What next for computing in schools

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What's in this talk

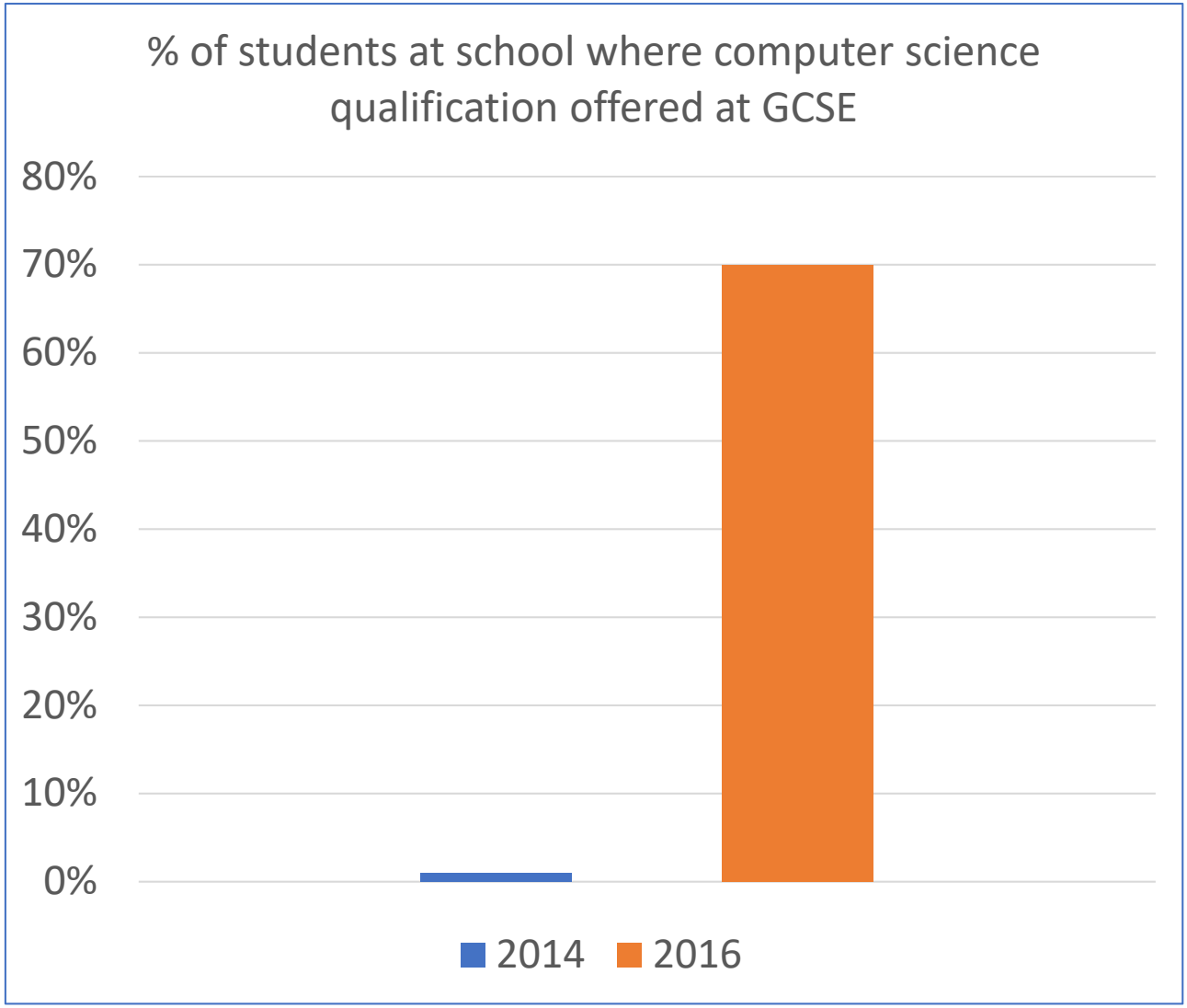
- What capacity do we want in secondary education
- What the state of secondary education
- What's worked in supporting schools
- What DfE have said about the additional support they plan to give to schools from September 2018.

UK Government Industrial Strategy

For the UK to be a world-leading digital economy that works for everyone, it is crucial that everyone has the digital skills they need to fully participate in society

https://www.gov.uk/government/publications/uk-digital-strategy/2-digital-skills-and-inclusion-giving-everyone-access-to-the-digital-skills-they-need

How many students in state maintained schools could access GCSE Computer Science in 2017



How many students take GCSE Computer Science

- 70,000 students (approximately) took GCSE Computer Science across all schools in 2017
- That is only 11% of students who could have taken it.

Aspiration for education pipeline

BCS opinion is the capacity in the Computer Science education pipeline should be:

- 200,000 students taking GCSE Computer Science each year
- 40,000 students taking GCE A2 level Computer Science each year
- All students taking Computer Science at degree have A2 level Computer Science as prerequisite entry qualification

The need for digital skills in the general population should see an additional 300,000 students taking a high quality technical qualification at GCSE equivalent level each year.

N.B. there are around 200k students taking History GCSE each year, and around 145k taking Physics GCSE each year. The 200k aspiration in that context is reasonable.

The CAS Network of Teaching Excellence (NoE)

- To understand GCSE Computer Science useful to distinguish between schools reached by CAS and those not reached by CAS.
- CAS has worked through the NoE to provide structured support to secondary and primary schools working in collaborative partnership with schools, universities and employers
- DfE have funded the NoE since 2012, with £150k in 2012/13 increasing to £1.2m for 2016/17.
- **All DfE funding for the NoE ceased on March 31st 2018.**
- New funding from DfE of over £80m to support computing in schools is expected to be put out to public tender before the end of May, though there is no official date yet, not is there any official tender document.

Question: What impact has the NoE had in the classroom?

GCSE Computer Science since 2014

Very confusing situation when looking at all types of schools across England, given many of them are specialist and many of them are independent.

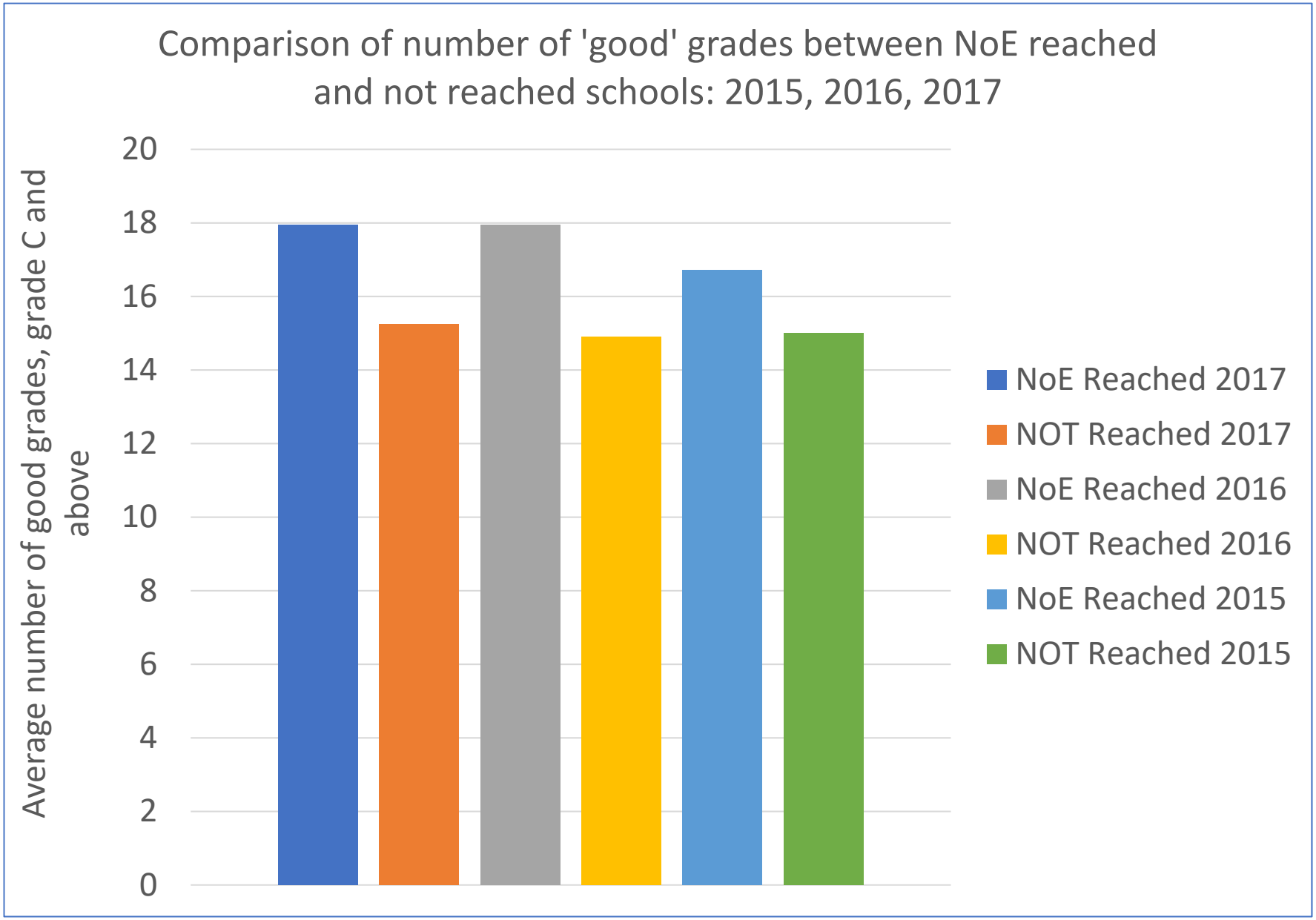
Looking at only state maintained schools, it turns out 95%+ of students in state maintained schools are at these five types of school:

- Academy - Converter Mainstream
- Community School
- Academy Sponsor Led
- Foundation School
- Voluntary Aided School

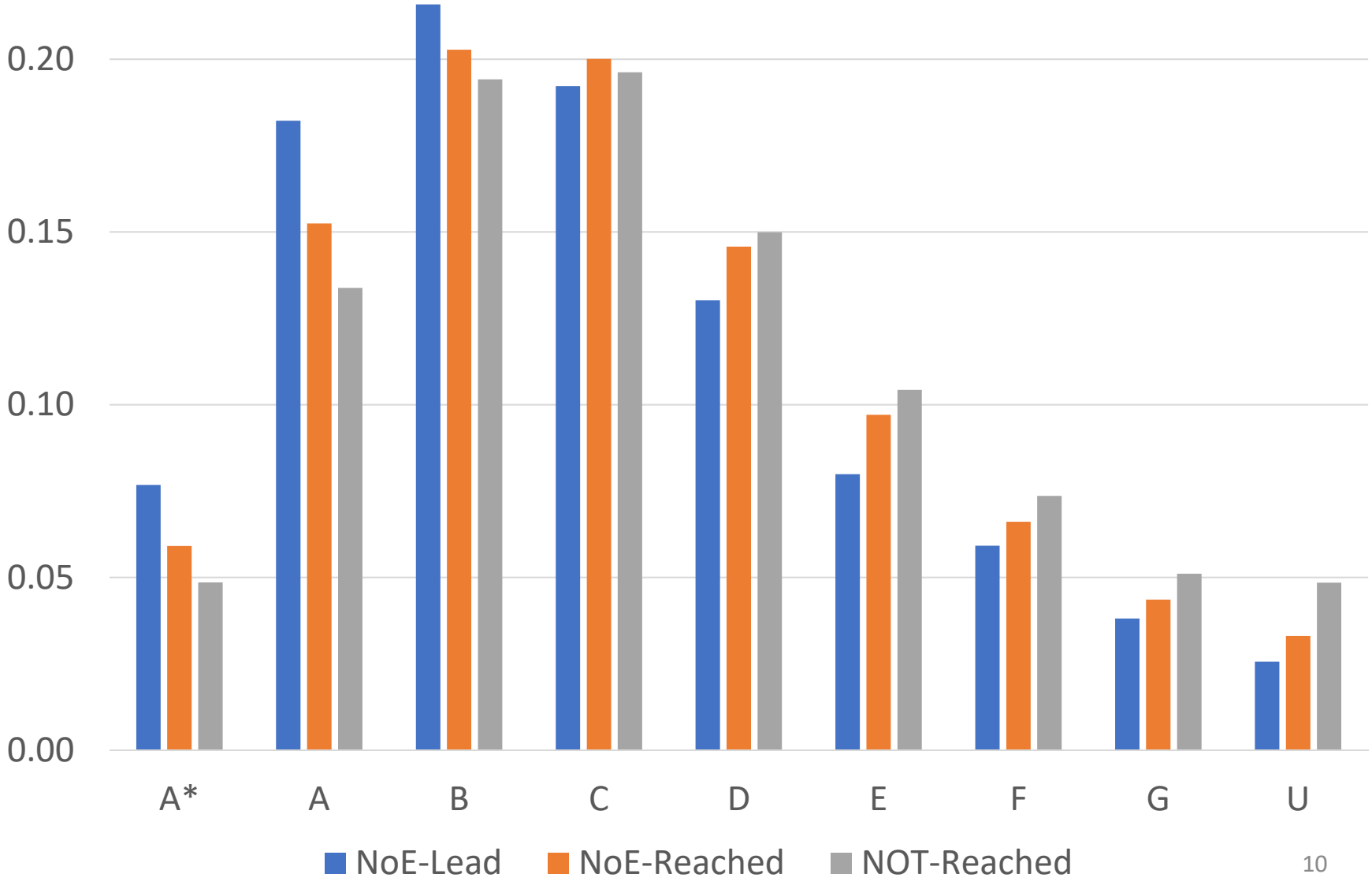
Looking in detail at these schools tells us something useful about progress so far.

Rest of talk the analysis in the slides is limited to these schools.

Average output of grades in GCSE Computer Science



Average number of GCSE Computer Science grade achievements in each school cohort – 2017 (analysis of 64k+ results)



Breakdown of Schools offering Computer Science GCSE 2017

2017	Number Schools
NoE Lead	236
NoE-Reached	1182
NOT-Reached	1103

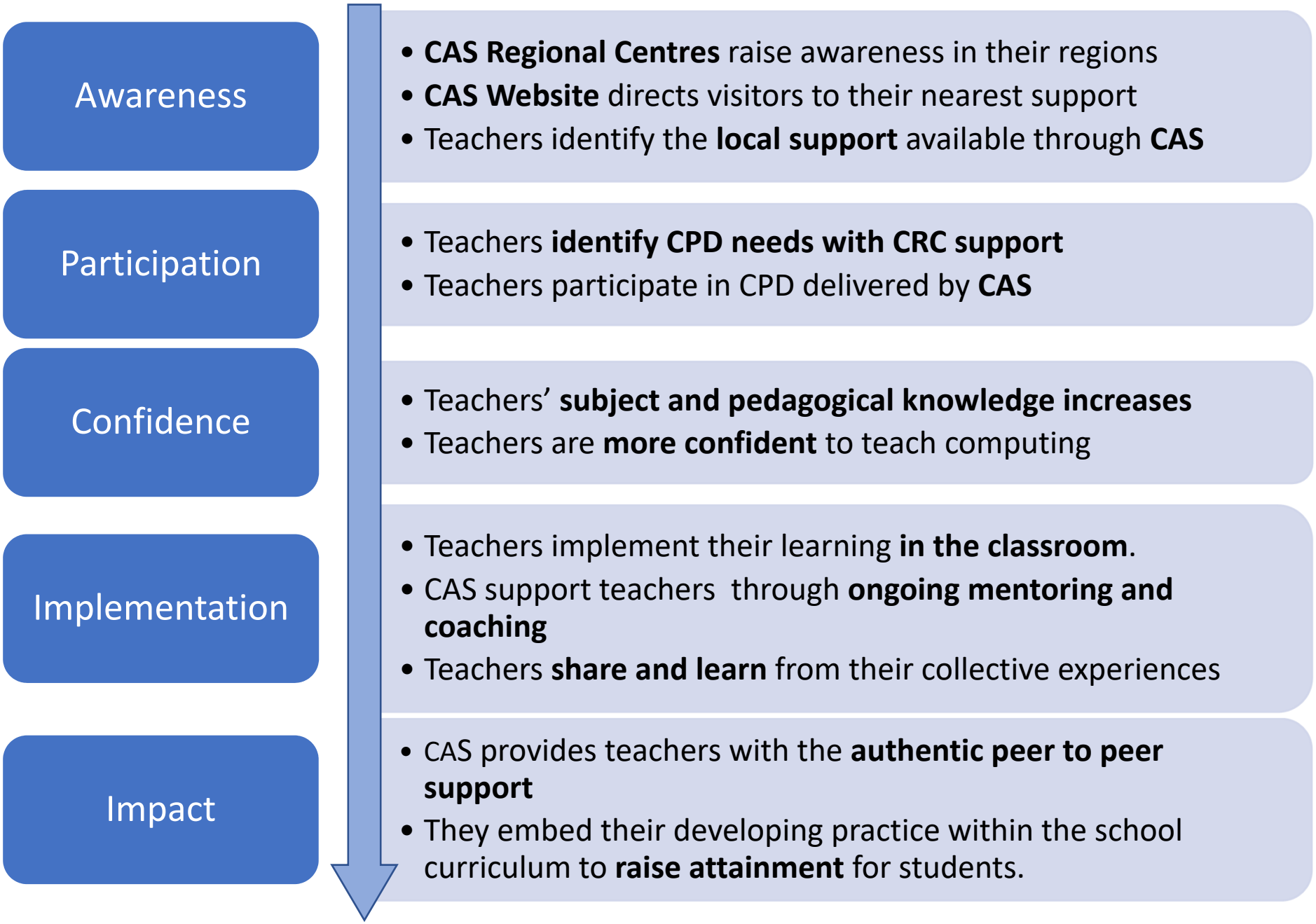
2017 total number of grades in schools	A*	A	B	C	D	E	F	G	U
NoE Lead	641	1521	1802	1605	1087	667	494	318	214
NoE-Reached	2041	5265	7001	6909	5033	3352	2283	1505	1142
NOT-Reached	1424	3926	5697	5757	4398	3059	2159	1498	1422

These tables show the data behind the graph on previous slide

So what, clearly only schools that are good at Computer Science joined the NoE in the first place

- The data shows students at NoE supported schools are getting more good grades and more of them are taking GCSE Computer Science than students in not-reached schools.
- Is that because NoE reached schools are just bigger?
  - That's not the case as shown by the results broken down per cohort
- Is that just because schools in the NoE are self selecting, which means they are schools that do better at GCSE in general?
  - No, further analysis shows NoE supported schools are well spread across schools with different GCSE Maths attainment levels. E.g. around 46% of schools in the bottom quartile of schools with regard maths achievements at GCSE are NoE reached schools.
  - Other analysis has shown NoE schools with more than twice the national average of free school meal (FSM) students do comparatively better than other similar schools.

Logic model for why the NoE worked



What next, announced support from DfE over 2018-2022

DfE have announced £81.4m over four academic years to establish:

- A National Centre of Computing Education to establish a network providing support for teachers in primary and secondary schools, and facilitating links with industry (£40m)
- A training programme to deliver at least 40 hours of training to upskill 8,000 existing secondary computing teachers to teach GCSE computer science effectively by 2022 (£35m)
- A level support programme (£4m)
- Improving gender balance in computing (£2.4m)

Department for Education

National Centre of Computing Education

Department for Education

A National Centre of Computing Education to establish a network providing support for teachers in primary and secondary schools, and facilitating links with industry

- Create a network by identifying and recruiting at least 40 computing secondary school Hubs (once agreed with DfE)
- Develop, curate and disseminate a central repository of high quality knowledge-rich resources for teachers to cover the whole curriculum (from KS1-4)
- Provide nationally available, evidence-based and quality assured CPD. It will:
- Improve priority areas of computing knowledge and pedagogy
- Include follow up to CPD offered through Lot 2
- Forge links with relevant industries in the digital and tech sector and work with government to promote and facilitate industry support for computing
- Targeted and free support for Priority Schools (schools in category 5 & 6 AEAs)
- Further develop the evidence base for effective pedagogy in computing through the publication of a series of reports, toolkits and other resources on an annual basis
- Funding: £40 million over 2018-2022

Training programme

Department for Education

A training programme to deliver at least 40 hours of training to upskill 8,000 existing secondary computing teachers to teach GCSE computer science effectively by 2022

- Training must be in line with DfE standards
- The programme should include initial diagnostics (to allow for tailoring), a formative assessment and certification on completion
- Training will be free to use for the teachers and schools
- Funding will cover the supply cover costs required to release a teacher on the programme
- This programme will also be targeted at secondary schools who:
- do not currently offer GCSE computer science; and
- have below average GCSE computer science entries and/or attainment.
- Provide subject knowledge and how to use knowledge (this should not overlap with CPD on pedagogy provided by Lot 1 Supplier)
- The supplier will need to work with the Lot 1 supplier to ensure follow up
- Funding: £35 million over 2018-2023

A level support programme

Department for Education

The programme will:

- Develop a range of knowledge-rich resources
- Deliver a programme of face-to-face roadshows/masterclasses for pupils
- Deliver support to A level teachers including:
  - training to develop A level subject knowledge and pedagogy
  - guidance on promoting computer science A level to younger pupils
- Be free for all A level pupils and teachers
- Be targeted at schools and colleges that offer A levels but that currently do not offer A level computer science, and have below average A level computer science entries and/or attainment.

- Funding: £4 million over 2018-2023

Improving gender balance in computing

Department for Education

A pilot programme to identify effective approaches to improve gender balance in computing and increase the number of girls who take up computer science

- We are seeking innovative interventions that can be robustly tested and scaled up in the future
- Proposals should outline the strategies that will be tested, including both innovative approaches and drawing on the existing national and international evidence base and related pilots in this field.
- Proposals should specify the scale of interventions, how schools, teachers and pupils will be identified
- At a minimum should be KS2 and KS4 focused but could cover full range of primary and secondary

- Funding: £2.4 million over 2018-2022