Attitudes to Computing Courses and Careers among Secondary School Pupils

Preliminary research report

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The survey

- Seven schools in the NE and SE England & Wales
  5 comprehensive (3 LPN), 1 independent, 1 voluntary aided

- 650 students (around 170 more to come)
  58.4% male, 41.6% female
  61.7% pre-GCSE, 38.3% post-GCSE

- Among post-GCSE students…
  15 are taking Computing but not ICT (13 male, 2 female)
  89 (37.3%) are taking ICT but not Computing (57 male, 32 female)
  4 are taking both Computing and ICT (1 male, 3 female)
  56% are taking neither computing nor ICT
A/AS subjects – non-CS/ICT students

- Mathematics & physical science: 18.4%
- Humanities and/or languages: 9.2%
- Business studies: 7.1%
- Combinations with business studies: 13.5%
- Combinations with social sciences: 12.8%
- Combinations of humanities & sciences: 23.4%
- Art, design and graphics: 6.4%
- PE, social care, healthcare: 6.4%
- Other subjects: 2.1%
A/AS subjects taken with CS/ICT

- CS/ICT only: 11.3%
- Mathematics & physical science: 18.9%
- Biological sciences: 3.8%
- Humanities and/or languages: 7.5%
- Business studies: 8.5%
- Combinations with business studies: 17.0%
- Engineering and technology: 1.8%
- Combinations with social sciences/media: 4.7%
- Humanities and social sciences: 8.5%
- Humanities and physical/biological sciences: 9.4%
- Art, design and graphics: 5.7%
- PE, health and social care: 2.8%
Why did you choose Computing/ICT?

Post-GCSE students only

- CS/ICT is a useful skill to have alongside other subjects: 80.9% Computing, 78.9% ICT
- I want to learn new things and explore new areas: 57.3% Computing, 78.9% ICT
- I believe CS/ICT will improve my job prospects: 80.9% Computing, 78.9% ICT
- I'm considering CS/ICT when I leave school: 63.2% Computing, 66.3% ICT
- I believe I can achieve good grades in CS/ICT: 63.2% Computing, 66.3% ICT
- I like the CS/ICT staff at my school: 47.4% Computing, 23.6% ICT
- My friends are doing CS/ICT: 21.1% Computing, 21.9% ICT
- I was advised to study CS/ICT: 10.5% Computing, 16.9% ICT
- I am taking CS/ICT for other reasons: 5.3% Computing, 6.7% ICT

CS/ICT is a useful skill to have alongside other subjects, and I believe CS/ICT will improve my job prospects are the top two reasons for choosing Computing/ICT.
And how is your course going?
Post-GCSE students only

If I had to choose again, I'd still take this subject
65.2  73.7
I am enjoying this subject
49.4  63.2
This subject is very interesting
39.8  52.6
I am enjoying this subject, but not as much as I expected
31.6  44.9
This subject is much easier than I expected
16.9  21.1
This subject is much harder than I expected
15.8  28.1
This subject is boring
0  11.2
I am not enjoying this subject
0  11.2
I'm studying things in this subject which I did not expect
6.7  0
# Reasons for *not* taking CS/ICT

Post-GCSE students only

<table>
<thead>
<tr>
<th>Reason</th>
<th>Maths/science</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel that CS/ICT offers too male-dominated an environment</td>
<td>6.5</td>
<td>11.7</td>
</tr>
<tr>
<td>I think CS/ICT would be too technical</td>
<td>6.3</td>
<td>7.9</td>
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<tr>
<td>I think that the workload in CS/ICT would be too great</td>
<td>9.5</td>
<td>10.8</td>
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<td>I feel that many people who study/work in CS/ICT are nerdy or geeky</td>
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<td>11.5</td>
</tr>
<tr>
<td>None of my friends are doing CS/ICT</td>
<td>9.5</td>
<td>11.5</td>
</tr>
<tr>
<td>I find the image of CS/ICT jobs and/or courses unattractive</td>
<td>27</td>
<td>25.9</td>
</tr>
<tr>
<td>I believe CS/ICT are boring</td>
<td>39.7</td>
<td>38.8</td>
</tr>
</tbody>
</table>
Reasons for *not* taking CS/ICT

Post-GCSE students only

- I want to study CS/ICT in university and other subjects will prepare me better: 3.2% (Maths/science) 2.9% (All)
- I haven't chosen an HE course/job and want to keep my options open: 20.6% (Maths/science) 18% (All)
- I don't think I could achieve good grades in CS/ICT: 20.1% (Maths/science) 12.7% (All)
- CS/ICT is more of a skill than a subject: 27% (Maths/science) 25.9% (All)
- I'd never consider working in CS/ICT: 36% (Maths/science) 39.7% (All)
- It's easy to pick up skills in CS/ICT without taking the subject: 39.6% (Maths/science) 39.6% (All)
- I have clear plans to study and/or work in an area other than CS/ICT: 40% (Maths/science) 40% (All)
I’m thinking of taking CS/ICT because...

Pre-GCSE students only

- A useful skill to have alongside other subjects: 69.1%
- I believe this subject will improve my job prospects: 64.2%
- I'm interested in this subject: 60.3%
- I want to learn new things and explore new areas: 51%
- I'm considering studying/working in this area: 38.7%
- I think I can get good grades: 38.2%
- I like the staff in this subject: 22.1%
- My friends are doing this subject: 12.7%
Reasons for *not* taking CS/ICT

Pre-GCSE students only

- **CS is not relevant to my chosen further studies/career:** 47.3%
- **I think it's easy to pick up enough skills in CS without taking the subject:** 46.6%
- **I am not interested in computing:** 38.7%
- **CS would be too difficult:** 31.1%
- **I don’t think I could achieve good grades in CS:** 30.3%
- **The workload would be too great:** 26.5%
- **CS would be too technical:** 22.3%
- **I feel that people who study/work in CS are nerdy or geeky:** 17.2%
- **None of my friends are doing CS:** 10.5%
- **I feel that CS offers too male-dominated an environment:** 10.1%
Gender trends in A/AS subject choices

- Among pre-GCSE students, *female* students are significantly more likely to cite a lack of interest, finding the subject ‘boring’ or ‘too technical’, and anxiety over marks.
- Among post-GCSE students, males and females show similar scores for the above. *Male* students are significantly more likely to state that they fear the workload will be too great.
- At both stages *male* students are more likely to state that they are considering working in CS or ICT, and that their decisions are influenced by those of their friends.
Trends by school type

- Students from the Independent and Voluntary Aided schools are significantly more likely to state that it is easy to pick up enough skills in these subjects.

- Students from the Independent and Voluntary Aided schools are significantly more likely to dislike the image of jobs in CS/ICT and to feel that people working or studying in these areas conform to the ‘nerdy’ stereotype.

- Students from the comprehensive schools are significantly more likely to cite anxiety over marks as a reason for not taking these subjects (and students from the LPNs are significantly more likely to cite this than students from the other comprehensive schools).
Quotations from focus groups & questionnaires…

ICT is a lot of work but it’s all repetitive… when they took the coursework out of maths loads more people started choosing it

ICT is not at all difficult but it’s very time consuming

ICT is a waste of a GCSE

I am not going to study Computing/ICT at university because the subject becomes mundane using standard software

ICT is really repetitive… it’s all spreadsheets

ICT is extremely boring and mundane

I did ICT and I never want to annotate another screen shot
Quotations from focus groups & questionnaires...

It’s too ICT-related. I prefer web designing, development and programming. I know HTML, PHP, CSS, Javascript and plan also to learn ASP and JSP. They don’t focus enough on programming at school, college or university. I am more interested in these than in learning Office applications.

It sounds like a subject that narrows your choices too much... people want to keep their options open, even after they graduate, and computing sounds like it’s going to be too specific if you aren’t sure what job you want.
Computing or ICT?

- Many respondents (in questionnaires and focus groups) stated that they did not know the difference between computing and ICT.
- Students were confused by the distinction between computing and ICT which was made in the questionnaires.
- Negative responses to ICT in schools may ‘colour’ understanding of computing.
Which school subject is most like computing at university?
Orientation to higher education?

- **All**: 60.6% definitely plan to apply to university, 12% may apply, 14.1% probably/definitely will not apply.
- **pre-GCSE**: 55.9% definitely plan to apply to university, 14.1% may apply, 23% probably/definitely will not apply.
- **post-GCSE**: 68.1% definitely plan to apply to university, 8.8% probably/definitely will not apply.
Computing/ICT at university?
All students

- Definitely: 32.5%
- Possibly: 24.0%
- Chosen other subject: 11.8%
- Other not chosen, but definitely not CS/ICT: 31.7%
Computing/ICT at university?

<table>
<thead>
<tr>
<th>Male pupil</th>
<th>Female pupil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely</td>
<td>29.1</td>
</tr>
<tr>
<td>Possibly</td>
<td>27</td>
</tr>
<tr>
<td>Chosen other subject</td>
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<tr>
<td>Other not chosen, but definite not CS/ICT</td>
<td>14.8</td>
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<tr>
<td>Other not chosen, but definite not CS/ICT</td>
<td>7.6</td>
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</table>
Computing/ICT at university?

- **pre-GCSE pupil**
  - Definitely: 6.1%
  - Possibly: 30%
  - Chosen other subject: 26.1%
  - Other not chosen, but definitely not CS/ICT: 37.8%

- **post-GCSE pupils**
  - Definitely: 22%
  - Possibly: 42.5%
  - Chosen other subject: 14.5%
  - Other not chosen, but definitely not CS/ICT: 20.7%
Computing/ICT at university?

**Post-GCSE CS/ICT Study**
- 43.4% definitely chosen
- 25.3% possibly chosen
- 6.1% chosen other subject
- 25.3% other not chosen, but definitely not CS/ICT

**Post-GCSE CS/ICT Study**
- 56.3% definitely chosen
- 34.4% possibly chosen
- 6.3% chosen other subject
- 3.1% other not chosen, but definitely not CS/ICT
Early decisions...

This questionnaire should be for people who haven’t done their GCSEs yet… we have made these decisions
Other subjects chosen...

- Humanities
- Business and finance
- Medicine, dentistry, veterinary medicine
- Social studies & psychology
- Law
- Nursing & subjects allied to medicine
- Engineering
- Sport
- Design & graphics
- Education
- Art & creative disciplines
- Mathematics
- Physical sciences
- Media
Reasons for taking CS/ICT in HE

- I want to work in computing when I leave: 60%
- fast-moving and exciting: 58.5%
- can achieve good grades: 55.4%
- improve job prospects: 53.6%
- useful skill alongside other subjects: 50.8%
- learn new things/explore new areas: 44.6%
- role model: 24.6%
- my friends are doing computing: 20%
- I was advised to study computing: 9.2%
Reasons for *not* taking CS/ICT in HE

- definite plans to do something else
- easy to pick up skills without taking the subject
- believe it would be boring
- don’t know much about computing
- too many CS/ICT graduates & not enough jobs
- would be too technical
- would be too difficult
- people who take it are nerdy/geeky
- would be hard to get a job
- none of my friends are taking it
- too male-dominated

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>definite plans to do something else</td>
<td>48.4</td>
</tr>
<tr>
<td>easy to pick up skills without taking the subject</td>
<td>34.1</td>
</tr>
<tr>
<td>believe it would be boring</td>
<td>34.1</td>
</tr>
<tr>
<td>don’t know much about computing</td>
<td>19.2</td>
</tr>
<tr>
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<td>too male-dominated</td>
<td>7.1</td>
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</tbody>
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Influences on post-GCSE study

- Friends: 29%
- Family members: 26.1%
- Internet information: 18.6%
- Parents: 57.1%
- Information from universities: 26.3%
- Teachers: 41.3%
- Careers advisers: 34%
- Guidance tutors: 13.5%
- School careers publications: 20.1%
Influences on choosing HE

- Friends: 26.2%
- Family members: 23.7%
- Internet information: 16.5%
- Parents: 59.8%
- Information from universities: 34.6%
- Teachers: 37.4%
- Careers advisers: 30.3%
- Guidance tutors: 14.8%
- School careers publications: 16.2%
Influences on HE subject choice

- friends: 18.8%
- family members: 19.5%
- internet information: 14%
- parents: 49.4%
- information from universities: 34.3%
- teachers: 38.6%
- careers advisers: 31.2%
- guidance tutors: 14.5%
- school careers publications: 15.6%
Influences on education choices…

- **Post-GCSE study**
  Main influence – ‘own choice’ 73.5%, Parents – 13.2%, Careers advisers – 5.1%
  *Men are more likely than women to be influenced by school careers publications, careers advisers, guidance tutors, information on the internet and family other than their parents*

- **Go to university?**
  Main influence – ‘own choice’ 70.5%, Parents – 11.4%, University info – 4.2%
  *Men are more likely than women to be influenced by school careers publications, careers advisers and guidance tutors. Women are more likely to be influenced by their parents*

- **University subject?**
  Main influence – ‘own choice’ 77%, University info – 5.4%, Parents – 5.4%
  *Men are more likely to be influenced by guidance tutors & school publications*
The ‘thrill factor’? - challenge

- Computing courses aren't very challenging: 43.7% strongly agree/agree, 6.3% not sure, 37.5% disagree/strongly disagree.
- Studying computing at university would be exciting and challenging: 37.5% strongly agree/agree, 18.7% not sure, 43.7% disagree/strongly disagree.
- Working in computing/ICT would be exciting and challenging: 37.8% strongly agree/agree, 26.5% not sure, 35.7% disagree/strongly disagree.
The ‘thrill factor’? - jobs

- A job in ICT is really just like any other office job: 32.5% strongly agree/agree, 34.6% agree, 32.9% not sure, 15.8% disagree/strongly disagree.
- There are some really exciting jobs in computing/ICT but most are mundane: 35.9% strongly agree/agree, 48.3% agree, 15.8% not sure, 26.6% disagree/strongly disagree.
- People who work in Computing/ICT are stuck in front of a computer all day: 47.5% strongly agree/agree, 26.6% agree, 23.9% not sure, 20% disagree/strongly disagree.
Who is ‘thrilled’… and who is not?

- **Male students** are *more* likely to believe that courses and jobs are exciting and challenging.
- **Female students** are *less* likely than male to believe that a computing/IT job is ‘like any other office job’. They are less likely to be unsure about whether IT professionals are ‘stuck in front of a computer all day’.
- **Post-GCSE students** are *less* likely to believe that courses and jobs in Computing/ICT are exciting/challenging.
Who is ‘thrilled’… and who is not?

- Students considering Computing/ICT in HE are more likely to believe courses and jobs are exciting/challenging.
- Among students who state that they possibly or definitely plan on taking Computing/ICT in HE, subject interest, learning new things and exploring new areas and working in a fast-moving and exciting area are significantly important to students also studying maths.
- Students taking maths and/or physical sciences are more likely to think that Computing/ICT professionals are ‘stuck in front of a computer all day’ and that these jobs are like ‘any other office job’.
- Maths/phys sci students are less likely to agree that CS is challenging.
What do computing professionals do?

- A computing degree involves doing lots of programming: 58.6% strongly agree/agree, 38.2% not sure, 3.4% disagree/strongly disagree.
- People who work in computing mostly just do programming: 61.5% strongly agree/agree, 14.3% not sure, 24.2% disagree/strongly disagree.
- The workload on a computing course at university would be very heavy: 50.7% strongly agree/agree, 37.2% not sure, 12.1% disagree/strongly disagree.
- I don't understand why people do computing at university, it's a skill you can pick up: 44.4% strongly agree/agree, 28.5% not sure, 27.1% disagree/strongly disagree.
- Computing is more of a skill than a career: 37.4% strongly agree/agree, 37% not sure, 25.5% disagree/strongly disagree.
Views of computing professionals

- **Students from LPN disagree** with the view that ‘Computing/ICT is a skill you can just pick up as you go along’
- **Male students** agree more strongly than female students that working in Computing/ICT involves a lot of programming and also that workloads on Computing/ICT courses in HE will be very heavy: also agree more that it is a skill which you can ‘just pick up’
- **Students taking CS/ICT at A-level** disagree more frequently with the idea that this is a skill you can ‘just pick up’
Quotations…

You can just pick up what you need

Everybody does it, you can pick up what you need. There isn’t a lot more they can teach you at university

Obviously if you just want to use computers you don’t need a degree in it. I suppose you can do a computing degree if you want to go into it in a lot more depth

I can’t imagine doing any more of what I’ve done at school… do you just do more spreadsheets and data entry and so on?
Quotations...

We don’t really know anything about computing and ICT jobs

Careers service doesn’t tell you enough

Computing and ICT aren’t publicised enough at school... that’s why people don’t want to do them

Computing and ICT are useful skills but they’re constantly changing so there’s no point studying them

Web designer... programmer... systems administrator... technician... IT consultant [isn’t that just like helpdesk?]...
Getting a job…

- Doing computing/ICT at university gives you a good chance of a job: Strongly agree/agree: 52.2, Agree: 32.9, Not sure: 15, Disagree/Strongly disagree: 12.7
- The number of jobs available in computing/ICT will increase over the next decade: Strongly agree/agree: 62.7, Agree: 24.6, Not sure: 12.7, Disagree/Strongly disagree: 13.5
- There are too many Computing/ICT graduates and not enough jobs: Strongly agree/agree: 54.2, Agree: 32.2, Not sure: 13.5, Disagree/Strongly disagree: 10.2
- Computing jobs are usually well-paid: Strongly agree/agree: 46.4, Agree: 43.4, Not sure: 10.2, Disagree/Strongly disagree: 10.2
- A computing job would pay quite well but accountancy or law would pay much better: Strongly agree/agree: 60.1, Agree: 29.2, Not sure: 10.7, Disagree/Strongly disagree: 10.7
Views of the job market

- **Students from LPN** are *less* likely to plan on taking Computing/ICT in HE because they plan to work in the area and *more* likely to do so because they believe it improves general job prospects. They are *more uncertain* about the graduate job market overall.

- **Male students** are more likely to plan to work in Computing/ICT and **female students** to regard Computing/ICT as a useful skill. Women are more pessimistic about career advancement but more likely to *agree* that Computing/ICT job numbers will increase in the next decade (*males* seem generally more uncertain about jobs market)

- **Post-GCSE students** are more pessimistic about job prospects

- **Computing/ICT students** are more confident about their own knowledge of the jobs market

- **Students taking maths/physical science** believe pay will be lower
Status

You have to be clever to study computing at university
People who work in computing have to be clever
A computing degree would not be as prestigious as a degree in some other areas
Computing professionals don't get as much respect as doctors, lawyers and accountants

- Strongly agree/agree
- Not sure
- Disagree/strongly disagree
Quotations

You don’t have to be that clever to do computing, you just need application

If you look at the people at our school who are doing computing, it’s not like the clever ones

People who work in IT aren’t clever like doctors... they wouldn’t get that sort of respect, there’s no reason to

I think people who work with computers don’t get so much respect because people don’t know about their job and what it does
Views of status

- **Male students** agree more frequently with the statement that Computing/ICT professionals (and students) need to be ‘clever’

- **Female students** agree that Computing/ICT professionals will get ‘less respect’ than people in other professions

- **Pre-GCSE students** are less likely to believe that Computing/ICT jobs will be regarded as ‘low status’

- **Students not taking Computing/ICT** are more likely to disagree that Computing/ICT students and professionals need to be clever, more likely to view Computing/ICT as a low status profession and more likely to believe this subject will be chosen by those who can’t get in elsewhere

- **Students from LPN** are more likely to disagree or be uncertain over the statement that Computing/ICT degrees are ‘less prestigious’ than others
Views of status

- Students taking maths/physical science believe that computing/IT professionals are respected less than other professionals. However, their estimation of the respect given to Computing degrees is similar to other students.
- This effect is particularly strong among students who plan to take medical subjects or physical sciences at university.
- These students are also more likely to believe that working in Computing will be anti-social.
Image: gender and the ‘geek’ factor

- Many people who study computing at university are nerdy/geeky: 26.2% strongly agree/agree, 23.5% agree, 51.9% not sure, and 21.8% disagree/strongly disagree.
- Many people who work in computing are nerdy/geeky: 35.9% strongly agree/agree, 37.6% agree, 38.9% not sure, and 25.7% disagree/strongly disagree.
- Working in computing would involve working in a very male-dominated environment: 36.5% strongly agree/agree, 26.7% agree, 25.7% not sure, and 33.6% disagree/strongly disagree.
- A job in computing would be quite anti-social: 39.7% strongly agree/agree, 33.6% agree, 36.5% not sure, and 26.7% disagree/strongly disagree.
Image... some caveats

- Students know that *stereotyping is bad*
- Focus group participants were clear that the *nerd* and *geek* images were ‘just stereotypes’… although they later described ‘real’ people in precisely these terms!
- ‘Model’ Computing/ICT professionals include film characters, *some* TV characters, and school ICT technicians
- Students who had done *work experience* in Computing/ICT had been pleasantly surprised… although one had not told anyone about it because it would make him look ‘geeky’.
- Some students had strong ‘personal’ role models in Computing/ICT employment or study
Gender & image of Computing/ICT

- Male students are more likely to be influenced than females in their choice of university subject by what their friends are doing.
- Male students are significantly more likely than females to say they believe Computing/ICT professionals are ‘geeky’.
- Female students are significantly more likely than males to believe that Computing/ICT jobs will offer a male-dominated environment and less likely to believe that it will be ‘glamorous’.
- Female students are significantly more likely than males to either agree or disagree with the statement that the Computing/ICT workplace may be ‘anti-social’ (males are more likely to say they are unsure).
Image - science students

- Students who are taking maths/physical science at A-level are more likely to agree and less likely to disagree that Computing students/professionals are ‘nerds’/‘geeks’
Some quotations…

You shouldn’t say things like ‘nerd’ and ‘geek’ because these are stereotypes

[In response to the question on gender balance] ... No bad thing, don’t be politically correct

I don’t think that people who work in ICT are nerdy or geeky but I would not want to work in it

Most people in ICT are geeks [and variations on a theme]
Comments on the media image

- Very few documentaries or news stories
- ‘Good’ computing stories are missed
- Concentrates on failures or on crime (hacking, fraud and viruses)
- Feeds ‘computer phobia’ or ‘computer shyness’ [‘computers will control us!’]
- Stories presented by non-experts
- Computing is shown as ‘secondary’ to other sciences or ‘missed out’ when it plays a vital role
Comments on the media image 2

The glamorous scientist gets a bit of data from the computer nerd...
The computer people are always working for somebody else
You never see what they actually do in the computer department
Fat men with bad glasses, greasy hair and beards
Hackers are the ones who have sex and get drunk - the cool ones
Portrayed as with no social skills at all

When a really cool character is a computer scientist they don't focus on that at all. Like Tom Cruise in Minority Report, nobody thinks he's a computer scientist but he is, really.