE with your contacts in schools? contact: supporters@teachcomputing.org
Industry funding for bursaries

• Our target of £1.6m will cover the cost of access to CPD for teachers from priority areas
• We have already raised £300,000 towards the target
• Our funding partners include:
  • Rolls-Royce
  • Arm
  • BT
• Do you know someone who can help? contact: julia@bcs.uk
Resources

- Significant list of third party resources already identified
- Call out for additional resources to be included in the Resource Bank
- OGL only for inclusion pre 2020

- All content to be of high quality, guided by an appointed “Subject Expert Panel”.
- If you want to share content, please contact: supporters@teachcomputing.org
Support CAS Community of Practice

• Host community meeting
• 1, 2 or 3 meetings a year
• Up to 20 teachers
• Usually midweek 4pm – 6pm
• Term time
• Tea and cake
• Share real world examples

• Join CAS and connect with local Community Leaders in your area, find out more computingatschool.org.uk

• Lead or support a local community, contact: compatsch@bcs.uk
Become a CAS University Partner

- A named person who can guide and help with:
- Outreach Programmes available and how these can be accessed, e.g. showcase events for sixth formers, GCSE students
- STEM activities involving Computing
- Anything around widening participation
- Donate venue/low cost venues for hosting events/conferences
- Links with ITT department to promote CAS and to get ITT trainees to learn about CAS/Teacher networking
- Guest speakers on specialist topics for schools or for CAS events
- Specialist CPD which is different to but could complement the NCCE courses
- Engagement in the CAS Working Groups – Research, Assessment, Diversity
- Any other ways you can feed into CAS