

## Future of Computing Science in Scottish Schools

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It is a positive time to study Computing Science. The trade body ScotlandIS state that 66% of Technology industry companies are looking to recruit more staff in the next year. It's not only programmers who are needed. Although software and web development skills are in the greatest demand (70%), they're closely followed by commercial and business support skills (66%) and project management skills (65%). However we currently don't have enough young people going on to work in this industry to fill the demand. Sixty percent of employers questioned by ScotlandIS reported that they will need to recruit people from outside of Scotland.

At a time when, more than ever, we need subject specialists teaching Computer Science, we have again seen a fall in numbers. The number of Computing teachers in Scotland has gone down by 25% over the last ten years, to 598 in 2015. This is the lowest number of any specialist teacher considered to be within either the Sciences, Technologies or Mathematics curricular areas. Nationally we now have 17% of schools with no computing specialist. That is 62 secondary schools without a subject specialist to deliver the experiences and outcomes for the subject or to deliver certificate-level courses.

Why have we seen this dramatic decrease in staffing? We are still concerned that Head Teachers and school management teams don't value Computing Science as a rigorous academic subject, and perhaps do not understand the difference between ICT and CS. We are also concerned that the stresses on sole subject specialists as well as pressures of rising class sizes, teaching multiple qualifications concurrently and being required to undertake 25-70 hours of unpaid coursework marking for the SQA are all driving teachers away from the profession.

We have a recruitment crisis. Schools who want to employ a computing teacher are struggling to find suitable candidates. There are currently not enough Computing Science teachers to address demand. 15 local authorities out of the 32 said that they had problems recruiting Computing Science teachers. Many authorities also mentioned low numbers of applicants.

More student teachers are needed to stop the decline in numbers. It is clear we need to increase the number of students training to teach Computing over the next few years. However the Initial Teacher Education institutions are not getting enough qualified and quality applicants as we can see by the low rates of students completing the PGDE successfully. We need new approaches to this problem. All undergraduate Computing Science students at universities across Scotland should be told about the benefits of choosing Education as an attractive career path. We also need more potential career-changers to be aware of Teaching as a career. This will require a national publicity campaign.

We need to fix the pipeline. We need children enthused about the subject in Primary, to learn about more than just the current craze for coding, but also logical thinking, problem solving, modelling and reasoning skills. We need young people studying the subject at Secondary school for more than the current average of less than one period a week (and this time often also includes ICT and business education) so that they get a deeper understanding of computational thinking. We need more pupils studying Computing Science courses, not necessarily to go to become software engineers but because a grounding in computer science will be beneficial for most careers nowadays.

In order to do this we need more Computing Science teachers in our schools. Every child should have an opportunity to learn from a skilled subject specialist, not just from an enthusiast. It's going to require schools, universities and industry to work together. If we can provide university students with experiences in schools then more will see teaching as a worthwhile and rewarding career.

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Finally, we need protect the rights and conditions of existing teachers, so that they can focus on doing their job: educating young people. We have lost a significantly higher proportion of Computing Science teachers over the last ten years compared to other subjects. We call on schools, local authorities and government bodies to protect, respect, value and support the Computing Science teachers currently in post, before we lose them too.

*Ends.*

## Full report:

[https://docs.google.com/document/d/1d4KxZZrobSgK0P\\_UeEPn4Oq-Q6p9vbSTm0gNAUU7aK8/edit?usp=sharing](https://docs.google.com/document/d/1d4KxZZrobSgK0P_UeEPn4Oq-Q6p9vbSTm0gNAUU7aK8/edit?usp=sharing)

## Key Findings

- The number of Computing teachers in Scotland is down to 598 in 2015. This is the lowest number of any specialist teacher considered to be within either the Sciences, Technologies or Mathematics curricular areas.
- The number of Computing Science teachers has gone down by 25% over the last ten years, disproportionately in comparison to the number of pupils (11%) and the numbers of English, Maths and Physics teachers (4%, 6% and 10% respectively).
- Nationally we now have 17% of schools with no computing specialist. That is 62 secondary schools without a subject specialist to deliver the experiences and outcomes for the subject or to deliver certificate-level courses.
- There are now 17 local authorities with secondary schools without CS teachers, up from 12 in 2014. This represents over half of all local authorities.
- A quarter of Secondary schools have only one CS teacher. Schools with a single CS teacher are vulnerable to losing that teacher.
- Almost half (47%) of local authorities reported difficulties recruiting suitable candidates for CS teacher vacancies. Even where a post was filled, there have been many instances where only one or two suitable candidates applied.
- 56% of local authorities have had difficulties in getting Computing supply cover.
- New teachers entering the profession is down 67% on 2006.
- Initial Teacher Education Institutions are struggling to recruit enough high quality applicants. Only three of the eight PGDE students studying Computing education at the University of Glasgow last year completed the course, and only two of them went into the Scottish Teacher Induction scheme.
- Only 20 newly qualified teachers have joined the teachers' induction scheme in 2016, the same number as in 2014.
- There are 2698 teachers registered with the GTCS with Computing as their main or additional subject yet only 598 are actively teaching the subject.

### Recommendations

- We need more research into sole subject specialists. We need to find out if they are more adversely affected by issues such as large class sizes and limited development time. We need to find out if they are more likely to be teaching multiple concurrent qualifications and more likely to want to leave teaching than teachers in larger CS departments.
- We need local authorities to investigate ways in which sole subject specialists (both for CS and for other curricular areas) can be better supported in their existing school, ideally so that CS departments can develop and grow.
- We currently don't have enough teachers to replace the large number of teachers who will retire in the next 10 years and we have the lowest replenishment rate of all subjects. We need new approaches to this problem. All undergraduate Computing Science students at universities across Scotland need to be aware of Education as an attractive career path. We also need more potential career-changers to be aware of Teaching as a career. This will require a national publicity campaign. It is hoped that Skills Development Scotland will take on this challenge as part of the Skills Investment Plan for IT.
- We need alternative course options for potential students if the current PGDE courses are not suitable or attractive to them. This might be to do with the course content, delivery, location or the format. We encourage the Scottish Government, the Scottish Funding Council and Scottish Universities to investigate possibilities for high quality teacher training courses that will attract new teachers into Computing Science education.
- It is possible that newly qualified teachers might head off to English schools instead of joining the Scottish induction program as they have more flexibility in terms of salary, which may be attractive to new teachers. We need more data about retention rates in teacher training and during induction and factors that affect retention. We need more information about destinations of the teachers that leave the system.
- We need more information about the schools where newly qualified teachers are placed for their induction year to find out how the retention rates for probationers working in a school with at least one other CS teacher compares to probationers placed in a school as the sole subject specialist.
- There are 2698 teachers registered with the GTCS with Computing as their main or additional subject yet only 598 are actively teaching the subject. It would be useful to find out how many of the 2100 other teachers are not currently teaching and how many are teaching other subjects.
- For those people registered to teach CS but not currently teaching at all, it would be useful to find out their reasons for leaving, whether they are interested in returning, and the professional learning that they would require to support their return to the classroom.
- We need Computing Science added to the SNCT list of Practical Classes. Large CS classes are normally accommodated in rooms that were not designed for that number of pupils and computers. There is an impact on health and safety, marking time, learner engagement and student uptake.
- Computing teachers should not be asked to teach bi-, tri- or even quad- qualification classes. Learners that are losing out when multiple qualifications are being taught concurrently, and it is an extremely tough and stressful situation to be in as a teacher. This is not a sustainable situation and will result in teachers leaving as well as lower uptake by students. We call on schools and local authorities to recognise the negative effects of multiple qualification and multiple level classes, and to reduce their dependence on them.
- Computing at School Scotland have previously reported on teachers' concerns over additional coursework workloads that adversely affects their capacity for supporting students. It is important that SQA urgently

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looks at this issue given the current severe shortages of teachers, to ensure that teaching capacity is not affected by this issue.

- We have lost a significantly higher proportion of Computing Science teachers over the last ten years compared to other subjects. **We call on schools, local authorities and government bodies to protect, respect, value and support the teachers currently in post, before we lose them too.**