ECYP/S6/24/17/2

Education, Children and Young People Committee
Wednesday 29 May 2024
17th Meeting, 2024 (Session 6)

Scottish Technology Ecosystem Review: Update

Introduction

1. This parliamentary session, the Education, Children, and Young People Committee has agreed to scrutinise the continuing reforms to education and skills in Scotland on an ongoing basis.

2. This has involved taking evidence from key figures responsible for the various, recent reports on education in Scotland, including:

    - OECD review of Curriculum for Excellence
    - Upper-secondary education assessment in Scotland: a comparative assessment
    - Putting Learners at the Centre: Towards a Future Vision for Scottish Education
    - It's Our Future - Independent Review of Qualifications and Assessment
    - Fit for the Future: developing a post-school learning system to fuel economic transformation

3. During a meeting which considered the alignment of digital skills provision with the needs of business, the Committee also took evidence from Professor Mark Logan, author of Review of the Scottish technology ecosystem. As part of his review, Professor Logan had considered the role Scotland's education system can play in nurturing talent in the tech sector.

4. Following this meeting, the Committee wrote to the Scottish Government noting that there were structural issues which needed to be addressed through interaction between the industry, formal education sector and skills bodies but stressed the need for urgent action to ensure that young people are given the tools they need to thrive in digital careers.

5. The then Minister for Further Education, Higher Education, Youth Employment and Training responded highlighting Scottish Government activity designed to address skills planning challenges and to ensure that Scotland has an agile and responsive education and skills system.

Committee meeting

6. At today's meeting, the Committee will take evidence from Professor Mark Logan, Professor in Practice -Technology Entrepreneurship, School of Computing Science, University of Glasgow.

7. The focus of the session will be on the progress made on the Logan review recommendations that relate to school, further and higher education, since it was published in August 2020.

8. Members will be aware that, in addition to his role at the University of Glasgow, Professor Logan was appointed to advise ministers on the implementation of the recommendations in March 2021. As such, Professor not only carried out the Review, but also advises Scottish Ministers on the implementation of the Review's recommendations.

9. In July 2022, Professor Logan was also appointed Chief Entrepreneurial Advisor to the Scottish Government.

Supporting information

10. A SPICe briefing has been prepared for the session and is included at **Annexe A**.

Clerks to the Education, Children and Young People Committee, May 2024

Annexe A

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Introduction

In December 2021, the Committee held an evidence session on digital skills and alignment with business needs, and Professor Mark Logan was one of the witnesses in his role as author of the Scottish Technology Ecosystem Review (STER). The Committee will hear from Professor Logan to explore the progress made in implementing the findings of the STER view.

This paper will summarise the key finding from the STER review, progress made to date on implementation and previous evidence provided to Parliament by Professor Logan.

Background: Review of the Scottish technology ecosystem

In May 2020 Professor Mark Logan was commissioned by the Cabinet Secretary for Finance to undertake a review in how Scotland's technology sector can contribute to the country's economic recovery from the COVID-19 pandemic. Chapter 2 of the review dealt with the role Scotland's education system can play in nurturing talent in the tech sector.

The review noted that: in order to encourage more start-ups, young people need to have programming and related skills by the time they leave school; increasing technical computer science skills will increase the pool of technical expertise to support start-ups; computing science teachers are generally not subject specialists and this restricts what can be taught; gender balance of computing students is 84% male; there is a lack of entrepreneurial content at university level; and entrepreneurs need to be equipped with better skills in business.

The review made 34 recommendations, of which 11 relate to school, further and higher education in Scotland:

1. Create a network of tech scaler centres which provide long-term affordable space, free high quality educational material covering Silicon Valley business models, internet-economy working practices, team and people management, funding models and operating hygiene.

2. Treat computer science teaching the same as mathematics or physics – teach it from the first year of high school and attract more computer science graduates into teaching. Allow computer science teachers dedicated training time each year to keep pace with a rapidly changing subject.

3. Establish an industry partnership with schools to give computer science pupils summer work experience.

4. Strategically support extra-curricular programming clubs at the school stage.

5. Address the gender stereotyping in the early stages of computer science schooling.

6. Introduce an education/ mentoring scheme for start-ups to develop better skills and understanding of funding models, venture capital and pitching.

7. Increase university funding to create more local software engineers.

8. Adjust university incentivisation to improve spin-out scale and quality.

9. National, pan-university Tranzfuser-style summer-school.

10. Increase the number of start-up internships available to students.

11. Introduce an education/mentoring scheme for start-ups in funding models, venture capital, pitching.

In the 2020-21 Programme for Government, the Scottish Government committed to:

> "[establish] a national network of 'Tech Scalers' – world-class start-up incubators delivering the best available mentoring and training for our company founders. We aim to have five operational scalers by end 2021/22 and aim to create between 300-500 high-quality new start-ups over 5 years."

In March 2021, the Scottish Government appointed Mark Logan to advise ministers on the implementation of the recommendations of the Logan Review, which included £7 million funding for 2021-22. Professor Logan gave evidence to the Committee on 8 December 2021.

Progress on recommendations

In November 2022, the Scottish Government published a progress update on the recommendations. Progress on the education elements of the recommendations includes:

- **The creation of a teacher-led organisation called Scottish Teachers Advancing Computing Science):** Developing an upskilling plan and a repository of teachers.

- **A national upskilling plan for computing science teachers:** Initial pilot was planned for last year, with a full-scale roll out planned for this year. Experienced teachers to produce 'bite-sized' videos and tutorials and deliver in person events.

- **A new teacher resource repository:** The Scottish Teachers Advancing Computing Science website has now been launched. The resources are intended to help teachers plan engaging lessons.

- **More than £1m of investment in computing science hardware for schools**: Fund established for secondary schools to bid for grants of up to £2,500 each. About 300 secondary schools have used grants to buy devices, software and teaching resources.

- **Resources to bring the tech industry into schools, so pupils can learn first-hand what the subject and a future career in tech has to offer:** A Tech Industry In Schools Toolkit has been developed.

Other work includes work to address the gender imbalance of computing science. On average, 84% of students studying higher Computing Science are male. This is being done through resources to help teachers tackle gender stereotyping and unconscious bias, work with colleges and universities to narrow the gender gaps, and improving career advice and progression. The Improving Gender Balance and Equalities team at Education Scotland are involved in this work.

£4m investment since 2020 via Skills Development Scotland for delivery of reskilling programmes such as Digital Start Fund for those on benefits or low incomes. Code Your Future helps "vulnerable people" including refugees with skills to help them progress in education and employment.

Skills Development Scotland's Digital Economy Skills Action Plan was published in March 2023, setting out a plan for the digital economy for 2023-2028.

In terms of progress on infrastructure, universities will deliver hubs as part of a Techscaler network in partnership with universities, local authorities and businesses. This will offer free of charge advice on scaling up internet economy businesses.

Professor Logan said he was encouraged by progress on the collaborative partnership approach and the systems-oriented approach.

Committee's previous evidence session, 2021

On 8 December 2021, the Committee held an evidence session on skills alignment with business needs. The second panel focused on digital skills, and included Professor Mark Logan. Key points raised by Professor Logan include:

- The issues affecting the teaching of computer science go beyond funding – there has been a 'failure to recognise the importance of computer science to the economy'

- Computer science in schools is not held in the same regard as other science, technology, engineering or mathematics – Professor Logan suggested it was essentially a third-tier subject and vies for time in the syllabus with home economics and physical education.

- This lack of regard impacts the attractiveness of a career as a computer science teacher – there were around 20 per cent more teachers in computer

science 15 years ago than now. There has also been a reduction in the number of children studying the subject – it used to be around 8,000 annually, but has fallen to around 5,000.

- The impact of gendering in computer science is significant – Professor Logan noted that "half our best people are, in essence, excluded from an industry we depend on economically".

- The dumbing down of the syllabus, in part necessary because there are so many generalists teaching the subject in schools, means that the more complex and exciting aspects of the subject are not covered. Addressing this will require recruitment practices which target more expensive computer science graduates and deliver a nationwide intensive and on-going upskilling programme for existing computer science teachers. In part, this upskilling needs to be ongoing to reflect the fast-evolving nature of the subject – what was cutting edge 12 years ago is far from that today.

- There is a morale problem in the profession, due to the perception that their profession is 'dying'. There needs to be a teacher led organisation to "procure, curate and promote" best practice across the country.

- Parents and pupils need to be engaged earlier to promote the career opportunities that the subject can lead to. Currently this can happen as late as third year in high school – this needs to be far earlier and reach pupils while they are at primary school.

- Professor Logan noted that the Cabinet Secretary for Education and Skills had convened a senior steering group which included Professor Logan, SDS, SFC and Education Scotland to look at these issues.

- There needs to be caution around changes to the curriculum, as previous changes may have led to teachers leaving the profession. Professor Logan suggested that 'exam-filler stuff' such as GDPR should be removed and replaced with projects. This would require that classrooms were equipped with the necessary kit to support interesting projects, and extra-curricular programming clubs.

Professor Logan's evidence to the Economy and Fair Work Committee

Professor Logan has twice contributed to the Economy and Fair Work Committee this session.

The first evidence session was part of the Committee's enquiry into Scotland's supply chains in November 2021, as part of a panel exploring skills gaps. Professor Logan noted that digital skills were a spectrum; at one end there is a general degree of digital literacy required across the population, and at the other there are 'digital native' businesses which face their own challenges. The specific skills required are rapidly changing, so there should be a focus on developing people's capacity to be entrepreneurial, flexible and adaptable'. Professor Logan noted that the number of children taking computer science has dropped every year since 2008, despite the number of software engineer jobs in Scotland growing by around 150 per cent per

year. He also noted that more work needs to be done to offer retraining opportunities for people looking to join the sector; the current initiatives are not effective, and Scotland's colleges in particular, do not do as well as private initiatives such as CodeClan.

The second evidence session focused on Professor Logan's role as Chief Entrepreneurial Advisor to the Scottish Government, in January 2023. Professor Logan noted that the National Strategy for Economic Transformation had a big focus on entrepreneurial education, and re-iterated the challenges the gendering of some sectors and entrepreneurship presents in terms of discouraging the best talent from pursuing a career. Professor Logan noted that the Scottish Teachers Advancing Computer Science network was continuing to involve teachers in front line decision making, and that the Scottish Government were about to launch a teacher upskilling programme.

Letter to SG and response

Following the evidence session in 2021, the Committee wrote to the Scottish Government and made 14 recommendations, of which 3 related to digital skills. The Scottish Government responded on 11 April 2022, these recommendations and the Scottish Government response are set out in the table below:

Committee Recommendation	Scottish Government Response
The Committee found the evidence heard on digital skills compelling. Given the need for these skills both now and in the future, action must be taken now to ensure that young people are given the tools they need to thrive in digital careers. This means well qualified and inspiring computer studies teachers, the promotion of computer science as a subject and the provision of the physical infrastructure needed in schools.	In regards to Computing Science provision in schools, work is underway in the STER programme to address the upskilling of Computing Science teachers and how best to attract new teachers to the discipline. Key to this, is the appointment of former computing science teachers Toni Scullion & Brendan McCart to the newly formed Scottish Teachers Advancing Computing Science (STACS), an organisation based at Glasgow University who will advise us as we implement the school recommendations and spread best practice in computing science amongst schools. Local Authorities across Scotland have been granted up to £1.3 million to improve teaching of computing science. Every primary and secondary school will receive two class sets of Micro:Bits, pocket-sized computers that introduce pupils to how software and hardware work together. Schools have also bid for grants of up to £3000 to purchase additional computing science equipment, devices, software or teaching resources and allocation of this funding is currently underway.
The Committee welcomes the setting up of the steering group but seeks assurances from the Scottish Government that momentum will be maintained in seeking to address these issues. We ask the Scottish Government to keep the Committee updated on progress in this area.	
We note that there are structural issues which need to be addressed through interaction between the industry, formal education sector and skills bodies. Local authorities should also be engaged in seeking to improve the infrastructure to improve computer science teaching facilities in schools, and to keep them up to date.	

	Our Digital Skills Group is a public sector and industry partnership with companies such as JP Morgan, Hewlett Packard Enterprise, and Cisco and has delivered a range of projects to both respond to immediate needs of industry and broaden the future talent pool. In addition, the STER Advisory Board co-chaired by the Cabinet Secretary for Finance and Economy advises us on the implementation of the STER recommendations, and the Computing Science Steering Group has been set up to specifically look at the school's recommendations. We will be happy to keep the committee up to date with progress made on digital skills across the whole STER programme.

Recent developments and policy

Scottish Teachers Advancing Computing Science (STACS) was launched as part of the response to the STER review and is funded by the Scottish Government. This offers computing science teachers access to high quality teaching materials including lesson plans, teacher notes and solutions, access to a directory of computing science teachers, access to upskilling opportunities, and other resources including videos, books and opportunities for pupils.

In August 2023, Scotland's digital skills academy code clan was placed into liquidation. The Scottish Government, in response to a written question, noted that Codebase (who operate the Techscaler network) acquired all the training materials and other assets from CodeClan, with the Scottish Government providing financial support to enable students who had begun training in CodeClan to finish their courses.

The most recent Programme for Government (2023-24, published September 2023) pledged to 'Develop a digital strategy to help ensure digital provision supports the wider aims of the education system'. IT is worth noting that the First Minister pledged to bring forward the next Programme for Government on June 20, prior to the summer recess.

The Scottish Government are currently refreshing the National Strategy for Economic Transformation, and expect to set out more detail in summer 2024.

Andrew Feeney-Seale, Senior Researcher (Financial Scrutiny Unit)

23 May 2024