

Computer Science is a science and engineering discipline

1. Computer Science (CS) is an academic discipline. It is an intellectual, *science* and *engineering* discipline. CS should be treated like Chemistry and Physics; additionally, like Mathematics, it provides infrastructure for other disciplines. CS is separate from IT (also called ICT). Conflation of CS with IT has been damaging to CS. CS is an academic discipline in need of urgent attention.

CS as a science and engineering discipline has implications for:

- schools (curriculum; teacher qualifications; CPD)
- universities (entrance qualifications; quality of students; funding of CS as lab subject; separation of academic and vocational degrees)
- the economy (highly skilled, high quality CS professionals; impact on innovation)

2. Schools

- curriculum
 - currently conflates CS with IT and discourages academic students
 - we need a clear separation of CS from IT; CS is an academic subject
 - IT remains an important topic and a universal skill like arithmetic or reading
 - include CS in English Baccalaureate as a science subject
- status
 - affected by perception of head teacher and subject grouping (e.g. is it with maths and physics, or technical drawing and domestic science)
- teacher qualifications
 - currently most have none, or it is a poor one in IT, not a good degree in CS
- teacher CPD
 - currently there is poor or inappropriate provision (i.e. not in CS)
- pathways to university
 - currently non-existent
 - usually maths is the entrance requirement for CS degree; many universities do not recognise computing school qualifications, or consider them harmful

3. Universities

- we need a clear separation of vocational ICT and academic CS degrees; conflation of vocational and academic degrees does not occur in other disciplines such Chemistry, Physics, Maths, etc.
- CS degrees require funding as a science/engineering laboratory subject
- conflation of degrees affects employment statistics, giving a false impression that CS has poor employment prospects, whereas they are extremely good
- expansion has been primarily of vocational degrees; there has been an overall drop in academic degree students (approx. 50% decline since 2000)
- higher status of CS at school will attract better graduates and thence researchers

4. Economy

- CS professionals innovate in the CS industry, in the IT industry, and in other sectors (e.g. Banking, companies like Rolls Royce)
 - 1.5 million highly skilled CS professionals in UK -- they need critical care
- software is produced and used widely: retail, financial and manufacturing sectors, government, transport, security, hospitals etc.
 - 27% UK jobs are IT-related, £60 billion spend in UK on IT products
- our global competitors have either identified similar problems and are investing in CS (e.g. USA), or they already recognise its importance and status (e.g. India, China)
- if we do not develop the highly skilled, academic side of CS, then we will lose our competitive advantage

5. Computer science is well organised in the UK:

- UKCRC (UK Computing Research Committee)
- CPHC (Committee of Professors and Heads of Computing)
- BCS Chartered Institute of IT
- BCS Academy of Computing
- CAS (Computing at School)

6. We can offer

- advice on school curriculum development, teacher CPD, pathways to university
- CPD for CS professionals
- expert, scientific advice on CS research questions and challenges

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