



Unlocking Potential: Digital Skills Training and Social Mobility

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Generation

About Learning and Work Institute

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Executive Summary

The UK tech industry is expanding rapidly, growing at a rate that is two and a half times faster than the rest of the economy. The tech sector is key in driving productivity and improved living standards and is likely to become even more important going forward – evidence suggests that the tech industry could grow the economy by an additional £413 billion by 2030, accounting for almost a fifth of the UK economy. However, there are clear digital and tech skills gaps at a national level, which are detailed in this report, with many employers reporting significant shortages.

In hiring to digital/tech roles, employers tend to stick to traditional hiring routes and mainly hire people with degrees, missing out on the talents of people from more diverse and disadvantaged backgrounds who are under-represented in tech. At a time when a shortage of skilled digital and tech workers is holding back economic expansion it is crucial that people from all backgrounds have opportunities to develop skills for these vital roles.

Project aims

Focusing specifically on evidence from England and Scotland, this innovative research¹ aimed to understand the digital/tech employment gap; highlight which programmes and skilling pathways are most effective in enabling people from disadvantaged backgrounds to progress into digital and tech jobs, and why; and make the case for investing in programmes that are most effective in achieving social mobility outcomes. The research has a specific focus on people from lower-socio-economic backgrounds and with lower qualification levels, and includes people in low paid work, underemployed or unemployed.

This report presents evidence from a poll of 490 employers and 1979 adults, a desktop evidence review, secondary data analysis and qualitative research with a range of policymakers, training providers and employers.

Challenges and opportunities

Key findings:

- The UK labour market is facing a shortage in digital/tech skills that is having a significant impact on productivity and growth, costing the UK economy £63 billion a year. **Half of employers (49%) say they are struggling to hire staff with the digital/tech skills that they need**, and data shows that there are over 40,000 vacancies in tech occupations. Digital skills shortages are a challenge at all levels and across functions but are particularly pronounced at senior levels and in leadership and management roles.
- When employers hire to digital/tech jobs they mainly use traditional routes. As a result, they often overlook and miss out on talent from groups of people that face barriers to employment for example, young people who are not in education, employment or training (NEET), people from ethnic minority backgrounds, those with disabilities, or with lower education attainment - **six in ten employers (59%) say that a high proportion of the staff they recruit have degrees** and data shows that almost seven in ten workers in tech occupations (67%) have an HE qualification compared to just four in ten (41%) in non-tech roles.
- **Creating effective pathways for people from disadvantaged backgrounds into tech/digital careers is key to:**
 - Addressing the digital skills gap, via more diverse and hidden talent pools.
 - Enabling employers to benefit from staff with different and diverse ways of thinking, helping to build a high quality workforce and increase productivity.

¹ In April 2024, L&W was commissioned by Generation: You Employed, UK ('Generation') with the support of JP Morgan, to undertake research into effective approaches to supporting people from diverse and disadvantaged backgrounds into digital and tech jobs.

- Addressing under-representation in tech/digital roles by gender, especially women, people from ethnic minority backgrounds, and people with disabilities. International research shows that the most diverse businesses are more likely to outperform less diverse companies on profitability.²
 - Improving economic and social mobility across the UK, by creating pathways into higher skilled and salaried roles.
 - Reducing unemployment and economic inactivity.
- There are a wide range of skills programmes offering pathways into digital/tech jobs, including publicly funded, private and non-profit sector provision. However, **the three main supply chains, used by employers are degree programmes, apprenticeships and Skills Bootcamps**. There were approximately 35,300 starts on undergraduate Computing courses³, 25,000 starts on ICT apprenticeships and approximately 22,600 starts on Digital Skills Bootcamps in 2022/23, compared to much lower volumes on other types of provision. Approximately 1300 people completed digital T Levels in 2023/24 and less than 1000 people in total have been supported through Sector Based Work Academy Programmes that had IT and Communications sector placements.
 - Digital Skills Bootcamps starts have risen from close to zero in 2018/19 to 22,600 in 2022/23. If targets are met this year, they could exceed 30,000 starts in 2023/24. Latest data for ICT apprenticeship starts also indicates an increase to over 26,000 in 2023/24. Therefore **if existing trends continue then Digital Skills Bootcamps are likely to overtake ICT apprenticeship numbers this year**.
 - **Each of the three main supply channels play different roles. However, evidence on performance is limited and across all types of digital skills provision the quality of providers and outcomes are inconsistent**. This makes it difficult to understand the comparative value of different interventions in supporting under-represented groups into work, highlighting the importance of ongoing focus on outcomes.
 - **The flexibility of Skills Bootcamp policy means that there is vast variation in the design and delivery of programmes, and key differences in how they are funded**. While some programmes are fully funded by the Department for Education (DfE), others draw on funding from employers (typically for training existing employees) or from charitable sources. Digital Skills Bootcamps that include at least an element of charitable funding are more likely to attract diverse participants and secure good outcomes.
 - Although employers mainly hire people with degrees, **three in four employers (74%) see recruiting from different channels, and wider talent pools, as an effective way of addressing skills gaps**. When hiring, employers are increasingly considering candidates' wider transferable skills and willingness to develop new skills, alongside understanding of key technology principles, as this is what they are looking for, particularly for junior roles. However, small and medium enterprises (SMEs) in particular, face specific challenges in hiring people from disadvantaged groups to entry level roles, and further investment is needed to support this.
 - Many people from disadvantaged groups, and those further from the labour market, have low awareness of and do not see themselves in digital/tech jobs and careers – **only around a third of adults (37%) in lower-socio economic groups say that jobs requiring advanced digital/tech skills are currently a realistic option for them**, compared to more than half of those in higher socio-economic groups. This limits the pool of potential applicants for jobs.
 - Despite increased demand for programmes such as Digital Skills Bootcamps, there continues to be a gap between employer demand for advanced digital skills and the supply of staff from training programmes. This suggests that the main supply chains need to be scaled. Coherent, credible and high-quality pathways that can support significant volumes of people into digital/tech is critical. However, **policy changes are needed to prioritise and improve access for disadvantaged groups. Without this, scaling of existing programmes will continue to overlook people facing barriers to digital/tech roles**.

² McKinsey (2020) [How diversity, equity, and inclusion \(DE&I\) matter](#) | McKinsey

³ Higher Education Statistics Agency (HESA) 2022/23. Figures shown are for England and Scotland (38,440 for UK in total) and include Computer Science; Information Technology; Information Systems; Software Engineering; Artificial Intelligence; Computer Games and Animation; Business Computing; Others in Computing

- **Almost all employers (95%) say that it is important for the government to increase investment in non-traditional routes into jobs that require digital/tech skills.** Wider stakeholders agree that action to improve access to digital/tech skills training, jobs and careers should be a priority for government and employers to ensure that more people can develop the digital skills needed to address skills gaps, boost economic growth and improve social mobility.
- **Short and modular programmes are increasingly valued by employers to respond to more immediate needs, particularly given the fast pace of change in the digital/tech sector.** Shorter programmes and stackable micro-credentials style provision offer flexibility to meet the needs of different types of learners.
- **One to one support is crucial in enabling people from diverse and disadvantaged backgrounds to secure positive outcomes from digital and tech training programmes.** However, this type of provision is costly to deliver. Future funding should better incentivise a focus on people from lower socio-economic groups and with lower qualifications, for example through financial incentives or commissioning structures.
- There is a consensus that further devolution of responsibility for skills is the right approach to meet some of these challenges – local government is best placed to understand their communities and to assess local market industry needs for digital/tech skills, and to commission provision to meet these needs.
- In Scotland, there are concerns about the impacts of delays to implementation of the Withers review⁴, and what some see as stalled progress on reform of skills in Scotland compared to the faster pace of change across the border, including the introduction of Skills England. There is appetite for greater coherence in skills strategy, including digital skills, to meet current challenges.

Recommendations for policymakers, commissioners and employers⁵

- 1. Target support and aim high: Local growth plans, such as City Region and Growth Deals in Scotland, and Local Skills Improvement Plans in England should include assessment of tech/digital skills needs, with employers investing more and public funding targeted on those that need the most help.** Meeting skills needs is a partnership between individuals, employers and the Government, and it is important to get that balance of responsibilities right. The best provision already does this and there are excellent examples across the country.

The Government has said it wants local areas to draw up growth plans, which will bring together the range of infrastructure, business support, skills and other conditions needed to increase growth. Local Skills Improvement Plans have already been developed in many areas across England by business representative groups. As each of these is developed and refreshed, they should ensure they include assessment of the need for digital/tech skills and plans for how to meet this, including how employers will increase their investment. Employers, including those in the tech/digital sectors, should ensure they engage in these processes and also consider what actions they can take themselves (see below for more details).

Different sources of funding, such as the Adult Skills Fund, the UK Shared Prosperity Fund and Investment Zone Funding, should be aligned with local plans to ensure that people from disadvantaged backgrounds, who need the most support, are able to benefit from opportunities. Public investment should be focused on market failures and where there is a social justice requirement, with employers and individuals focusing their investment (of time and money) where they will directly benefit and are able to do so. The principles of Skills Bootcamps in England (shorter training, designed with employers who guarantee completers an interview) are good, but, overall, they are not currently meeting this test. The flexibility of the policy means that there is vast variation in the design and delivery of Digital Skills Bootcamps. While employers and providers felt that Digital Skills Bootcamps which include at least some element of charitable funding often attract diverse participants and often secure good outcomes, DfE evaluation data does not differentiate by how programmes are funded and shows that, overall, Skills Bootcamp participants are most likely to be graduates and from the top three socioeconomic groups. There is also little data on outcomes or value for money, which means it is difficult to understand and differentiate the relative effectiveness of Skills Bootcamps which do and do not draw on charitable funding to support people from diverse and

⁴ Scottish Government (2023) [Fit for the Future: developing a post-school learning system to fuel economic transformation - gov.scot](#)

⁵ Specific recommendations for policy makers and commissioners, and for employers are listed separately in Appendix 2.

disadvantaged groups. It is important that published data and evaluations of the programme effectively distinguish between different types of learner, for example people from lower socio-economic groups, who often face barriers to digital/tech employment, and those already in digital/tech roles who take part to upskill. Having a separate programme also adds to complication for people and employers.

Skills Bootcamp funding should be folded into a single employment and skills funding pot for devolved areas in England. They can then decide how best to spend this funding to achieve employment and skills outcomes set out in devolution agreements. It would have the potential for strategic stakeholders and existing providers in devolved areas to deliver support and training that is tailored to the needs of digital and tech employers, and local people who need help the most. Devolved areas and the UK Government may decide to continue with a standalone programme, or to build the approach into their mainstream funding.

Either way, future funding (whether in a continuation or evolution of Skills Bootcamps or other work-related learning route) should better incentivise a focus on people from lower socio-economic groups and with lower qualifications. This could come through a mix of:

- **Financial incentives.** Such as differential funding rates for people with different qualification levels, or a requirement for co-funding from the employer or individual for learners already qualified at level 3 and above. As part of this, ensuring funding is available for people who face specific barriers to employment, recognising the cost of the higher and more intensive support that is often crucial in enabling them to secure good employment outcomes.
- **Commissioning structures.** Such as setting a requirement that each provider only has, say, 25% of participants who already have a Level 3 qualification or higher, or only 25% are in work or have been out of work for six months or less, or setting benchmarks or incentives to engage underrepresented groups such as people with disabilities or from specific minority ethnic backgrounds.

To make informed decisions, the Government should publish timely data and commission robust independent evaluations of all publicly funded provision. Understanding the performance and value for money of different programmes in supporting people from disadvantaged backgrounds into employment is crucial. Published data is currently inconsistent across programmes and does not provide evidence of the comparative value of different interventions in reaching the people who need the most help and supporting them into work.

- 2. Find hidden talent: Employers, working with national and local government, should consider how they can promote careers in digital/tech, widen recruitment approaches and build career pathways.** Digital and tech careers should be accessible to everybody. Widening the talent pool that digital/tech workers are drawn from will help mean employers get the best possible workers and that people have the best possible opportunities. Employers need to do this both individually and working together in local areas and within sectors.

A first step should be considering how best to raise awareness of the careers available in digital and tech, across all sectors of the economy, building information on these into careers services for young people and adults. In this way, setting out the career ladders available and how to climb each rung. That should include use of role models – ‘people like me’ from under-represented backgrounds who work in digital/tech. One way to do that would be to promote entries to Festival of Learning's adult learning awards, England's largest lifelong learning celebration.⁶

Beyond this, employers and employer groups should consider how they can individually and collectively reach some of the hidden talent they are missing out on. That could include: engaging with schools, colleges and training providers to offer visits and work placements; working with Jobcentre Plus and employment services to offer work trials; considering where and how to advertise vacancies; working with local government, particularly where they have developed hubs or gateways to bring people, employers and learning together; and working with learning providers, community groups and others to raise awareness.

Given that the majority of UK employers are SMEs, and report lack of awareness and capacity to broaden recruitment approaches, larger employers and employer groups should play a leading role in taking this agenda forward.

⁶ <https://learningandwork.org.uk/what-we-do/lifelong-learning/festival-of-learning/>

- 3. Invest in skills. Employers should increase investment in digital/tech training, supported by the Growth and Skills Levy and a new Skills Tax Credit.** Investing more in training staff, including supporting new recruits as apprentices, can aid productivity, business success, and meeting skills needs.

Policy needs to better support and target training at work. The Growth and Skills Levy should take the 'flex and match' approach proposed by Learning and Work Institute.⁶³ Under this approach, large employers in England should have flexibility to spend some of their levy payments on non-apprenticeship training, but only matched up to the amount they invest in apprenticeships for young people.

The Government has said that Skills England will determine which learning is eligible for funding under the Growth and Skills Levy. Employers, trades unions and local government should be able to input into this decision. It should include, where appropriate, tech/digital skills learning, including modular and bite size training to reflect the need for shorter courses employers have identified as important, and with the flexibility that is valued by people who face barriers to employment. It could also include pre-apprenticeship provision or pre-employment support that reaches underrepresented groups.

It should also be able to be regularly and swiftly updated, to reflect rapidly changing technology and skills needs. It could also potentially include pre-apprenticeship learning programmes, where these are focused on under-represented groups and demonstrate a good track record of progression onto apprenticeships, jobs and other learning.

Evidence from the former traineeship programme in England showed that provision that focussed on enabling young people to develop job specific skills, in response to skills gaps, such as digital/tech, were highly valued by employers and young people, and likely to produce the best employment outcomes. Government should ensure that lessons from traineeships inform future policy.

Employers also need to invest in training beyond the levy, increasing current investment to meet their digital skills needs and unlock growth potential. That includes SMEs, who do not currently pay the levy. To incentivise this, the Government should introduce a Skills Tax Credit, providing financial incentives for firms to invest in accredited learning, particularly in essential skills like literacy, numeracy and digital, and up to Level 5. Sectors should also consider whether to introduce a skills levy to tackle sector-specific skills issues, as construction and other sectors have done. This could include where shortages of digital and tech skills are identified.

Combined authorities should have a responsibility for driving demand for apprenticeships in their region as part of their role in shaping and creating a coherent local skills and employment system.

- 4. Simplify the employment and skills system and make training flexible: The employment and skills system should be simplified, joined up, and able to adapt to rapidly changing digital and tech skills needs.** The employment and skills system is complex for both employers and people, too often disjointed, and afflicted by short-term limited funding and rapid change. This can particularly impact on sectors, such as digital and tech, where needs are rapidly changing.

The content of qualifications, other learning, and apprenticeships needs to be updated more speedily to reflect changing needs in digital and tech roles. If it changes too slowly then employers are unable to get the skills they need. That could include exploring a more modular approach to apprenticeships, that allows some tailoring of the content to specific roles or technologies.

We also need to make it easier for employers looking to recruit digital and tech roles and people looking to move into those occupations to find the right help. Devolution within England offers an opportunity to build this approach, and indeed some areas, like London, have already started to try and develop it. Local areas, across England and Scotland, should work with employers to understand the pathways into digital and tech roles and what employers need, and build support and careers advice around this.

As a whole, accountability, commissioning and ways of working need to focus more on the outcomes they are seeking to achieve (more people in work, including in digital and tech roles, and earning more) than on individual programmes and the number of participants on each. Longer-term funding settlements, such as at least three year budgets for further education colleges and other institutions, could help with building relationships with employers.

1.

Introduction

In April 2024, L&W was commissioned by Generation, with the support of JPMorganChase, to undertake research into effective approaches to supporting people from non-traditional backgrounds, into digital and tech jobs.

The UK tech industry is expanding rapidly, growing at a rate that is two and a half times faster than the rest of the economy. **DfE projects 7% employment growth to 2030 and 13% to 2035 across all digital and computing occupations compared to 3% and 6% projected growth across all occupations over the same period**⁷. The tech sector has the potential to drive productivity and improved living standards - however, many employers face significant digital and tech skills gaps. At a time when a shortage of skilled digital and tech workers is holding back economic expansion, it is crucial that people from all backgrounds have opportunities to develop skills for these vital roles.

Focusing specifically on evidence from England and Scotland, the research aimed to understand the extent to which employers' current and future digital and technology skills needs are matched with suitably skilled labour; and how effective different training programmes/skilling pathways are at enabling people from non-traditional backgrounds, who face barriers in digital and tech, to develop digital skills and progress into digital and tech jobs and careers.

For the purposes of this research, the term 'non-traditional' is used to reflect a specific focus on socio-economic diversity. This includes people with lower levels of educational attainment, people who are not in employment or are in low paid jobs, as well as under-represented groups with specific characteristics such as gender and ethnicity.

The research is focused on digital and tech jobs and careers such as IT support/helpdesk, data analytics, cyber security, software engineering and cloud computing, either in the digital/tech sector or in other sectors, rather than support for people to develop generic digital skills for employment.

This report aims to inform policy direction and help to identify how providers, employers, policy makers and wider stakeholders can work together to reduce barriers and improve access to high quality digital skills training that secures good outcomes, and enable progression to jobs for people from diverse and lower-socioeconomic backgrounds.

Digital and tech skills and employment policy context

Skills gaps and skills shortages in digital and tech

It is widely acknowledged that the UK is facing a digital skills crisis. Research with employers consistently shows that labour market skills shortages and workforce skills gaps are most acute in relation to digital skills. For instance, Forbes' IT Skills Gap report found that **93% of businesses have an IT skills gap**⁸, while research by Lloyds Bank shows that **68% of employees are unable to complete one or more of the basic digital tasks considered necessary for effective participation in work** under the UK's Essential Digital Skills Framework.⁹ Not only does **the digital skills gap reportedly cost the UK economy almost £63 billion every year**¹⁰, with that figure set to rise, but there are significant impacts at an individual level for people struggling to enter the labour market or progress in work because they lack essential digital skills. Research has found that over a quarter of UK employees feel that they do not have the digital skills required for their job role, while **58% stated that not having digital skills has affected them negatively in the workplace**¹¹.

⁷ Department for Education (2024) [Unit for Future Skills, Jobs and Skills Dashboard](#)

⁸ Forbes (2023) [The 2023 IT Skills Gap Report - Forbes Advisor UK](#)

⁹ Lloyds Bank (2021) [Lloyds Essential Digital Skills Report 2021 \(lloydsbank.com\)](#)

¹⁰ Department for Digital, Culture, Media and Sport (2022) [New Digital Strategy to make UK a global tech superpower - GOV.UK \(www.gov.uk\)](#)

¹¹ Oxford Learning College (2023) [Skills Gap Statistics UK 2023 | Oxford Learning College \(oxfordcollege.ac\)](#)

This generally low level of digital skills within the working population contributes to the particularly pronounced skills shortages reported in relation to specialist digital and tech roles. Between 2019 and 2022, the number of advertised vacancies in tech jobs increased by 42%, as the pandemic focused the attention of many UK organisations on the opportunities offered by digital and tech.¹² The rapid expansion of artificial intelligence (AI) and automation and the increasingly critical role that digital plays across industries means that tech roles are found in every sector of the economy, and will only become more prevalent. High levels of demand for skills are found in areas such as software development, AI, cyber security and programming.¹³ It is estimated that demand for technology-related skills will have risen by more than 30% by 2030.¹⁴ The digital/tech sector is a rapidly changing sector, for example AI can now write code so learning skills in AI might currently be more useful than coding, but this is likely to change in the years ahead, and so labour and the types of skills needed are also going to change.

Research by the Confederation of British Industry (CBI) identifies industry-specific technical knowledge and advanced digital skills as employers' primary areas for investment over the next five years.¹⁵ However, many employers are unable to fill digital and tech vacancies, and report difficulties in finding, attracting and retaining tech talent.¹⁶ One study suggests that almost 95% of employers recruiting to tech roles have encountered a skills shortage.¹⁷

Challenges in recruiting to tech roles act as a brake on organisational innovation and business growth, with consequences for the wider economy. **Evidence suggests that the tech industry could grow the economy by an additional £413 billion by 2030, accounting for almost a fifth of the entire UK economy.**¹⁸

Current digital and tech training provision

The scale of skills shortages in digital and tech has focused the attention of policymakers and other stakeholders on the need to significantly increase the number of people pursuing tech careers, by strengthening training routes into tech jobs and widening the pool of talent on which organisations can draw.¹⁹ Greater diversity in the social-demographic profile of the tech workforce, and greater diversity of entry and progression pathways, are seen as key to effectively addressing the digital skills and employment challenge. New recruits into tech roles continue to come largely from higher education, and it is recognised that this alone will not be able to meet the level of demand.²⁰

The skills funding system, including digital skills, is complex and disjointed and varies according to the aims, outcomes and eligibility for funding. It includes public spending, employer investment and self-funding by learners, alongside contributions from charitable and voluntary sector organisations. Public funding for skills comes from different sources depending on the type of training and the age of learners, including the Adult Skills Fund, the National Skills Fund and the UK Shared Prosperity Fund. Some funding is administered at national level, while some is devolved to local areas.

A new growth and skills levy will replace the existing apprenticeship levy that some employers currently pay. In addition, a new Lifelong Learning Entitlement will create a new single funding system to help people 18+ to develop new skills and gain new qualifications (including modules of high value technical courses at Level 4 to 5). Alongside this, employer investment in training includes spending on off-the-job courses, apprenticeships, and on-the-job training like coaching. The different sources and complexity of funding are demonstrated throughout this report, for example in the case of some Digital Skills Bootcamps that are funded by employers and through charitable sources, in addition to DfE, to work specifically with disadvantaged groups facing barriers to employment.

In Scotland, digital skills training may be funded by Skills Development Scotland and the Scottish Funding Council on behalf of Scottish Government, alongside drawing on funding from employers, individuals and charitable sources.

¹² Tech UK (2022) [The UK Tech Sector in the 2020s](#).

¹³ DDCMS (2021) [Quantifying the UK Digital Skills Gap](#).

¹⁴ Industry Strategy Council (2019) [UK Skills Mismatch in 2030](#).

¹⁵ Confederation of British Industry, 2022, [education-and-skills-survey-2022.pdf](#) (cbi.org.uk)

¹⁶ Forbes, 2023, [The 2023 IT Skills Gap Report – Forbes Advisor UK](#)

¹⁷ <https://www.computerweekly.com/news/252529226/Tech-skills-shortage-still-a-problem-for-employers>

¹⁸ Public First, 2022, [AWS UK – Unlocking Europe's Digital Potential](#) (publicfirst.co.uk)

¹⁹ Tech UK (2022) [The UK Tech Sector in the 2020s](#).

²⁰ DDCMS (2021) [Quantifying the UK Digital Skills Gap](#).

Key programmes which currently offer skills and employment pathways to careers in the tech workforce, through both initial training and via reskilling and upskilling include the following: (A summary table of current provision is also shown in Chapter 3)

Further Education ICT provision

In England, a range of different types of providers deliver FE ICT courses, including for example colleges, Independent Training Providers (ITPs), local authorities, employers, and non-profit sector providers. In 2022/23 there were approximately 88,900 ICT FE completions (excluding apprenticeships), mainly at Entry Level/Level 1, including essential digital skills, and so employment is not the primary focus of the training. Around a quarter were Level 2 (23%) and another quarter at Level 3 (24%). At Level 2 these include for example Information and Creative Technology BTEC Level 2, and Level 2 Certificate in Digital and IT Skills.

Apprenticeships

In both England and Scotland, apprenticeships are an important contributor to the supply of digital and tech professionals. Digital apprenticeships in England are delivered at all levels from Level 2 through to Level 7 but are more likely to be at Higher or Degree level than at Levels 2 and 3. At Level 3, examples include Software Development Technician and IT Solutions Technician. The duration of apprenticeships varies by level. For example, a Level 2 apprenticeship typically lasts for a minimum of 12 months, between 18 and 24 months at Advanced Levels, and between three and six years for a degree apprenticeship. The growth in ICT apprenticeship starts between 2021/22 and 2022/23 from 22,820 to 25,100, has been driven largely by a rise in the number of Higher apprenticeships.²¹ A specific Digital apprenticeship programme has been developed in the civil service, and in 2023 recruited 2,500 apprentices to tech roles in government.²² In Scotland, digital apprenticeships are available as both Modern apprenticeships (MA) and Graduate apprenticeships (GA). MAs account for around 1,800 apprentices each year, and include the new apprenticeship in engineering and digital manufacturing which has been developed in response to growing demand for integrated digital skills.²³

Skills Bootcamps

Skills Bootcamps provide eligible adults in England with the opportunity to undertake rapid upskilling or reskilling through short, flexible courses of up to 16 weeks' duration in skills shortage priority areas, with wraparound employability skills training and guaranteed job interviews. In the academic year 2022/23 there were around 40,000 Skills Bootcamp starts, the majority of which were in digital-related fields.

Funding for Skills Bootcamps is drawn from a range of sources. While some programmes are fully funded by the Department for Education, others draw on funding from employers (typically for training existing employees) or from charitable sources (typically for programmes targeted at people from diverse and disadvantaged backgrounds, who face barriers to digital and tech employment).

T-Levels

T Levels are a relatively new Level 3 qualification for young people, introduced in 2021-22. The number of colleges or schools offering T Levels has gone up from 101 in 2023 to 162 in 2024.

In the 2023-24 academic year, 7,380 people completed T Levels courses, (compared to 3,559 students in 2022/23 and 996 in 2021/22). Of these, 1,363 (18% of the total) completed a Digital T Level. The majority of students²⁴ participated in the Digital Production, Design and Development course (76%), and smaller proportions participated in the Digital Support Services (22%) and Digital Business Services (3%) courses which have both been offered since 2022/23.

²¹ <https://explore-education-statistics.service.gov.uk/data-tables/fast-track/625fe5d7-54d7-4cd9-662e-08dc0dea598f>

²² <https://www.gov.uk/government/news/government-steps-up-digital-skills-with-2500-new-tech-recruits>

²³ Skills Development Scotland (2023) *Digital Skills Economy Skills Action Plan 2023-28: key issues and priority actions*

²⁴ Total percentages add to over 100% due to rounding estimates

Sector-based Work Academy Programmes (SWAPs)

SWAPs are a short-term work experience placement style training programme.²⁵ They are designed for people on unemployment benefits and are administered by JobCentre Plus. SWAPs, which last up to 6 weeks, have three main components: a short period of sector-specific pre-employment training delivered by FE colleges and training providers, a work placement and either a guaranteed job interview, or tailored support for an employer's recruitment process. In England, SWAP training is fully funded through the Education and Skills Funding Agency (ESFA) and delivered by further education colleges and training providers. The training will enable participants to undertake units on the Qualifications and Credit Framework (QCF).

In Scotland, sector-based work academy training may be fully funded through Skills Development Scotland, or other partner organisations, and delivered by further education colleges and training providers.

Around 30,000 people have taken part in SWAPs between 2021/22 and 2022/23, however, IT and Communications sector placements represent only a fraction of these (2%).

Restart

The Restart programme, launched in 2021, is designed to provide personalised support to unemployed people in England and Wales to help them to find work. Participants are referred by JobCentre Plus. By the end of April 2024, 720,000 individuals had been referred to the scheme since its launch, with 610,000 of these having started.²⁶

Free Courses for Jobs (FCFJ)

FCFJ offers access to fully-funded training to adults aged 19+ in England who are unemployed or on low pay, on courses designed to develop in-demand skills. The training leads to Level 3 qualifications that have been identified as having strong wage returns, and includes digital subjects such as computer science and cyber security.²⁷

Scottish Digital Academy

Launched in 2017, the Scottish Digital Academy provides professional learning and training to support the development of digital skills and capability across the public and non-profit sectors in Scotland. As well as providing upskilling pathways to support existing digital, data and technology (DDaT) professionals to progress in their roles, it offers training opportunities for those wishing to reskill and change career into DDaT roles.

Non-publicly funded provision:

Beyond publicly funded programmes, a range of provision offers pathways into tech careers. For example:

- The tech sector itself supports various returners programmes for people who have had a career break, primarily women. Tech UK's returners hub has information on why returners are good for business, including guidance from the Government's Equalities Office and guidance to help businesses become 'returner inclusive'.²⁸
- Non-profit sector organisations such as The King's Trust and Catch 22 have specific programmes to support young people to understand digital and tech careers and how to access them.²⁹ The King's Trust offer a range of Get Into courses, for example Get Into Digital Marketing, and Catch 22 offer courses aimed at specific groups who face barriers to employment, for example Code 4000 which empowers women impacted by the criminal justice system with the core skills for a career in tech.

²⁵ Sector-based work academy programme: employer guide - GOV.UK (www.gov.uk)

²⁶ Restart Scheme statistics to April 2024 - GOV.UK (www.gov.uk)

²⁷ <https://www.gov.uk/guidance/free-courses-for-jobs#who-is-eligible>

²⁸ <https://www.techuk.org/what-we-deliver/returners-hub.html>

²⁹ <https://sectors.princes-trust.org.uk/digital-careers/>

The evolving skills policy landscape

Policymakers, in both England and Scotland, have recognised the need for government to take a strategic lead on creating the conditions to significantly increase the number of people pursuing tech careers, by strengthening training routes into tech jobs and widening the pool of talent on which organisations can draw.³⁰ The most recent overarching national digital strategies for both countries include an explicit focus on digital skills training, covering all elements of the education and skills system including schools, FE and HE, apprenticeships, lifelong learning and careers information, advice and guidance (CIAG).³¹

Yet despite the plethora of policy reforms, initiatives and associated training programmes that have been introduced, not only do substantial skills gaps and skills shortages remain, but evidence points to a range of persistent issues that impede progress. For instance, key groups from which new digital talent could be drawn, including women and people from backgrounds that are economically and socially disadvantaged, face considerable barriers to entering and progressing in the tech and digital sector.

A range of factors have created challenges in widening access to both digital skills training and jobs in the tech sector, including: poor careers advice for young people and adults on digital and tech opportunities; low levels of awareness and understanding about routes into tech careers; a focus on provision to develop essential and low level digital skills, without adequate pathways to progress learners on to further digital training and into tech careers; and a lack of comprehensive, up-to-date, relevant training provision to match the fast pace of technological advancements.³²

In both England and Scotland, policy aimed at developing digital and tech skills and employment pathways sits within wider education and skills policy. While the stated aim of skills policy at national, regional and local levels has long been to address the challenge of skills gaps and skills shortages by effectively aligning the supply of skills with labour market demand, and ensuring that it is responsive to changes in that demand, analysis of progress to date points to major and persistent systemic weaknesses. Common recurring themes in studies from both sides of the border include challenges presented by: fragmented skills systems; policy churn and short-term funding which impact negatively on programme development and implementation and constrain provision; financial barriers to upskilling, reskilling and career change; and weak CIAG.

However, there are indications of a growing policy focus on bringing greater integration and coherence to the skills and employment systems for both England and Scotland, with the intention of achieving more effective alignment with and responsiveness to labour market demand.

Skills reform in England

While the new UK Government has yet to set out its specific policy and strategy on digital, there are early indications of the intended direction of travel with regard to the skills and employment system for England, which will have implications for approaches to training in digital and tech. In its election manifesto and the King's Speech, Labour has indicated that skills are a central plank of its strategies for economic growth and social renewal. The following key high level reforms have been announced to the skills policy landscape.³³

- A new agency, Skills England, has been established to bring coherence to the existing fragmented skills system. Skills England aims to bring together central and local government, businesses, education and training providers and unions to address skills needs, with strategic responsibility for ensuring that training provision is aligned with the needs of the economy and determining what training should be eligible for public funding.³⁴ Operating initially as a shadow body within the Department for Education, Skills England will ultimately absorb all the functions of the current Institute for apprenticeships and Technical Education (IfATE).

³⁰ Tech UK (2022) [The UK Tech Sector in the 2020s](#).

³¹ DCMS (2022) [New Digital Strategy to Make the UK a Global Tech Superpower](#); Scottish Government (2021) [A Changing Nation: How Scotland will thrive in a digital world](#).

³² Forbes, 2023. [The 2023 IT Skills Gap Report – Forbes Advisor UK](#); Princes Trust (2024) [Decoding the Digital Skills Gap](#); I&W (2021) [Disconnected? Exploring the digital skills gap](#).

³³ <https://www.gov.uk/government/news/skills-england-to-transform-opportunities-and-drive-growth>; <https://www.fenews.co.uk/skills/what-is-skills-england-and-what-does-it-mean-for-the-skills-sector/>.

³⁴ Department for Education (2024) [Skills England: driving growth and widening opportunities \(publishing.service.gov.uk\)](#)

- The apprenticeship levy will be reformed as a more flexible Growth and Skills Levy, with eligible organisations able to use some of their levy pot to fund types of training other than apprenticeships. This reflects on-going calls from employers, and is intended to widen access to workforce training and strengthen responsiveness to changing skills needs, particularly those associated with technological change. One of the responsibilities of Skills England is to maintain a list of training that is eligible to be funded through the levy.
- A new strategy for post-16 education and skills will be launched, with the aim of developing a skilled workforce, driving social mobility and supporting the agenda for growth in the government's industrial strategy.

Devolved skills in England

The partial devolution of responsibility for skills funding and planning in England means that devolved authorities have all developed their own digital skills strategies and plans, and have some degree of autonomy in focusing their digital and tech skills investment to address local needs. These plans identify the critical importance of supporting digital skills development to local economic growth and promoting social mobility and higher living standards for residents.

To date, the nature of the core devolved funding (the Adult Skills Fund, formerly the Adult Education Budget) means that in practice the focus of attention has been primarily on addressing essential digital skills and tackling digital exclusion and digital poverty. Local flexibilities have been possible in relation to FCFJ eligibility criteria, and additional devolved funding for Skills Bootcamps has been allocated to some Mayoral Combined Authorities and the Greater London Authority, some of which has been used to boost digital and tech training. For instance, the West Midlands Digital Retraining Fund provides upskilling and reskilling opportunities that offer a bridge into entry level roles in occupations including coding, cyber security and digital marketing. Using a locally developed skills bootcamp model, it targets adults aged 19+ who are unemployed, seeking a career change, or wish to upskill.³⁵

The new government's early indication of its commitment to extending and strengthening the powers of devolved authorities,³⁶ and integrating their activity into the work of Skills England, suggests that they could play an increasingly important role in shaping skills policy and programmes.

Scotland skills policy

A number of inter-related strategies and plans have been introduced by the Scottish Government and its agencies, with the intention of building the capacity of the economy and society to respond effectively to technological change and make the transition to digital. Within this digital agenda, skills are a key area of focus.

- The overarching digital strategy for Scotland articulates priorities around increasing the digital skills talent pool in order to grow the digital workforce. These include strengthening entry and progression pathways in digital careers; supporting re-skilling and upskilling for roles in the digital tech sector; and increasing diversity in the digital talent pool through widening participation in digital and tech subjects across the education and skills delivery system.³⁷
- The Digital Economy Skills Action Plan (DESP) was developed by Skills Development Scotland in partnership with the Federation of Small Businesses. It sets out detailed priorities for action to address the digital skills implications of: key Government policies such as the National Strategy for Economic Transformation (NSET),³⁸ digital-specific strategies including the Digital Strategy,³⁹ Cyber Resilience Strategy⁴⁰ and Artificial Intelligence Strategy;⁴¹ and the findings of the Logan Review into how Scotland's technology sector can contribute to economic recovery in the wake of the Covid 19 pandemic.⁴² The necessary actions it identifies

35 <https://www.wmca.org.uk/news/21m-funding-so-4-000-west-midlands-residents-can-benefit-from-digital-skills-bootcamps/>

36 <https://www.gov.uk/government/news/deputy-prime-minister-kickstarts-new-devolution-revolution-to-boost-local-power>

37 Scottish Government (2021) *A Changing Nation: How Scotland will thrive in a digital world*.

38 <https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/>

39 Scottish Government (2021) *A Changing Nation: How Scotland will thrive in a digital world*.

40 <https://www.gov.scot/publications/strategic-framework-cyber-resilient-scotland/>

41 Scottish AI Alliance (2021) *Scotland's AI Strategy*.

42 <https://www.gov.scot/publications/scottish-technology-ecosystem-review/>

include steps to ensure that skills and employment opportunities contribute to a fairer, more inclusive and diverse digital economy, and measures to rapidly increase the acquisition of critical digital economy skills through workforce development, upskilling, and reskilling⁴³

Nevertheless, these efforts to bring greater coherence to the digital skills landscape, through DESAP, are taking place against a backdrop of wider concern about the state of the overall post-school learning system. The Withers Review (2023) points to a highly complex and fractured skills system, highlighting the lack of a cohesive approach, common purpose or strategic narrative joining together the different elements such as strategy, funding, qualifications and pathways. The review makes five structural, and ten operational recommendations, aimed at creating an integrated post-school system centred on skill development.⁴⁴ The extent to which Scottish Government will implement the recommendations remains unclear.

Research methodology

This research has been informed by a range of quantitative and qualitative research activities including:

A desktop evidence review of 70 sources including policy and academic research, grey literature, and wider evidence from relevant sector bodies. The review focused on mapping current provision of digital/skills training; the effectiveness of existing training programmes and pathways in driving social mobility; what makes existing programmes and pathways successful; barriers to people from lower socio-economic groups from accessing opportunities; and the advantages and disadvantages of different programmes and pathways from the perspective of employers.

Secondary data analysis of UK wide Labour Force Survey data (based on pooled quarterly data sets from 2023), UK wide Employer Skills Survey data 2022, and Government Further Education (FE) data for England 2022/23.

Definition of digital and tech jobs

The analysis is primarily occupation based, including individuals working in digital and tech occupations, regardless of the sector of their employer. However, for some datasets and/or variables, an occupational breakdown is not available. In these instances, analysis is sectoral-based. This includes analysis of DfE data on participation in further education and apprenticeships, where analysis was based on the provisions' sector subject area. It also includes analysis of some indicators in the Employer Skills Survey for which occupation was not available; for these indicators analysis included individuals working for employers in the digital and tech sector, regardless of their occupation.

A definition for digital and tech occupations to be included in the secondary data analysis was agreed with Generation (See Appendix 1)

An online poll of 490 businesses in England (438) and Scotland (52), undertaken in June 2024. The poll explored recruitment to meet digital/tech skills needs; the impact of and employer responses to digital/tech skills shortages; recruitment channels used and effectiveness of these to recruit people from non-traditional backgrounds; and the importance of action to improve access to digital/tech jobs.

An online poll of 1979 working age adults (18+) in England (1798) and Scotland (181), undertaken in July 2024. Samples were boosted to include sufficient numbers of respondents in lower socio-economic groups and with lower levels of attainment (at Levels 1, 2 and 3) for a robust analysis. The poll explored levels of awareness of jobs requiring digital/tech skills; interest in and perceptions of the possibility of working in digital/tech; barriers to getting a job that requires digital/tech skills; and views on the effectiveness and benefits of different training programmes in developing digital/tech skills and supporting access to digital/tech jobs.

Qualitative interviews with a range of stakeholders across England and Scotland. The interviews lasted between 45 minutes and an hour and were undertaken between July and September 2024. These included:

- 17 provider interviews (t:20) including Further Education, non-profit sector and independent training providers (ITPs). Interviews focused on the type of digital/tech skills training programmes offered;

⁴³ Skills Development Scotland (2023) [Digital Economy Skills Action Plan](#).

⁴⁴ Scottish Government (2023) <https://www.gov.scot/publications/fit-future-developing-post-school-learning-system-fuel-economic-transformation/>

approaches to recruitment including importance of and any specific approaches for non-traditional groups; design and delivery features of programmes identified as effective for these groups; and plans to develop their digital/tech skills training offer.

- 10 employer interviews (t:16) including a mix of tech/non tech sector, SMEs and larger employers. Typically, interviews were with staff with overall responsibility for recruitment. Interviews focused on employers' digital/tech skills needs; approaches to recruiting for digital/tech roles; views on the effectiveness of different digital/tech skills training programmes in meeting their skills needs and bringing people from diverse/non-traditional groups into the business.
- 13 interviews (t:12) with policy makers, commissioners and wider strategic level stakeholders⁴⁵ across a range of government policy leads, provider bodies, skills agencies, and combined authorities in England. Interviews focused on views on current and future digital skills challenges at a UK, national and regional level; perspectives on policy priorities to improve digital skills and address the digital skills gap; and perspectives on the effectiveness of different digital skills training programmes/pathways in developing the skills needed to meet current and future employer needs and in driving social mobility.

⁴⁵ Referred to as 'policy stakeholders' throughout the remainder of the report

2.

What does the digital skills gap look like?

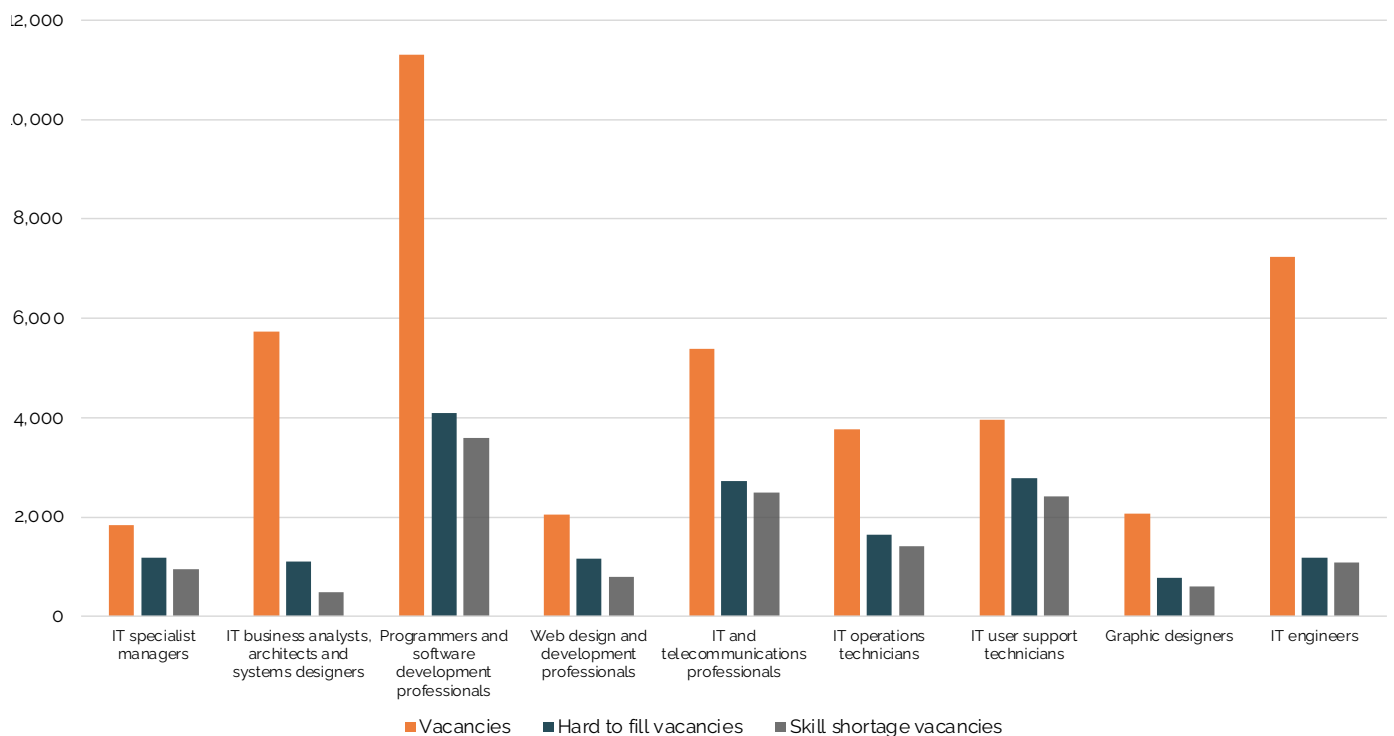
Key digital skills gaps

Our employer poll showed that half of employers (49%) report being unable to recruit workers with the digital/tech skills that they need. Digital and tech skills shortages are a particular concern given the growing number of roles businesses have that require digital and tech expertise. In the employer poll, for example, nine in ten (89%) employers reported that more of their roles will require employees to have digital and tech skills in the future.

Secondary analysis of Employer Skills Survey data highlights where skills shortages are most significant and shows that in the UK, the tech occupation with the highest number of vacancies in 2022 (latest available data) was programming and software development, with 11,300 vacancies in these roles.⁴⁶ This was followed by IT engineers - 7,200 vacancies, IT business analysts, architects, and systems designers - 5,700, IT and telecommunications professionals - 5,400 and IT user support technicians - 4,000.

Using the occupational definition of tech jobs adopted for this research (see section on methodology in Chapter 1) the total number of vacancies in 2022 was 42,367. This compares to a total of 1,495,000 vacancies across all occupations in the UK (of which, approximately 1,260,000 were in England and 116,000 in Scotland).

Figure 1: Number of vacancies, hard to fill vacancies and skills shortage vacancies in the UK by tech occupation, 2022



Of the 850,000 roles defined as 'hard to fill vacancies'⁴⁷ in 2022 across the UK labour market, 16,683 were in tech jobs.

Figure 1 shows that the highest number of hard to fill vacancies in tech occupations was for programmers and software development professionals with 4,100, followed by IT support technicians with 2,800, and IT and telecommunications professionals with 2,700.

⁴⁶ Department for Education (2022) [Employer Skills Survey](#). Figures are rounded to the nearest hundred.
⁴⁷ Defined as 'vacancies that employers struggle to fill' [Employer skills survey 2022 research report \(publishing.service.gov.uk\)](#)

Some tech jobs have a substantially higher proportion of hard to fill vacancies than others. The hard to fill vacancy density⁴⁸ in the UK, for all occupations is 58%. Despite a relatively low number of vacancies for IT specialist managers, these are one of the hardest vacancies to fill (64%). This is similar for web design and development professionals (57%). IT user support technicians have both a high overall number of vacancies, and a high proportion that are hard to fill (70%).

Of 531,200 skills shortage vacancies⁴⁹ across the UK labour market, 13,855 were in tech jobs. The highest number of skills shortage vacancies in tech occupations were for programmers and software development professionals, with 3,600 skills shortage vacancies in the UK, followed by 2500 IT and telecommunications vacancies and 2400 IT user support technician vacancies, and 1400 IT operations technician vacancies. Additionally, there were 1,100 skills shortage vacancies for IT engineers, 900 for IT specialist managers, and 800 for web design and development professionals.

Taken together, the data shows a clear need to address digital skills shortages, with half of employers unable to recruit sufficient workers with relevant digital/tech skills and over 40,000 vacancies in tech occupations. There are also particular skills shortages in specific occupations, such as programmers and software development professionals (in total number) and IT specialist managers (as a proportion of vacancies).

Key insights into digital skills shortages

In the qualitative research, employers suggested that recruitment challenges are driven by skills shortages in the UK labour market. These were felt to be particularly pronounced at more advanced levels.

Employers reported facing digital skills shortages at all levels and across functions, from front-end functions such as tech support and IT helpdesk roles, to those requiring more advanced technical skillsets. At the senior level, some employers reported difficulty filling vacancies and retaining staff in advanced technical functions including software engineering and infrastructure architecture.

Policy stakeholders also identified the challenge for employers as mainly higher up, in mid to senior level roles e.g. system architects, and leadership and management roles (Level 4+), which were described as a big step up. They reflected that some SMEs in particular, are struggling to manage change within their organisation and lack understanding of what their skills gaps are and what training they need for their staff.

'It's more about upskilling leaders within organisations to understand and act on digital transformation as well as...technical roles. And it's also about higher level skills.'

(Regional policy stakeholder)

Less well developed progression pathways and qualification structures in the digital/tech sector, compared to other more established careers e.g. financial services, was one factor seen by policy stakeholders as potentially impacting on ability to fill vacancies in higher level positions. The covid pandemic and associated shift to home working saw a big increase in demand across the UK, and globally, for digital roles such as IT technicians and e-commerce related jobs such as website design, software development and cyber security. Policy stakeholders described how, emerging from this period and with advances in AI technology, demand for these types of roles has been in decline. A stakeholder from one combined authority, for example, explained how, since 2023, while employers still need these roles, they have also been looking for different types of skills.

'...the advice, what was it, 10 years ago, was go and learn to code, go and learn how to write software and you'll be in with a job for life, kind of thing. Whereas now we've got tools that can do that for us much quicker. You're better off learning to write good AI problems these days because it can write software quicker and better than you can.'

(Regional policy stakeholder)

Feedback from stakeholders in combined authorities indicates that there are high levels of vacancies in the digital and tech sector, particularly at entry level, above the average for many other sectors.

⁴⁸ Calculated as the number of hard to fill vacancies as a proportion of total vacancies

⁴⁹ Defined as 'a specific type of hard-to-fill vacancy that occurs when an employer cannot find applicants with the required skills, qualification, or experience to do a job' [Employer skills survey 2022 research report \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/103112/employer_skills_survey_2022_research_report.pdf)

Impact/challenges of digital skills shortages

The employer poll and qualitative fieldwork highlight that employers face significant operating challenges. In the poll, the impacts most frequently cited by employers who have been unable to recruit workers with adequate digital/tech skills included increasing workloads for other staff (48%); delays in developing new products or services (33%); increasing operating costs (32%); the need to outsource work (30%) and difficulties introducing technological change (28%).

Across the qualitative research, stakeholders discussed the rapid rate of change in the technology sector, through the introduction of emerging technologies, new digital tools and programming languages which drive changing skills needs. As a result, employers are challenged to keep pace with their competitors. Given this rate of change, there is a shortage of individuals with the necessary skillsets and knowledge. Those with expertise in advanced digital skills are very sought after and so command high salaries. Several employers explained that they struggle to match these salary expectations and so regularly lose out on talent to competitors or face high levels of staff churn.

This sentiment was echoed by policy stakeholders, who emphasised the high level of staff turnover in digital/tech roles due to the level of competition. They explained that the risk that staff may move on to roles with competitors disincentivises employers from investing in staff training and upskilling.

'It takes time to develop people into management positions and leadership positions. And, if you're moving people into those positions you're losing out, effectively, on productivity... because it's such a fast growing sector the prevailing wind seems to just be that, oh we'll just kind of hire someone in who's done this type of project before and get someone who's a little bit more senior. So, that creates a great market for those people so they can, pretty much, hop between businesses every couple of years if they need to...'

(Regional policy stakeholder)

While there are external training opportunities that can help to close knowledge gaps in more 'niche' advanced areas of technology, some employers felt that these were prohibitively expensive. For example, one employer reflected that for staff to develop the skills needed to work in senior cyber security roles they need to undertake a multi-year degree apprenticeship, which they see as too great a financial commitment for a small business. They suggested that shorter training opportunities are of greater benefit, and likely more affordable. Qualitative evidence suggests that there are regional disparities in training opportunities, which may explain why this employer was not aware of any shorter cyber security training locally.

Employers also reported that it had become increasingly difficult to fill vacancies for junior roles. As with senior positions, they felt that there had been an inflation in salary expectations in recent years, even for candidates with little to no experience. One business also reported that applicants to junior roles, often with the help of recruitment agencies, are upselling their experience and skill levels.

'The problem is the candidates coming through have previously done some work elsewhere, they don't have huge amounts of experience in the industry but their expectations on salary are far higher. Not just their expectations on salary, their expectations on...how experienced but how knowledgeable they are is not in alignment with reality.'

(SME employer)

'We rely heavily on LinkedIn and Indeed job boards, and the number of people that apply wanting to get into tech with no skills or expectations, [thinking] that they'll apply and we'll just pay for them to do a degree or stick them on a third-party training scheme for 6 months is just unfeasible for a company of our size.'

(SME employer)

To combat this issue, employers have had to invest more time and resources into recruitment. They also reported that they have stopped using recruitment agencies who tend to take a large proportion of first year salaries as commission. This problem is particularly challenging for smaller employers. Where larger businesses

may have HR teams dedicated to recruitment and recruiting strategy, smaller employers rely on employees who juggle multiple roles within the business e.g., managers with IT roles performing recruitment duties. This hiring challenge is therefore like to impact the business' productivity.

Approaches to tackling digital skills shortages

In interviews, employers explained that they utilise a range of recruitment approaches to fill digital skills gaps. All employers have had to adapt their approach to recruitment in response to market-driven hiring challenges including skills shortages and salary inflation. For example, they have explored new approaches to hiring junior staff, altered their application processes, invested in training and development for existing staff or increased staff benefits to make their offers more competitive.

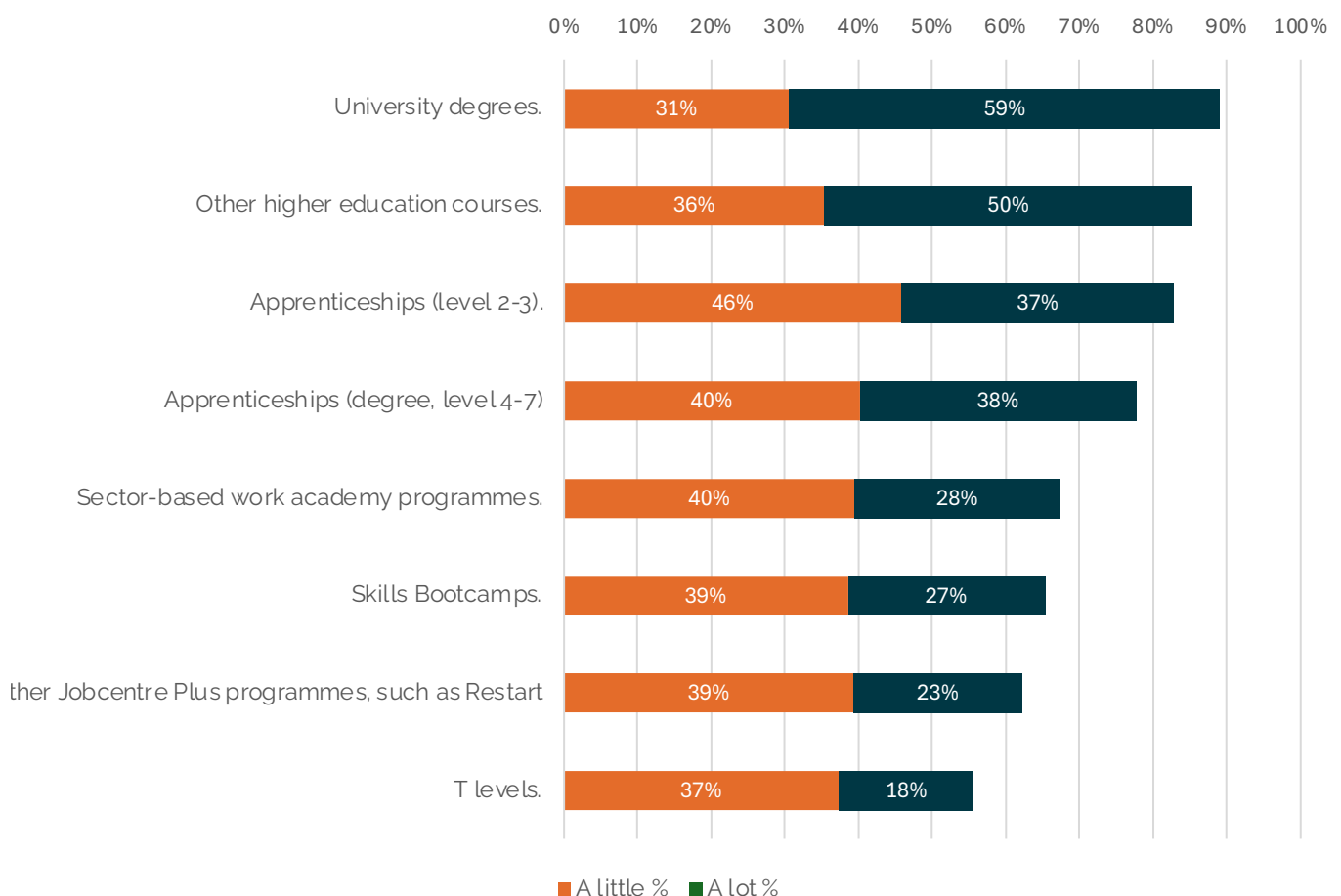
Recruitment

Half of employers in the poll (50%) have responded to digital/tech skills shortages by recruiting new workers with the necessary skillsets to meet their needs. Employers typically hire into advanced digital and technology roles through traditional routes, for example, by using job postings through LinkedIn or online job boards to recruit experienced staff. Smaller employers in particular favour these hiring routes, because they typically fill vacancies with people who already have experience in digital/tech roles. They explained that they need staff who are capable of adding value as soon as they start on the job, and that they have less funding available to invest in the development of inexperienced candidates.

'We're still relatively small and typically when we're hiring, we're often hiring for somebody to come in and land and do the job now.'

(SME employer)

Figure 2: Extent to which organisations included in the business poll used different training programmes to recruit to digital/tech jobs



Source: Employer poll

A large proportion of people hired to tech roles are university graduates; the secondary data analysis shows that workers in tech occupations are substantially more likely to be graduates or have an equivalent qualification (67%) compared to those in non-tech occupations (41%)⁵⁰. This is supported by the employer poll (Figure 2) which found that the majority of employers (59%) recruited 'a lot' of employees who had university degrees. The interviews highlighted that at a junior level, graduates were either employed directly, with or without previous experience, hired through internships or were recruited on to graduate development programmes in the case of several larger employers.

Despite the predominance of graduate recruitment, employers said they have explored a wider range of recruitment approaches in recent years in response to evolving skills needs and salary inflation.

In the business poll, three in four employers (74%) agreed that recruiting people from non-traditional routes i.e. non degrees, is an effective way to address skills gaps in their organisations. In the poll, a large proportion of both SME and large businesses had used apprenticeships at 'Level 2-3', with 37% reporting that they use them 'a lot', while 46% reported that they use them 'a little'. During the qualitative research, several small employers reported increasing their use of Level 3 apprenticeships.

In general, employers were very positive about apprenticeships. They explained that while the quality of apprenticeships varied by provider, they had established long standing relationships with providers they trusted.

'We used to run two apprentices on an annual basis and we're now doing four. We have a staggered apprenticeship now and we're going to maintain that because it is the best source of people for us.'
(SME employer)

Some employers reported using Digital Skills Bootcamps to recruit staff. For example, in the employer poll one in four (27%) employers reported using Skills Bootcamps 'a lot' to fill digital/technology roles, rising to more than a third (36%) of employers in the digital/tech sector specifically.

In the interviews, employers who had utilised this recruitment pathway, identified several benefits to employing Skill Bootcamps participants to meet their digital skills needs. Employers valued the focus on specific skills, such as particular coding languages, or functions, like data engineering or software development, and the responsiveness of training content to sector skills demands.

'[Skills Bootcamps] are driven purely by the correct demand. Whereas by the time an apprenticeship gets signed off, it's probably 2 years after someone asked for that demand, and it might have moved on.'
(Large employer)

In general, larger employers utilised a wider range of recruitment approaches than smaller employers. Larger employers were able to dedicate more resource to their recruitment and training strategies. Smaller employers on the other hand, were less likely to have specialised staff focussed on exploring and implementing new hiring approaches. There was also a sense that smaller employers had less awareness of the range of options available to them. For example, one small IT business of 40 employees who took part in an interview, was not aware of Skills Bootcamps or T Levels as potential hiring options.

'We're not a massive company, so we don't know all of the options out there and have no HR or recruitment specialists internally, so getting that information is also hard, to be perfectly honest...the T Levels are the perfect example, we only know this because, through a mutual acquaintance, we work with a local college.'
(SME employer)

Lack of awareness of the full range of options for recruiting staff into digital and tech roles (particularly among SMEs) limits the potential talent pool open to employers. Given that the majority of UK employers are SMEs, this is likely to play an important role in ongoing digital and tech skills shortages. It is also likely to have implications for increasing the diversity of people employed in digital and tech roles.

⁵⁰ L&W analysis of Quarterly Labour Force Survey, pooled 2023 datasets

Altering hiring approaches

Reflecting recent moves by employers across sectors towards skills-based hiring, several employers described how they include an assessment of candidates' broader skills set, to identify the people best suited to fill their digital skills vacancies. This allows consideration of more diverse candidates, without degrees or specific technical qualifications. This was seen as particularly important, given the rapidly changing skills needs in the tech sector. One employer for example emphasised that when hiring for permanent junior positions they focussed on candidates' transferable skills, understanding of key technology principles, and willingness to develop new skills. They explained that discrete technical skills and knowledge alone were insufficient, given the rate at which existing software and digital tools fall out of use. Similarly, at junior levels other employers explained that they assessed candidates' problem-solving skills, core competencies and motivation for working in the sector rather than experience.

'An issue is... the pace of change in technology and making sure that whoever we do employ, as well as our current employees, are happy to continually reskill and have a thirst for learning in the digital market. And because the skills are changing so much, we're putting less and less stock on what their previous digital skills experience is at a lower level.'

(Large employer)

Policy stakeholders, working directly with employers, reported that many businesses that they work with in the digital/tech sector are acutely aware of the skills shortages that they, and the UK more broadly, face and understand that recruiting inclusively will help to widen their talent pool.

'I think, because there's been lots of talent shortages around technology, employers are thinking differently.'

(National policy stakeholder – Scotland)

Their perception is that employer resistance to taking steps to diversify recruitment is often related to the financial investment and staff resources involved. For example, a thorough review of end-to-end recruitment processes and training for staff on changes introduced to recruitment policy and practice can be time-consuming and costly. Providing support for people from more disadvantaged backgrounds can also potentially incur higher costs, for example, they may need more support throughout the application process, including support with travel costs to get to an interview and more 1-1 support e.g. supervision and mentoring, during the early stages of employment. As a result, even though the long-term benefits of inclusivity, including financial benefits, are real and recognised, for SMEs in particular, restrictions on spending can be a barrier.

Upskilling existing staff

Many employers have looked to their existing workforces to meet their digital/tech skills needs. A majority of employers polled (62%) reported that they have provided on-the-job training in digital/tech skills to existing employees, and a smaller proportion (37%) reported that they had provided off-site training. Interviews with employers provided more details on these approaches. Some employers reported moving employees into tech roles from other functions in the business or investing in training and development to bridge the gap between junior, mid-level and senior employees.

While they explained that they provide ample training opportunities internally, some were also willing to fund external training. A provider explained that industry certifications, which are modular and bite-sized, offered by companies including Microsoft, Oracle and Cisco were a key part of their provision and were primarily paid for by employers upskilling their staff. As the salary expectation of candidates for experienced roles has risen in line with industry demand for their advanced technical skillsets, upskilling offers a more affordable alternative to fill digital skills gaps.

'In many instances, what we find is that people from within the company get into these types of roles through internal development. People may have come into a completely different role but have an interest in data science for example. They're then able to upskill through the training that we offer and that type of thing.'

(Large employer)

Upskilling is seen as beneficial as there is less risk attached to existing staff. Employers said they can feel confident that current employees have the necessary work ethic and that they understand the company's values. They are also capable of adding value to the organisation straight away, without the need for lengthy onboarding.

Employer approaches to reaching non-traditional groups

There was a consensus among employers that there is a lack of diversity in digital/tech roles. Specifically, employers highlighted a lack of gender diversity in their own organisations and in the sector, where there is said to be an average ratio of around 70:30 male to female employees⁵¹. Several employers also recognised a lack of ethnic diversity in their organisation. While they sense that there is greater diversity at junior compared to senior levels it is recognised that opportunities for progression at all levels are important in creating a more diverse workforce and addressing skills gaps at senior levels. For example, larger employers explained that they had no difficulty attracting candidates from ethnic minority backgrounds to their graduate schemes and early careers programmes.

While all employers saw the value in recruiting from a wider talent pool, this tended to be more of a focus for larger employers who have more resources and funding available to invest in diverse recruitment. For example, access to HR teams who can explore options and design recruitment strategies targeting specific groups through outreach activities. For smaller businesses taking part in the research, the focus is often on recruiting candidates who have the experience to start working immediately, given their limited resources for training and development, and the need to ensure that new staff are fully productive from day one of their employment.

Additional barriers to digital/tech for learners from non-traditional groups

Evidence from L&W's annual participation in learning survey shows that adults in lower socio-economic groups are twice as likely to not have participated in learning since leaving full time education, compared to those in higher socio-economic groups.⁵²

In addition to the negative impact of wider barriers impacting on diverse engagement with digital/skills training, all types of stakeholders in the qualitative research, suggested that key barriers to employment of people from non-traditional groups in the technology sector include a lack of awareness of the opportunities available and a sense that these opportunities aren't suitable for them.

This is supported by polling data (Figure 3) which showed that people in higher socio-economic groups, in work, and with a Level 4 qualification or above were significantly more likely to report being aware of jobs that require digital/tech skills than those from lower socio-economic groups, not working or with lower levels of attainment. More than three quarters of adults in higher social groups (76%) were aware of these jobs compared to 59% of adults in lower socio-economic groups.

⁵¹ [Female Roles Continue To Thrive In The UK Tech Sector - Prowess](#)

⁵² [Adult Participation in Learning Survey 2023 - Learning and Work Institute](#)

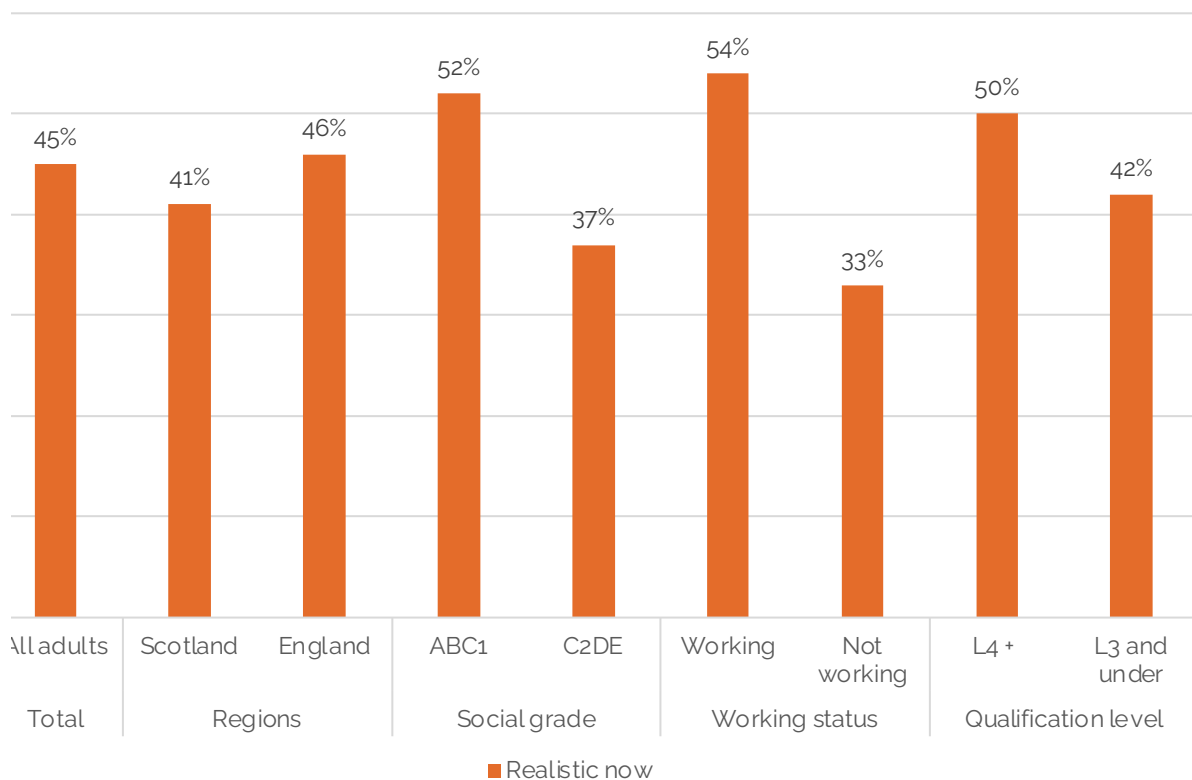
Figure 3: The proportion of people who are either very aware or quite aware of jobs that require specific digital/tech skills



Source: Poll of working age adults

Similarly, adults from higher socio-economic groups and higher levels of attainment were more likely to say that jobs requiring digital/tech skills are a realistic option for them (Figure 4). More than half of adults in higher social groups (52%) said this is a realistic option now compared to 37% of adults in lower socio-economic groups.

Figure 4: Extent to which people perceive jobs that require specific digital/tech skills to be a realistic option



Source: Poll of working age adults

This highlights the need to improve awareness and break down barriers so that digital and tech roles are seen as 'for people like me' for people from a wide range of backgrounds. To tackle this challenge to engagement, several employers explained that they run outreach activities targeted at groups that are underrepresented in the sector to encourage them to consider careers in technology. One employer explained that they are involved

in various initiatives designed to engage women in the sector. For example, they contribute to a website set up through the *Women in Tech* initiative, where they share employment opportunities and case studies of female employees to inspire future professionals.

Overcoming challenges to recruiting from non-traditional groups

Employers were asked about their role in improving access to digital/tech jobs for people from more diverse and disadvantaged backgrounds. Responses often focussed on increasing the flexibility of the apprenticeship levy. Many employers said that they consider apprenticeships to be too 'rigid' to meet their staffing needs and that this is a key reason why they do not access levy funding. Employers reflected that there are high costs associated with investing in the development of inexperienced staff and that this is a significant barrier to recruiting people from disadvantaged backgrounds, who were felt to need a greater level of support to develop the necessary digital/tech skills and experience. It was suggested that introducing flexibility to the apprenticeship levy to allow it to be spent on alternative training programmes or development of existing junior staff would encourage a wider range of employers to recruit people with less experience or those who do not have higher level qualifications such as degrees.

'Smaller companies like ourselves don't have the appetite for or the ability to pay [for training], so that leaves a gap at the bottom end, and we are basically left with what people know or what we can train internally, or having to recruit someone who's already got skills...which isn't an education piece.'
(SME employer)

There was also felt to be insufficient information for smaller employers on how best to design training and development for employees from non-traditional backgrounds. SMEs involved in the research explained that they did not have learning and development teams so lacked expertise in this area. For example, one employer explained that it would be helpful to learn how people from disadvantaged backgrounds could be provided with appropriate pastoral care in the first few months of their employment. In a similar vein, another employer suggested that there should be better promotion of the range of training and development opportunities available in the UK skills system. As a smaller organisation they said they didn't have the human resources to dedicate to exploring the range of hiring routes through which they could recruit people from more diverse and disadvantaged backgrounds.

'I bet there are plenty of other avenues for recruitment, you know...So, yes, something like, you know, published standards or published information on, 'Here are our suggestions on ways outside of the box, rather than just using a recruitment company or a website, here are some other options or avenues for recruitment.'
(SME employer)

While there are several opportunities to increase diversity through hiring, all stakeholders emphasised that the government needed to focus on the long-term pipeline of tech talent. They explained that to redress the lack of diversity in the technology sector, underrepresented groups, such as women and people from other disadvantaged groups, should be encouraged to consider technology as a viable career pathway in school.

Summary

The UK labour market is facing a shortage in digital/tech skills that is having a significant impact on productivity and growth. Polling data shows that half of employers struggle to recruit workers with the digital/tech skills that they need, and at the same time nine in ten employers say that more of their roles will require employees to have digital and tech skills in the future.

While employers report facing digital skills shortages at all levels, gaps are particularly pronounced at senior levels which often require more advanced technical skillsets. This is backed up by the secondary data analysis which shows that despite the relatively low number of overall vacancies, a high proportion of IT specialist manager vacancies are hard to fill – 64%.⁵³ There is also a significant gap in leadership and management roles,

⁵³ Department for Education, 2022. Employer Skills Survey

where the step up from more junior roles is considered challenging. Digital and tech skills shortages affect employers of all sizes, but often have a particular impact on SMEs. This is due to a range of factors including limited HR resources, lack of digital/tech staff capacity, and lack of understanding of what their skills gaps are and what training they need for their staff. To mitigate these challenges, some employers have invested in internal training and explored new approaches to recruitment. However, often, they stick to traditional advertising routes and tend to employ people with higher level qualifications, which means they are missing out on talented people from alternative skilling pathways and more diverse backgrounds.

Both the data analysis and qualitative insights highlight that employers typically recruit degree-educated candidates to digital and tech roles. The polling however, highlights that a large number of businesses use Level 3 apprenticeships to recruit staff to digital/tech roles. There are, however, several challenges that employers face to recruiting individuals from diverse and disadvantaged backgrounds. These include lack of awareness of the range of recruitment routes available to them, which is particularly low among small businesses, and the high costs of recruitment, training and development of employees from more diverse backgrounds.

3.

What works? Inclusive approaches for digital/tech training, skills and jobs

The analysis set out below draws on DfE data, polling data and qualitative insights to assess the success of different digital/tech skills training programmes, which offer an alternative to traditional Higher Education and degree programmes. While there is limited data available around how successful these programmes are at delivering positive outcomes, such as employment or progression into more advanced training, different stakeholders identified a range of benefits of current programmes in supporting people from disadvantaged groups.

Table 1 provides a summary of the different training programmes, including numbers of participants and the purpose, strengths and outcomes of each programme. The individual programmes and effectiveness in supporting diverse and disadvantaged groups into tech are discussed in more detail beneath the table.

Table 1: Digital skills training programmes

| Programme | Volume | Purpose | Key outcomes | Key strengths |
|-----------------|--|--|--|--|
| Degrees | 33,500 starts on ICT and Computer Science undergraduate courses in 2022/23 | Supports participants to develop the digital/tech skills and knowledge to enter full-time entry level roles in the sector, for example, on graduate programmes. | Graduates are favoured by digital/tech employers, so likely to progress into full time digital/tech roles - 67% of tech employees are educated to degree-level | Highly regarded by the digital/tech industry and perceived to be more intellectually rigorous than other provision. |
| Apprenticeships | Drop off in apprenticeships starts - total number of starts in 2023/24 at 86% of their peak level in 2018/19 but upward trend in ICT apprenticeships. 25,100 ICT apprenticeship starts in 2022/23 | Mainly at Level 3 to provide skills for entry level roles But increased use for upskilling for existing staff rather than as entry routes. Reflected in growing number of enrolments in ICT apprenticeships at Level 4 Increasing numbers of students choosing higher level apprenticeships as an alternative route to university. | On apprenticeship completion, participants are likely to progress into full time digital/tech roles. 56% achievement rate of participants on ICT apprenticeships in 2022/23 | Apprenticeship brand remains prestigious. Employers, particularly larger employers value the type of qualification they offer but see them as a longer- term commitment and not as flexible to changing employer needs Can be good route into the sector providing experience and skills development, in a job – although lack of pathways for learners at lower starting points (with lower level attainment, less experience) Learners value the combination of learning whilst working. |

| | | | | |
|--|--|--|--|---|
| Skills Bootcamps | Rapid increase in volumes since 2018/19, up to 40,040 starts in 2022/23 across all sectors Digital Skills Bootcamps are largest by sector, representing three fifths (61%) of all Bootcamp starts - 22,610 starts on Digital Bootcamps in 2022/23 | Short block of training to meet identified skills needs. Bootcamps fully funded through DfE primarily aimed at career changers and people currently in a tech role looking to develop new skills/to progress within an existing role/career Bootcamps providers also drawing on funding from employers and charitable sources and specifically targeting disadvantaged groups, support people facing barriers to employment/further from the labour market into entry level digital jobs Private pay bootcamps eg General Assembly, aimed at people looking for a new career in tech or upskilling in an existing job | Limited published data on outcomes Evaluation data shows 44% of participants across all types of providers achieved a positive employment-related outcome in 2021-22 | Short term and flexible, offering rapid upskilling or reskilling to progress into jobs at Level 3+ Benefits to employers – responsive to changing skills needs. Employers are able to recruit staff quickly with the skills needed. Particularly important within a fast paced sector with emerging technologies. Bootcamp model delivered by providers specifically targeting disadvantaged groups/ with barriers to employment provides the more intensive 1-1 wraparound support needed to support positive outcomes for diverse and disadvantaged participants. Prepare people well in specific skills/for specific roles but disadvantaged groups not able to compete with those with more experience Learners value programmes that are short term/modular, in particular the greater flexibility |
| Further Education ICT training | 88,900 people completed FE ICT provision (excluding apprenticeships) in 2022/23 | Mainly at lower levels – Entry Level/Level 1 so often the focus is on essential digital skills and act as a stepping stone to further training/courses rather than being a direct route into employment. | A positive outcome is typically progression on to a more advanced training programme. | Effective in reaching people that are underrepresented in digital/tech occupations - uptake is highest in the most deprived areas Participation is more diverse – greater gender parity and ethnic diversity |
| Sector-based Work Academy Programmes (SWAPs) | 98,710 participants on SWAPs overall in 2023/24 Low volumes in ICT – 1,730 in IT & Communications sector SWAPs | Specifically targeted at people out of work, through direct referral from JCP. Designed to support people on unemployment benefits into work through training, a work placement and job application advice. | No outcomes data available. Limited evidence of participants moving directly into employment. Participants report other positive outcomes, including improved confidence around their own employability and achieving qualifications having completed the programmes. | As SWAPs target people on Universal Credit (UC) they attract a high proportion of participants facing barriers to employment. Good for addressing short term skills needs before entering the workforce, for people closer to the labour market |
| Other charity programmes | Data not available | Non-profit organisations focused on supporting specific groups facing barriers to employment to gain the skills needed for a job in the tech sector | Data not available | Successful in engaging with and tailoring programmes to meet the specific needs of groups from diverse and disadvantaged backgrounds |
| T-Levels | 7,380 completions in 2023/4 Low volumes in ICT – 1,300 completions on digital T-Level courses | Post-16 technical qualifications offered in schools and colleges as an alternative to A-Levels. A progression route into more advanced training, such as, an apprenticeship or a degree. | Relatively recent initiative so too early to clearly understand outcomes A positive outcome is likely to be progression on to a more advanced training programme - | Good introduction to the digital / tech sector, particularly for young people (16+). Offers hands on practical experience at entry-level, through work placements and sector-specific project work, although securing placements is a challenge |

Further Education (FE) ICT provision in England

In the last full year for which data is available (the 2022/23 academic year), a total of 88,900 people completed an ICT course or programme at an FE institution (excluding apprenticeships).⁵⁴ This includes courses such as ICT Level 1 Functional Skills and Information and Creative Technology BTEC Level 2. This represents a decline in completion by 9% since 2020/21.

The data highlights that this type of provision tends to be weighted towards lower levels, with over half of ICT FE provision at Entry level or Level 1 (52%), while a quarter is at Level 2 (23%) and another quarter at Level 3 (24%). A small proportion of ICT completions were at Level 4 or higher (130). These findings suggest that FE provision in ICT can be seen as an opportunity to develop core digital skills and as an introduction to the sector. Rather than preparing learners for specific roles that require advanced digital skills, these courses are likely to be a stepping stone on to more advanced or specialised training or courses focused on basic IT skills for life and work, rather than progression to a role in digital/tech. Therefore, the decline in completions since 2020/21 is concerning as it suggests that fewer people are developing the foundation skills and qualifications that provide a pathway to opportunities, such as apprenticeships and Skills Bootcamps, which are typically at Level 3 or 4.

Compared to other training programmes, participation in FE ICT provision is more diverse. For example, in terms of ethnic diversity, a high proportion of those who completed courses in the 2022/23 academic year are from Asian/Asian British (22%) or black (16%) backgrounds, while half are white (50%). The proportions of Asian/Asian British and black learners in FE ICT are higher than those in tech occupations, of which 14% are Asian, 3% are black and 79% white.

Broadly, there is also greater gender parity in FE ICT participation than across most other digital/tech training. In the 2022/23 academic year, 45% of those completing courses are female and 55% male. However, the data highlights that the proportion of women is lower at higher levels, for example, 15% of those who completed Level 3 ICT courses in 2022/23 were women and 85% were men. By contrast, the proportion of women (61%) was considerably higher than that of men (39%) at Entry-level and Level 1.

The data also shows that uptake in FE provided ICT provision (excluding apprenticeships) is highest in the most deprived areas. This is true at all levels. For example, 12,410 people who completed Level 3 courses lived in the most deprived Lower layer Super Output Areas (LSOAs)⁵⁵, compared to 8,650 who lived in LSOAs within the three least deprived categories.

In summary, FE ICT provision is more effective than most other types of training at reaching people that are underrepresented in digital/tech occupations, suggesting that there are fewer barriers to entry. For example, these courses tend to have lower educational entry requirements and are often fully funded for learners. While this provision is successful at targeting people from disadvantaged groups, there is some evidence that it is less likely to result in immediate employment outcomes as courses are often a stepping stone on to more advanced or specialised training or equip people with essential digital skills rather than being a direct pathway into a job in tech.

Apprenticeships

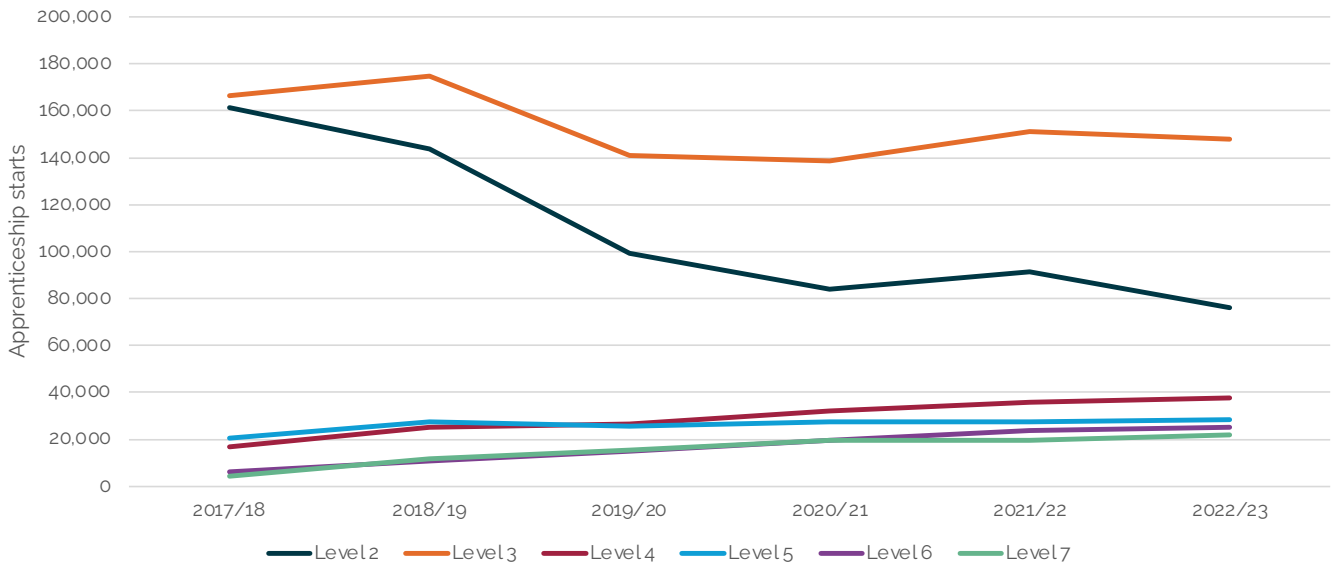
The number of apprenticeship starts across all sectors dropped sharply after 2018/19 (Figure 5). Although they have recovered slightly, the total number of starts in 2023/24 were still only at 86% of their peak level in 2018/19.⁵⁶ It is not possible to isolate new entrants to the labour market in the published data; however, the growth in starts at level 4, alongside the decline in starts among young people, suggests an increased use of apprenticeships for upskilling rather than as entry routes. For example, in 2022/23 (the latest detailed full year data) 37% of apprentices had been with their employer for more than a year prior to starting their apprenticeship. Full year data for 2023-24 is not yet available by sector, but overall data on apprenticeships shows 70,000 apprenticeship starts at Level 2, 146,100 at Level 3 and 121,660 starts at Level 4+.

⁵⁴ Comparable data on FE provision in Scotland was not available.

⁵⁵ According to the Index of Multiple Deprivation

⁵⁶ Although comparable data for Scotland is not available, figures show that there was not an equivalent drop for apprenticeships in Scotland, with 2022/23 starts (26,543) at 97% of the 2017/18 level (27,423).

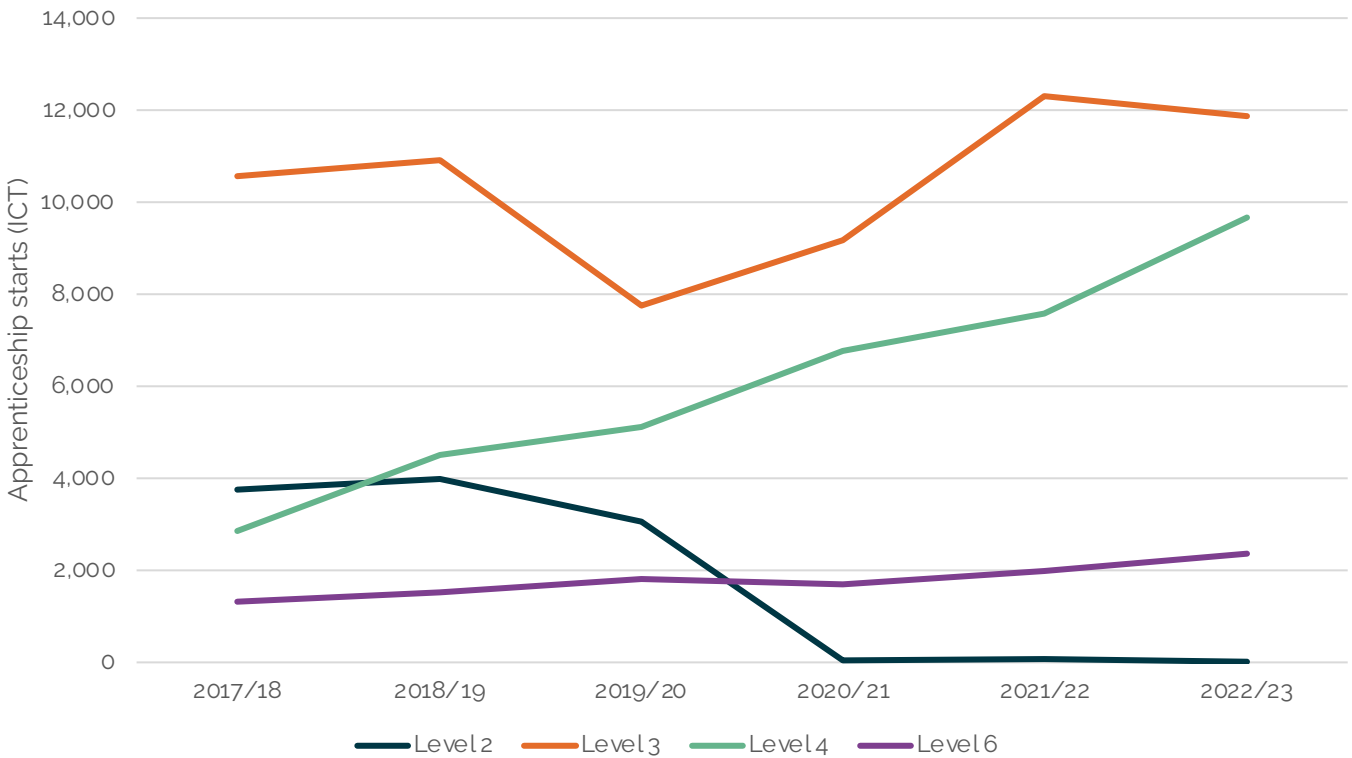
Figure 5: Apprenticeship starts up to 2022-23 academic year



Source: Department for Education (2023)⁵⁷

Despite the overall decline there has been an upward trend in ICT apprenticeship starts. In the 2022/23 academic year, 25,100 people started on ICT apprenticeships (Figure 6), 19% higher than in 2018/19, and representing 7.4% of apprenticeship starts compared to 5.4% in 2018/19.⁵⁸ Data for the first nine months of 2023/24 suggests a continuing increase, with ICT starts 5.2% higher than the equivalent point of 2022/23; although full-year data will be required to confirm this. Data for the first nine months of 2023/24 suggests a continuing increase, with ICT starts 5.2% higher than the equivalent point of 2022/23; although full-year data will be required to confirm this.

Figure 6: ICT Apprenticeship starts up to 2022-23 academic year



Source: Department for Education (2023)⁵⁹

57 Department for Education Further Education (FE) data for England 2022/23
 58 In 2022/23 IT and digital apprenticeships accounted for 13% (3572) of apprenticeships in Scotland
 59 Department for Education Further Education (FE) data for England 2022/23

The data shows that the increase in ICT apprenticeships has been driven largely by a growing number of enrolments at Level 4 which have increased by 5,520 from 2018/19 and now represent 39% of all apprenticeship starts in the sector. In interviews, several providers explained that they had seen an increase in the number of enrolments on higher level ICT and computer science apprenticeships by students who may otherwise have attended university. They explained that apprenticeships were increasingly considered a more affordable alternative, which gave participants the opportunity to earn while learning.

'Because it's a degree investment, there has been quite a switch of people applying for those that traditionally may not have done an apprenticeship, but are now seeing, 'Oh, I can get my degree paid for by an employer,' and, you know, be degree qualified but without the debt, because it's been covered by the employer in the levy funding. So, we are seeing a different type of candidate apply for that than previous would have [done].' (FE college)

Despite the growth in Level 4 apprenticeships, the largest proportion of ICT apprenticeships are at Level 3. As discussed in the previous chapter, there is some evidence from interviews that employers are increasingly looking to use Level 3 apprenticeships to address digital skills shortages.

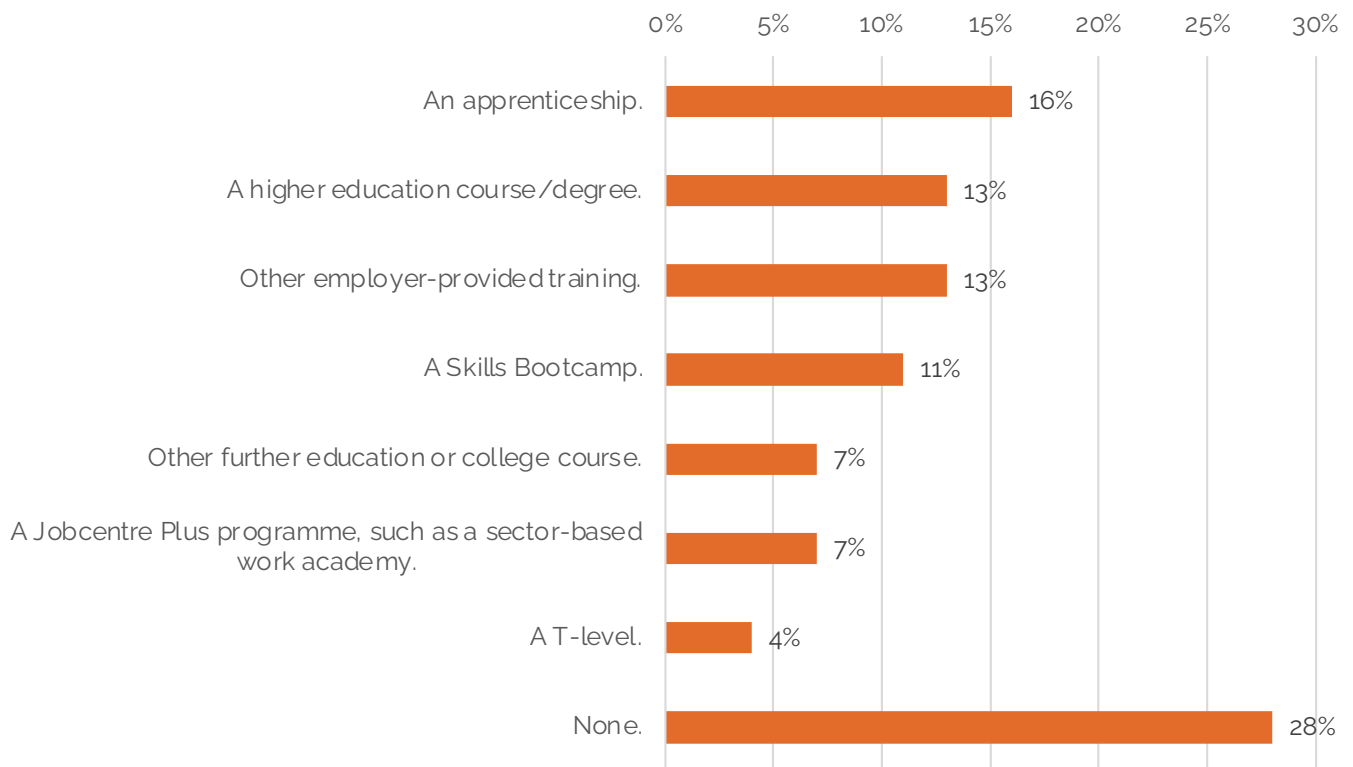
Analysis of secondary data shows that the achievement rate for ICT apprenticeships for 2022-23 was 55.9% which is just under the rate for wider STEM apprenticeships (57.6%) and slightly above the achievement rate for all apprenticeships (53.5%). In the interviews, several employers cited negative factors driving non-achievement, such as apprentices failing coursework, or lack of cooperation between training providers, employers or participants. In addition, previous research conducted by Learning and Work Institute⁶⁰ found that non-achievement on apprenticeships is driven by a range of reasons including participants who withdraw due to moving into other (non-apprenticeship) digital/tech roles, due to employers not releasing them for off the job training, because they don't value the apprenticeship or because they feel that they don't need to sit final assessments having gained adequate work experience

In interviews, both employers and providers viewed apprenticeships as a successful approach to supporting people to improve specific skills for digital/tech roles. This was in large part due to their structure, which blends classroom learning and on-the-job training, enabling apprentices to apply theory to practical scenarios.

This view was supported by polling data (Figure 8) which found that adults were more likely to think that apprenticeships would be most beneficial in improving their specific digital/tech skills (16%) compared to any other training programme. This was particularly the view of people without qualifications. In the poll, those with low or no qualifications were significantly more likely (18%) than those with Level 4 or above qualifications (13%) to say that apprenticeships would be the most beneficial programme to help them improve their specific digital/tech skills for employment.

⁶⁰ Learning and Work Institute and St. Martin's Group. (2022). *Apprenticeship Outcomes and Destinations*. <https://learningandwork.org.uk/resources/research-and-reports/apprenticeships-outcomes-report/>

Figure 7: Perceptions of different training programmes in helping adults to improve their digital skills for employment



Source: Poll of working age adults

Department for Education data highlights that apprenticeship uptake is relatively high among people from minority ethnic groups. In the 2022/23 academic year, 24% of those who started an ICT apprenticeship were from non-white ethnic minority groups. This is slightly higher than the proportion of those from these groups employed in the digital/tech occupations more broadly (21%) but is lower than the proportion enrolled in FE provision.

There is a significant disparity between men (67%) and women (33%) starting an ICT apprenticeship, which is consistent with gender representation in employment in digital/tech occupations. Findings from the interviews supported this, with most providers reporting that they struggled to attract women. Broadly, they felt that attitudinal barriers were the most significant factor, with some suggesting that women continue not to see the sector as suitable for them.

The secondary data also highlights that participation and achievement on ICT apprenticeships is lower in more deprived areas. For example, in the 2022/23 academic year, 17% of apprenticeship starts were recorded in the most deprived LSOAs⁶¹, while 24% were in the least deprived LSOAs. Similarly, 15% of apprenticeship achievements were recorded in the most deprived LSOAs, compared to 23% in the least deprived LSOAs. This was supported by qualitative evidence, with some combined authority stakeholders suggesting that apprenticeships are not working in some devolved areas as a mechanism to support people develop the skills needed to enter digital/tech jobs, and meet employer skills shortages.

A stakeholder from one combined authority (CA) expressed the view that apprenticeships do a good job, and would like to see more apprenticeship opportunities, but pointed to the significant drop in apprenticeship vacancies over the last 5 years. It was also noted that apprenticeships have become less attractive and viable for employers as a recruitment tool. One CA highlighted that the current apprenticeship system depends on the decisions of individual employers who will largely act in their own interests – as a result apprentices, are now older, on higher level qualifications and tend to be existing employees. This is supported by L&W research which shows that many large firms have focused their investment on their more experienced employees, with one in four apprentices at levy-paying firms aged over 25 and studying at higher education level.⁶²

⁶¹ According to the Index of Multiple Deprivation

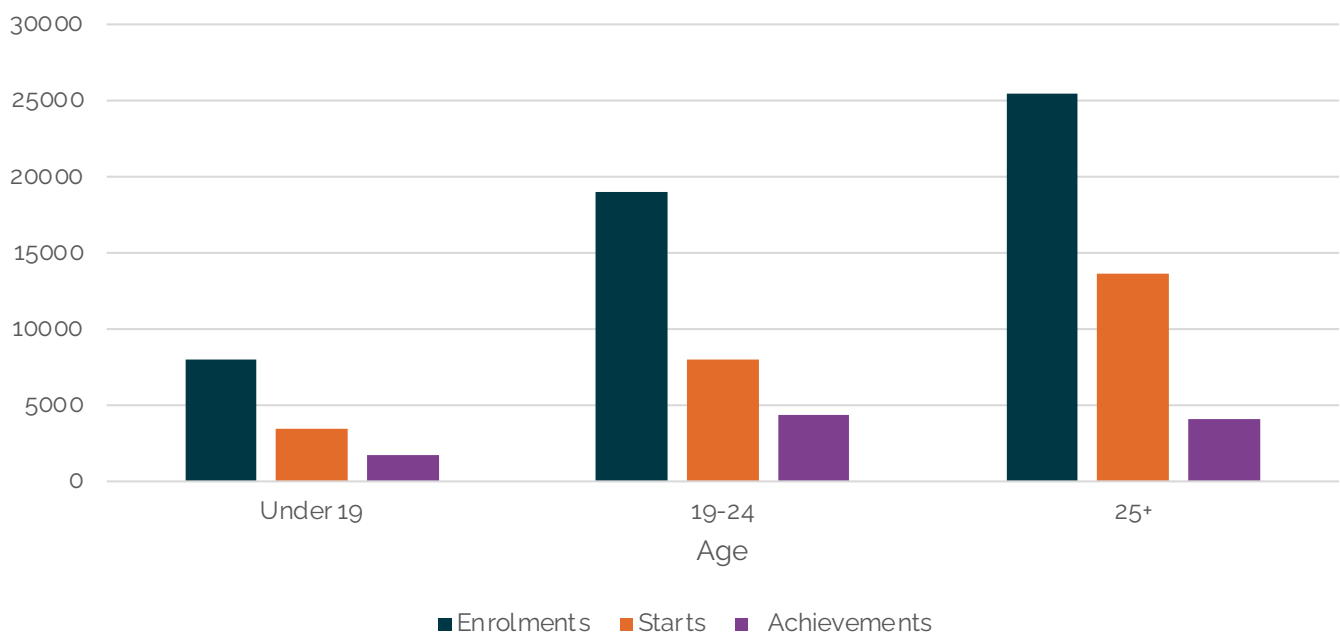
⁶² Learning and Work Institute and Timewise Foundation. (2018). *Exploring Models for part-time and flexible apprenticeships*. <https://learningandwork.org.uk/resources/research-and-reports/exploring-models-for-part-time-and-flexible-partnerships/>

This was echoed by other combined authorities. One described a huge drop in numbers, particularly for young people, in SMEs, and at lower levels, and in some of the key sectors important to their region including engineering and manufacturing.

This confirms findings from the L&W analysis, which highlighted the impacts of 'counterproductive' government reforms to funding resulting in apprenticeship numbers in England plummeting by 36% for young people and by more than a quarter in Tees Valley, Liverpool City Region and the West Midlands. The research also found that only one in two apprentices complete their studies, and that many employers say they are unable to access the training they need.⁶³

Secondary data analysis for this research shows that the majority of enrolments, starts, and achievements in apprenticeships were in the 25 and over age group, followed by the 19 to 24 age group, and then those under 19.⁶⁴

Figure 8: Participation and achievement in the ICT sector apprenticeships by age group, 2022-23



CA and wider policy stakeholders frequently identified inflexibility in responding to the rapid pace of change in the digital/tech sector as a limiting factor in the effectiveness of apprenticeships.

'If an apprenticeship standard was written four years ago how relevant is it to digital skills needs in today's workforce?'

(National policy stakeholder)

Effectiveness of apprenticeships in supporting people from non-traditional groups

In the polling, employers were more likely to agree with the statement that apprenticeships (83%) are effective in specifically enabling people from non-traditional backgrounds to progress into digital and tech jobs than they were in relation to any other type of digital skills training programme.

In the interviews, there were mixed views on this. For example, one 'policy stakeholder suggested that apprenticeships were a potential route to increase the diversity of the digital/tech workforce, provided recruitment processes are inclusive, and employers are set up to support people from underrepresented groups once in post.

However, the majority of digital/tech apprenticeships start at Level 3 and therefore require candidates to have previous qualifications, which was felt to be a barrier to some people using them as a route into digital/tech

⁶³ ibid

⁶⁴ [Apprenticeships and traineeships, Academic year 2022/23 - Explore education statistics - GOV.UK \(explore-education-statistics.service.gov.uk\)](https://www.gov.uk/explore-education-statistics)

jobs. For example, a combined authority stakeholder identified low levels of attainment in English and maths as a barrier to participation in apprenticeships for many young people. Consequently, policy stakeholders reflected that creating more effective digital skills training pathways into Level 3 is critical in improving opportunities for people from disadvantaged groups in digital/tech roles, for example, this could include pre-apprenticeship programmes or Level 2 ICT FE provision.

'There is an onus on us to think about this, what can the sector do? What can employers...do in the sector to create opportunities that bring young people in at level 2... something that the sector probably needs to think about more carefully, is if they're going to fill the vacancies that they've got and attract people to the sector, then they may have to...bring people in on level 2 and build up the skills to level 3.'

(National level policy stakeholder)

DfE data shows that there are currently a very small number of Level 2 ICT apprenticeships, with the majority offered at Level 3 and Level 4. Stakeholders advocated offering more Level 2 apprenticeships in ICT, with fewer barriers to entry, to attract more people from disadvantaged backgrounds to enter digital and tech careers.

'I would love to see way more apprenticeships at lower-level, entry-levels available... Increasingly, they are becoming the preserve of the already employed, because it's the easiest thing to do to create an apprenticeship scheme for your own employees at Level 4.'

(Regional stakeholder)

'I just think we're missing a Level 2 apprenticeship in the digital space, that would be more of an entry point for young people and be more of a starting role for SMEs.'

(Regional policy stakeholder)

Bootcamps

There is limited published data available on Digital Skills Bootcamps specifically, but data on DfE funded Bootcamps more widely shows that starts reached 40,040 in 2022/23.⁶⁵ This represents an increase from 18,110 in 2021/22 and 2,800 in 2020/21. Digital Skills Bootcamps are the largest by sector, representing three fifths (61%) of all Bootcamp starts in 2022-23. There were 22,610 starts on Digital Skills Bootcamps in 2022/23, compared to 36,596 applications.⁶⁶ The target number of Bootcamp starts in 2023/24 is 50,000;⁶⁷ this could equal over 30,000 Digital Skills Bootcamps starts if they continue to represent a similar proportion of the total.

The gender distribution of starts on Digital Skills Bootcamps was more equal than for all Bootcamps. In 2022/23 a total of 57% of starts were men and 42% were women, and uptake was relatively diverse – over half (51%) were from non-white ethnic minority groups. A total of 14% were from the most disadvantaged areas (IMD1) and 46% were not in employment. Approximately two-thirds (68%) of participants starting on Digital Skills Bootcamps held Level 4 or higher qualifications, and a third (32%) had a Level 3 or below qualification. The number of people starting Digital Bootcamps with Level 3 or below qualifications is in sharp contrast to other Skills Bootcamp types, where starts at Level 3 and below ranged from 71% on Green Bootcamps to 88% in Construction Bootcamps.⁶⁸ This suggests that Digital Bootcamps that are not targeted at people from diverse and disadvantaged backgrounds have been much less successful in reaching people from diverse participant groups,

There is limited published data on completion and outcomes achieved by Bootcamp participants. The latest available data that differentiates between types of Skills Bootcamps outcomes, from 2020/21, does not provide

⁶⁵ Data for skills bootcamps is on a financial year basis (April-March), whereas for FE and apprenticeships it is for the academic year (August to July)

⁶⁶ Department for Education. (2024). *Evaluation of Skills Bootcamps: 2022-23 (Wave 3) Implementation Report*. https://assets.publishing.service.gov.uk/media/66e9a3f824c4f1826d81bcbcd/Skills_Bootcamps_Wave_3_Implementation_Report.pdf Data is based on provider returns rather than Individualised Learner Records, and so may not include all participants.

⁶⁷ WhatDoTheyKnow. (2023). *Skills bootcamps number, spending and budgets - a Freedom of Information request to Department for Education*. https://www.whatdotheyknow.com/request/skills_bootcamps_number_spending

⁶⁸ Department for Education. (2024). *Evaluation of Skills Bootcamps: 2022-23 (Wave 3) Implementation Report*. [Evaluation of Skills Bootcamps: wave 3 implementation report - GOV.UK](https://assets.publishing.service.gov.uk/media/66e9a3f824c4f1826d81bcbcd/Skills_Bootcamps_Wave_3_Implementation_Report.pdf)

Data is based on provider returns rather than Individualised Learner Records, and so may not include all participants.

a sector breakdown. However, it does give some indication of the role that Bootcamps can play in terms of employment and the success of the model in delivering positive outcomes. Of the 2,800 Bootcamp participants in 2020/21 there were 2,210 completions. Around one fifth of participants (19%) found new employment (including full time, part time, temporary or an apprenticeship), 15% remained in their current employment with new or increased responsibilities, 6% became or continued to be self-employed with new opportunities and a further 4% gained a new role with their current employer. Though few people took part in Bootcamps in 2020/21 and so a small sample size, these findings highlight the type of candidates attracted to Bootcamps and their different employment motivations. Clearly, a large proportion of Bootcamps participants are already employed, and use them as a means to upskill in an existing role or to support a move to a new role.

Significantly, although evaluation data shows that a high proportion of people starting Bootcamps are already in employment and have degree level qualifications, for over half of participants (57%) in 2020-21, there was no outcome recorded or no change in employment.

Funding for Skills Bootcamps is drawn from a range of sources. While some programmes are fully funded by the Department for Education, others draw on funding from employers (typically for training existing employees) or from charitable sources (typically for programmes targeted at people from diverse and disadvantaged backgrounds, who face barriers to digital and tech employment). Published data on participation and outcomes does not disaggregate by how different Skills Bootcamps are funded.

One factor that can contribute to lower recorded outcomes, particularly for Bootcamps targeted specifically at people from diverse and disadvantaged groups, is the requirement for participants to provide evidence of both having a job interview and achieving a specific progression. Qualitative evidence from this research suggests that, although participants often progress to employment, it can be difficult for providers to source evidence of this, which affects their recorded outcomes and the funding they are able to claim.

In interviews, some stakeholders pointed to elements of DfE Bootcamps that they saw as successful in securing positive job outcomes for participants, including the requirement to offer participants a guaranteed interview on completion of their 12-16-week courses. Some employers who recruited through this pathway praised the focus of Bootcamps on equipping learners with a targeted specialised skillset focussed on a particular profession, e.g. cloud computing or digital help desk roles, which prepared them well for specific digital/tech roles in the sector.

In general, policy stakeholders also viewed the principle of shorter training courses, like Bootcamps, with content flexibly tailored to employers' needs, and a guaranteed interview, positively.

It was perceived that for some employers, apprenticeships, particularly degree apprenticeships are too long, requiring a large commitment. In contrast, shorter programmes such as Bootcamps provide a short block of training to meet identified skills needs. This was seen as particularly important within a fast-paced sector with emerging technologies and changing skills needs.

'What they need is a short, sharp intervention which enables them to either upskill existing staff or help support fill vacancies.'

(Regional policy stakeholder)

'So, that benefits you as an employer because you get people to, kind of, recruit relatively quickly and it benefits the learner because they're more likely to stick with it and see it out until the end, compared to the drop off you might see in some of the longer apprenticeship pathways anyway.' (National policy stakeholder)

Stakeholders also highlighted that the adaptability of Bootcamps can be particularly valuable for smaller employers who often report finding other skilling pathways, such as apprenticeships too rigid. However, they also suggested that the greater autonomy of Bootcamp providers in relation to what the programme looks like, how they deliver it, the amount of teaching time, and accreditation, means that there are still some questions over the quality of provision.

'So, at one end of the scale, you've got something that's quite rigid but inflexible, and [at the other] something that's probably too flexible and inconsistent quality.'

(National policy stakeholder)

The research presents mixed evidence on the effectiveness of Digital Skills Bootcamps in supporting people from diverse and disadvantaged groups into digital/tech jobs. In the business poll, around seven in 10 employers (68%) agreed that Bootcamps are effective in specifically enabling people from non-traditional backgrounds into digital/tech jobs. However, given that evaluation data shows that two thirds of people on Digital Bootcamps have Level 4 or above qualifications, it is likely that this more positive feedback is based on reflections on Bootcamps which specifically target and are funded to work with people from more diverse backgrounds. Typically, this type of Bootcamp is funded through a mix of public funding, charitable grants and employer sponsorship.

In the interviews, stakeholders identified limitations of DfE funded Bootcamps in reaching and supporting people from disadvantaged backgrounds into digital and tech jobs. DfE Bootcamps were primarily seen as aimed at career changers, or people currently in a tech role looking to develop new skills and/or progress within their existing role/career, rather than a route into entry level jobs for those without a tech background. Feedback from providers and policy stakeholders suggests that this is largely driven by DfE funding rules for Bootcamps which require a high proportion of participants to achieve specific employment outcomes on completion of Bootcamps. This is seen as discouraging some providers from recruiting people from disadvantaged backgrounds who they perceive as less likely to achieve a positive outcome than other types of participants. The financially safer option is to recruit those with previous experience who will more easily find work.

'... And so it's not always a level playing field, perhaps the tax person's not getting its best quid pro quo in terms of helping low-income people come through into those careers.'

(National policy stakeholder)

One DfE Bootcamp provider reported that the only way they could compensate for potential losses resulting from this funding model was to reduce the level of support they could provide for those with additional needs. This is likely to limit the accessibility and effectiveness of the training for people from disadvantaged backgrounds.

'If a bootcamp is costed at, say, £8,000, but you're only ever receiving £5,000 of it, because that person doesn't go into a job, something has got to give. Because companies just won't be able to survive on that.'

(Independent training provider)

While positive about Bootcamps broadly, some employers reflected that in their experience, Bootcamp participants often weren't at a suitable skill level to move straight into permanent roles having completed training. This suggests that training offered through some Bootcamps may not enable people without prior digital/tech skills or experience to be employment-ready.

'My own personal sense, of having presented to some of those groups [from Bootcamps] and then interviewed them and then tried to make it work is, there's a gap for companies like us where they need staff that can contribute when they join, and these people, that still feels a bit of a leap of faith on our part to jump in with them.'

(Large employer)

Similarly, a policy stakeholder viewed Bootcamps more as a step on someone's pathway into the digital/tech sector rather than a direct route into employment. Instead, the Bootcamp may provide those without experience with the skills to then progress on to a college course or an apprenticeship.

'I think most people cannot do a 'bootcamp' and then, go into technology employment. I think most people have...a more incremental journey. Because I think if you're not in the tech world already, that's a really big stretch for you as an individual, and you as an employer employing somebody after just three months.'

(Regional policy stakeholder-Scotland)

Despite these challenges, the research identified positive examples of specialist Bootcamp providers, that are funded through a mix of public and charitable funding, working to successfully support people from disadvantaged

backgrounds into digital/tech jobs. Alongside technical training, elements of this mixed funding Bootcamp model which support job outcomes for disadvantaged groups, compared to less targeted Bootcamp provision, include more intensive wrap around support such as pastoral, mentoring and follow up support for a period after completing the programme. For example, a Bootcamp provider who draws on charitable funding, alongside DfE funding, to target their programme at people from disadvantaged backgrounds reported that typically around 60% of their participants secure employment in digital/tech roles within a year of completing their Bootcamp.

Another provider whose work targets disadvantaged groups, including long-term unemployed young people, offers two versions of the same programme. When they first started delivering DfE-funded Digital Bootcamps they quickly established that these were unsuitable for their target groups who are further from the labour market. As a result, they now deliver two programmes. Firstly, a 16 week DfE Bootcamp which offers training across different digital skills and is primarily accessed by people in employment looking to upskill, and career changers. Secondly, a longer version of the programme (which is not DfE-funded), of approximately six months, aimed at those further from the labour market. This programme provides the higher level of 1-1 wrap around support needed, while focusing on building confidence, personal development and digital literacy in the early stages before progressing onto training in specific digital skills (similar to training on the DfE Bootcamp) for digital/tech roles once learners reach the work ready stage of the programme.

The same provider spoke about the challenges in scaling up their provision for disadvantaged groups due to the high costs of the intensive wrap around support they provide. As a result, they are starting to work with community partners to deliver some of the support needed in the early stages of the programme so they can focus their provision on participants who have reached the 'ready for change' and 'ready for work' stages.

'We recognised that...this wraparound support was one of the reasons we retained people. In scaling the programme, we realised that was going to be a limiting factor. We couldn't keep taking that on, so we had to partner with groups that are already doing that.'

(Independent training provider)

Providers suggested that to boost diversity on Bootcamps, there should be an increased focus on raising awareness and signposting of opportunities, for example, in Jobcentres. They also called for policy around funding and Bootcamp design to be altered to incentivise providers to target and recruit people from diverse and non-traditional backgrounds.

T Levels

In 2023/24, 1,363 T Level students (18% of the total) completed a digital T Level course⁶⁹. The majority of these students⁷⁰ participated in the Digital Production, Design and Development course (76%), which has run every year since T Levels have been offered. A smaller proportion participated in the Digital Support Services (22%) and Digital Business Services (3%), which have both been offered since 2022/23.

Data on the characteristics of T Level participants is limited. However, available data shows that there is a large imbalance in participation by gender. In 2022/23, just 9% of starts on T Level digital courses were women. Across T Levels as a whole, women represented 44% of all starts. In interviews, participants across each stakeholder group felt that the gender imbalance in digital/tech employment could only be resolved by redressing the imbalance in the education system. This T Levels data highlights that more work needs to be done to encourage women to consider digital/tech pathways at the post-16 level.

From the 2022 cohort, whose T Level courses finished in 2024, the completion rate on digital courses was 78% with 22% of students dropping out. This completion rate is higher than that recorded for T Levels overall (71%) and is the highest of all vocational routes.

In the polling data just over half of employers agreed that T levels (55%) are effective in supporting people from non-traditional groups to progress into digital/tech roles – this was one of the least likely channels to be identified as effective, along with Jobcentre Plus programmes such as Restart (52%).

⁶⁹ [Provisional T Level results, Academic year 2023/24 - Explore education statistics - GOV.UK \(explore-education-statistics.service.gov.uk\)](#)

⁷⁰ Total percentages add to over 100% due to rounding estimates

There was a consensus among policy stakeholders in interviews that it is too early to properly assess the effectiveness of T Levels in supporting people into employment, as only two cohorts have completed courses so far. Though there was some positivity around the potential they offer. For example, one policy stakeholder explained that T Levels were a big focus for the combined authority in their region and they were seen as a valuable progression pathway on to higher level apprenticeships.

Another combined authority stakeholder described T Levels as a valuable route in their own right but 'not the solution for social mobility'.

'...we don't tend to see that as anywhere near a solution for us in terms of what we need to do with a workforce that is generally lower than average attainment, already in work, and poorly productive, and that's the bigger challenge for us, thinking about an in-work offer for people, for who we need to upskill and improve their productivity'

(Regional policy stakeholder)

Similarly, providers who had offered T Levels reflected that they were a good starting point for building young peoples' technical digital skills and as an introduction to digital/tech roles. They were particularly positive about the project based learning and work placement aspects of the course, which gave students real world experiences that they could use when applying for more advanced digital/tech training or employment.

'I think it's a really good introduction for young people to understand what digital careers are, what they require, to give them a chance to test, and they get 315 hours, which is about 35, 40 days' worth of work experience working with an employer, so they actually get to test what it's like to do those jobs in real life, rather than in a simulated work environment within a college setting.' (Adult Education provider)

Providers suggested that T Levels could be particularly helpful in driving social mobility. Because these courses have lower barriers to entry, with no need for a Computer Science A-Level or previous experience for example, they are a good option for people from disadvantaged groups to develop advanced digital/tech skills and experience. One further education college for example, explained that because T Levels are offered as part of their standard college provision, they have funding to support people facing barriers, such as disabilities or neurodiversity, to thrive on these courses.

'We have a brilliant inclusive learning team who work very closely with our students, whether it's one-to-one support directly in the classroom or whether it's working with them in additional support outside the classroom, such as... students with neurodivergent needs having additional support...for them, staff get training from that inclusive learning team.'

(Adult Education provider)

Another college had relatively high levels of ethnic diversity on their digital programmes.

Given their relative infancy, there is no quantitative evidence on the success of T Levels in delivering positive outcomes for participants. However, qualitative evidence suggests that T Levels offer a good option for bridging the gap between digital/tech employment, or advanced training for young people without skills or qualifications. There is also some qualitative evidence that they attract relatively diverse student cohorts, though, much like the gender balance in digital/tech occupations, women are substantially underrepresented.

Sector-based Work Academy Programmes (SWAPs)

The secondary data analysis shows that between 2021/22 and 2023/24, 283,930 people have taken part in SWAPs overall.⁷¹ IT & Communications sector placements represent 2% of this total. The data suggests that take up has been much higher in other sectors, for example, construction (14%) and security (10%). There is no data currently available on the effectiveness of SWAPs for employment.

More than seven in ten employers in the poll agreed that SWAPs (72%) were effective in specifically supporting non-traditional groups into digital/tech roles.

⁷¹ Sector-based Work Academy Programmes (SWAPs) Management Information 2024. <https://www.gov.uk/government/publications/sector-based-work-academy-programmes-swaps-management-information-april-2021-to-march-2024>

This view was supported by a policy stakeholders who said that SWAPs play a helpful role in addressing individual's short-term skills needs and perceived them to have been well received and impactful. As they target people on unemployment benefits, they also perceived them to be effective in supporting those facing barriers to employment. However, they acknowledged that they are considerably more effective for people closer to the labour market, given their short duration.

Nonetheless, the same stakeholder noted that they have seen positive results from a trial with Hospitality SWAPs in partnership with a provider that offers the wrap around care needed for more disadvantaged groups.

Summary

The analysis of different digital/tech skills programmes shows that there has been a growth in participation in all types of digital tech/provision. The number of people starting an ICT apprenticeship has grown from 21,110 in 2018/19 to 25,110 in 2022/23, an increase of 19%. There has also been significant growth in participation in DfE funded Bootcamps, of which around three fifths are Digital Skills Bootcamps, from 2,800 in 2020/21 to 40,040 in 2022/23. Although at a much starting point, the number of young people on T Levels has also more than doubled in 2023/24 compared to the previous year.

The upward trend in ICT apprenticeships indicates that the introduction of newer digital skills initiatives such as Bootcamps have not 'eaten into' ICT apprenticeship volumes. Growth in both apprenticeship and Bootcamp starts also highlights a high level of demand for digital/tech skills training, from both employers and individuals.

Features of digital skills training that are effective for non-traditional groups

During interviews, stakeholders discussed the features of specific digital/tech skills training programmes that they perceive as making a difference in delivering positive outcomes for people from non-traditional groups. This section highlights these effective programme design and delivery features. These include contextualised learning, which gives people real world experience, such as project based learning and work placements. Providers also emphasise the importance of effective outreach, of flexible provision that is responsive to learner needs and 1-1 pastoral support for learners with additional needs.

Contextualised Learning

All providers interviewed felt that contextualised learning that is directly applicable to employment in digital/tech jobs is the most important factor in supporting learners to develop the skills needed to progress to these roles. This includes setting project work that has real world application, which is a constituent element of T Levels courses and work placements and many Bootcamp programmes.

Most training programmes, such as T Levels, include a work placement element, or employment, e.g., apprenticeships. While this hands-on learning is widely considered to be the most effective type of experience in supporting people to develop skills for digital/tech roles, similar skills can also be developed through project work.

One provider explained that project work not only helps learners to develop skills, but also gives them something tangible to reference when applying for more advanced training or employment. Furthermore, they explained that practical learning tends to be more suitable for people with fewer qualifications. These learners are likely to have struggled with the academic style of teaching and learning they had encountered previously during their GCSEs.

'Most colleges should be...getting their students out into the local area to help and support local businesses and organisations and get those real life scenarios which are helping them to build up their skill-sets which are then going to help them with their career paths because then having those very real pieces of evidence for their portfolio to say.'

(Adult Education provider)

Another provider that delivered specialist digital/tech BTECs and apprenticeships explained that they invite tech employers in for experience days, who set students problem solving projects related to their industries.

'If we can we'll do a multi-day industry project working closely with a company and they set some challenges. Recently, we had one with King Games, the makers of Candy Crush, and they came in and they set a problem around trying to get the students and teams to come up with a new board game that has online interactive elements.'

(Further Education college)

Providers also emphasise that most digital/tech roles require employees to have soft skills alongside a strong technical understanding. This is factored into curriculums, with project work supporting learners to develop wider skills such as project management, team working and presentation skills.

Providers said that as much as possible, they endeavour to develop curriculums that are reflective of industry skills needs. This is achieved in several ways, including, through regular consultation with industry partners and adapting curriculums based on their advice or by employing tutors who have recent industry experience. One provider explained that they run Bootcamps on an ad hoc basis, when they perceive that there is industry demand for certain skillsets or professions. These engagement practices help to maximise learner employment outcomes on completion of training programmes.

Outreach

Some providers explained that they invest heavily in outreach to engage with and attract learners from disadvantaged groups. While providers often have their own outreach teams and target specific learners independently through communications, other providers connect with partner organisation to promote tech training opportunities to hard to reach groups. For example, one Scottish college explained that they work with Access to Industry and Data Lab, who work with disadvantaged people and can refer them on to the college's provision. Another Bootcamp provider works with local community groups. They explained that they undertake research to identify which groups are particularly disadvantaged when they set up in new locations, and then hone marketing and outreach approaches to encourage applications from individuals from these groups to their programmes.

'Whenever we work in a new geographical location, I look at the census data, because that's who the community is. So, we identified that there was a huge amount of unemployed white males, with really poor mental health. So, we looked for a men's mental health charity to partner with.'

(Independent training provider)

Providers typically offer taster sessions to encourage people from underrepresented groups to consider a digital/tech career or attract them on to their programmes. For example, a college in Scotland explained that they regularly run sessions at local schools showcasing the variety of opportunities available, giving students an insight into tech jobs and careers. Another training provider explained that they engage people through local community groups and run taster sessions to encourage women to take part in their Bootcamps.

Learner Support

Programmes that secured effective outcomes for people from disadvantaged groups offer learners more intensive and tailored support. Providers recognise that people with a higher level of support needs, for example, those who are long term unemployed often require a greater time and resource investment. Several providers explained that they had employed staff who provide one-to-one academic tutoring and pastoral support to help these learners.

'Every learner we work with has an individual support plan then a pastoral team with various escalation levels. There's learner progress managers, inclusion managers that have more expertise, and then a head of safeguarding.'

(Independent training provider)

They also adapt course delivery to accommodate learners with differing needs.

'Every learner is on their own journey, so some learners are dyslexic, and they require the course materials in advance. Some need recordings sent to them to listen to it afterwards. We've worked with candidates who are hearing impaired and then we make sure they have the transcript, the live dictation on the screen.'

(Independent training provider)

This extra support is not delivered by all providers however, due to the high costs of delivery. One provider described this support as a 'nice to have' and one of the few cost savings they could make to compensate for potential loss of revenue if participants didn't achieve positive employment outcomes.

Several providers explained that they were able to offer financial support to learners from lower socioeconomic backgrounds to participate in digital skills training. This included funding transport costs, meals and providing digital equipment to support learning. In general, this type of support was more available from colleges and adult education providers.

'As a college we find that in our area, we have a lot of disadvantage especially financially disadvantaged students. We offer a lot of meal plans, things like that, etc. It's very clear in our stats about working with financially disadvantaged learners. So, we offer a lot of funding opportunities.'

(Adult Education provider)

Flexibility in Provision

Flexible delivery was identified as an important factor in success for learners from all backgrounds. One independent training provider explained that full time provision is often very fixed in terms of the start and end point and regular weekly schedule. This provision tends to be inaccessible for people with varied schedules, such as those on zero hours contracts, and people with wider commitments, such as childcare and caring responsibilities. The rigidity also means people sometimes have to leave courses when they encounter challenges in their personal lives, making them less suitable for those in challenging circumstances.

'Flexibility of provision would be absolutely critical. I think that's the lynchpin in it. At the moment, our full-time provision, for instance, is very fixed. If you start a Higher National Certificate (HNC) programme it's a full time course, and it runs the whole of the academic year. You'll find that you're starting to struggle, then there is really very little option for you other than to drop out.'

(Adult Education provider – Scotland)

To overcome this challenge, several providers advocated for stackable, micro credentials style provision that learners can dip in and out of and use to develop skills over time. As discussed by one provider, this kind of modular training was formerly delivered by some Institutes of Technology, but was no longer government funded. These short courses gave adults and young people access to training in digital courses focussed on areas experiencing skills shortage, such as artificial intelligence, digital construction and cyber security⁷². Their delivery model offered participants flexibility, in that they encompassed between 50-138 hours and were delivered over several weeks, enabling people to fit them around their personal and working lives. A provider explained that their ability to upskill participants quickly also made them popular with employers.

Online-only delivery was identified as less effective by some providers in supporting people from disadvantaged backgrounds to achieve positive outcomes. For example, one provider said that they struggled with learner retention when delivering online Bootcamps.

'You lost people very quickly and the, kind of, people cycling through the programme and not completing it was higher.'

(Independent training provider)

⁷² Department for Education (2021). [Thousands more adults set to benefit from new technical skills](https://www.gov.uk/government/news/thousands-more-adults-set-to-benefit-from-new-technical-skills) - GOV.UK

In general in-person learning is also identified by providers as more conducive to developing essential skills for employment, such as team working, communication and presentation skills so this provider advocated for a blended delivery model.

However, in contrast, a Bootcamp provider targeting diverse and disadvantaged groups described how they deliver a full-time online programme for people facing barriers to employment in digital/tech which consistently achieves 90% completion rates for those enrolled.

Summary

Analysis of different digital/tech skills programmes shows that there has been a growth in participation in all types of digital tech/provision.

Despite an overall decline in apprenticeship starts more broadly, from 393,380 at their peak in 2018/19 to 337,140 in 2022/23, uptake of ICT apprenticeships has risen in recent years. In the 2022-23 academic year, 25,100 people enrolled on ICT apprenticeships, 19% higher than in 2018/19, and representing 7.4% of apprenticeship starts compared to 5.4% in 2018/19. However, secondary data analysis and qualitative findings shows that a high proportion of ICT apprenticeships are at Level 3 and above, filled by older people and used for upskilling staff already in tech occupations, which does not support entry for new recruits to digital/tech.

The last two years have seen a significant growth in Skills Bootcamps. Starts on Bootcamps reached 40,040 in 2022-23, compared to 2,800 in 2020-21. Although the number of digital bootcamps approached the number of ICT apprenticeships in 2022-23 (22,160 compared to 25,100), the upward trend in ICT apprenticeships suggests that Bootcamps are not 'eating in to' apprenticeship volumes. The number of digital bootcamps may exceed ICT apprenticeships for the first time in 2023/24.

Analysis of the tech/skills training landscape highlights that training for employment is weighted towards higher levels. There is currently a gap at Level 2, particularly in Level 2 apprenticeships, which could be effective pathways to digital/tech careers for people from disadvantaged groups.

Evidence from interviews and polling analysis highlights that apprenticeships are widely considered to be effective in supporting participants to develop digital/tech skills and as a route for inexperienced people into the sector. On balance, apprenticeships are also relatively diverse.

There is limited published data available on the outcomes of Skills Bootcamps for participants, however the latest available data shows that despite a high proportion of participants having degree level qualifications, over half (57%) recorded no outcome or change in employment on completing the Bootcamp.

Evidence from the interviews suggest that the principle of shorter training courses, with content flexibly tailored to employers' needs, and a guaranteed interview is viewed as a good one. In particular, this type of programme is perceived to be more responsive to employers' rapidly changing and specific digital skills needs compared to other types of digital skills programmes, particularly apprenticeships due to the length of time between development and implementation of apprenticeship standards. Increased levels of participation in Bootcamps also reflects employers' and learners' appetite for shorter and more modular training options.

Views are more mixed on the success of Bootcamps in supporting people from disadvantaged backgrounds. Seven in ten employers in the employer poll identify Bootcamps as effective in specifically enabling people from non-traditional backgrounds into digital/tech jobs. However demographic participation data does not support this. Interviewees suggest that the current funding model for DfE Bootcamps, which is linked to participants evidencing specific employment outcomes on completion of the Bootcamp, can act as a disincentive to providers to recruit participants from disadvantaged groups who are further from the labour market. For this reason, the DfE Bootcamp model is viewed as primarily aimed at those with previous experience of digital/tech who are looking to upskill, and for career changers, rather than a programme offering a pathway for disadvantaged people into the digital/tech sector.

Feedback from employers and providers suggests that Digital Bootcamps delivered by specialist providers, which often draw on charitable funding and are targeted at people from more diverse/disadvantaged backgrounds can be effective in supporting positive employment outcomes. This type of Bootcamp typically uses a mixed funding model drawing from public funds, grants and employer sponsorship. It typically requires a higher level of investment to provide the more intensive and comprehensive learner support that is needed to enable participants from non-traditional groups to achieve successful employment outcomes.

Analysis of design and delivery features that are common to training programmes that are effective in supporting non-traditional groups to enter digital/tech identifies learner support as the most important factor in both attracting, retaining and supporting positive outcomes.

4.

What next? Moving towards a more inclusive digital/tech sector

This section explores ideas to create more inclusive digital/tech skills training that is effective in breaking down barriers to careers for people from non-traditional groups, polling.

Data from the business poll indicates a strong appetite for policy action, at a national level, to facilitate and promote alternative pathways, other than university degrees, into digital/tech jobs. Nearly all employers (95%) said that it is either very or quite important for the Government to increase investment in routes, beyond degree programmes, into jobs that require digital/tech skills. Likewise, nearly all employers (95%) said it is either very or quite important for the Government to focus on ensuring that routes are accessible to people from disadvantaged backgrounds into jobs that require digital/tech skills.

Similarly, stakeholders in the interviews consistently emphasised the importance of action at a policy level to reduce barriers for people from non-traditional groups to digital/tech jobs, both to increase the supply of suitably skilled labour to address employers' digital skills gaps, and to improve social mobility. There were mixed views however on the extent to which current policy supports social mobility.

Policy stakeholders at national and regional level welcome indications from the new government that they will further extend the powers of devolved authorities and see this as the right direction of travel.

'Mayors are accountable to their local populations and can work much more closely with their local employers, to really understand what the skills needs of their employers are, and then have as much flexibility as possible to respond to that.'

(Regional policy stakeholder)

However, the partial devolution of responsibility (for Adult Skills Funding) means that combined authorities do not have control over all elements of skills including, provision for 16-18 year olds, apprenticeships, and T Levels. A consistent message from stakeholders we spoke to in the regions was the need for strategic responsibility, if not devolved budgets, for apprenticeships.

'...there is of course, a role for national government, which is about standards, which is about data, which is about what works, and we want to do some things... nationally, but if we are thinking about understanding the labour market... and understanding the regional economy and getting people into it, we need some more strategic oversight and more flexibility to be able to do that.'

(Regional policy stakeholder)

This does not necessarily suggest that regions should hold the purse-strings for apprenticeships, but it does point to the need for greater strategic responsibility and a central role in shaping and creating demand.

One combined authority stakeholder expressed a view that the current skills system does not facilitate or support thinking about 'place' or specific sectors. They suggested that SMEs in their region are not seeing or realising the benefits of training their staff and they would welcome opportunity within the apprenticeship system for regions to 'market make'. This would involve regional government creating apprenticeships based on sectoral skills needs within their region, including the digital/tech sector.

'So, that could be about either strategic influence, or devolution of say the non-levy funds or the levy underspend, or in the move to a skills and growth levy, it could be about the money that's not spent on apprenticeships.'

(Regional policy stakeholder)

The introduction of Skills England is viewed by stakeholders as a positive opportunity for combined authorities to feed into skills policy thinking and development around digital/tech skills needs. Policy stakeholders also

identified a new Industrial Strategy as key in helping to align digital and wider skills strategies as a driver of economic growth. Skills policy was less clear to Scottish stakeholders. One Scottish provider was positive about the introduction of Skills England and the lifelong entitlement available to adults there, but reflected that there had been no announcements of a similar policy in Scotland.

Policy stakeholders made a number of suggestions, around options for the development of new or adapted programmes to support social mobility in digital and tech. For example, this research and wider evidence from the desk review highlights the difference that 1-1 support can make in supporting positive outcomes from digital/tech training programmes for people from non-traditional groups. In the interviews, some policy stakeholders reflected on the importance of this type of individualised support in enabling disadvantaged young people to secure good outcomes from the former national traineeships programme. Stakeholders discussed the potential benefits, in the digital skills context, of the government introducing a similar pre-apprenticeship programme but more closely linked to labour market demands, skills needs and where the young person is guaranteed an interview, as is the case in Skills Bootcamps. The new government's announcement of a Youth Guarantee, and changes to the apprenticeship levy, was identified as a potential opportunity to explore new initiatives such as this.

While one stakeholder broadly welcomed some of the new government's pledges for reform on skills, such as flexibility for employers in use of their growth and skills levy. They cautioned against introducing too many new initiatives – 'programmitis' – and spoke in favour of action to understand how existing digital/tech training provision could be adapted to better serve people from non-traditional groups.

'...sometimes some flexibility around what we've got rather than a one size fits all... in certain areas and standards and situations, a bit of flexibility might enable people to, kind of, bring in more talent or retain more talent or do the same thing but in a slightly different way. So, it's evolution I think, rather than revolution to what we've got...'

(National policy stakeholder - Scotland)

Similar views were expressed by wider policy stakeholders, who advocated for focussing on the space for programmes between apprenticeships and Bootcamps. Apprenticeships were generally viewed as very rigid in terms of standards, delivery, duration and assessment, while Skills Bootcamps were sometimes seen as structurally 'loose'. It was suggested that provision which occupied the middle ground between these programmes could be more effective for learners from non-traditional groups and for employers.

'I think some sort of, flexible programme that could cover, shorter than an apprenticeship, topping up skills, taster skills, getting people in, so yes, we don't want loads of initiatives, but what we've got makes some of those things a bit more flexible to fill a few different needs.'

(National policy stakeholder)

In Scotland, the Withers Review (2023) pointed to a fractured skills system and the lack of an overall strategy bringing together the different elements of skills such as strategy, funding, qualifications and pathways. One policy stakeholder had significant concerns about the impacts of delays to implementation of the Withers Review, comparing what they see as stalled progress on reform of skills in Scotland to the faster pace of change and policy developments such as the introduction of Skills England, across the border. They identified implementation of recommendations in the review as the one key change needed to bring greater coherence to skills policy including digital skills.

In addition, they perceived current government policy on digital/tech in Scotland to be too generalised which was felt to limit its effectiveness in supporting the development of suitably skilled labour to meet employers' skills needs. For example, they described how they are struggling to draw down funding to meet skills needs. They argued that this also creates challenges for the training sector in developing curriculum that meets the needs of learners and employers. They pointed to a need for a more defined and targeted national approach to digital/tech skills that is aligned with economic strategy. Government policy on childcare in Scotland was highlighted as an example in which the skills system, government and employers have worked together effectively to meet a specific skills need, and they advocated for a similar approach to policy on digital/tech skills.

'Where's the longer-term strategic plan and skills plan that both tackles the poverty agenda but also the skills gaps as well...there was a massive shortage of childcare professionals and the Scottish government brought out a new policy to increase childcare entitlement right across the board...It was very clear what was needed, they needed x amount of people upskilled. There was a policy and plan that followed it. Funding was made available, people were trained from all backgrounds, upskilled, reskilled, we've now met the need and met the demand. So, there's a good example of where a very sector specific challenge was raised, policy, procedure, strategy all aligned, funding aligned with it, and the objective met.' (Scottish Adult Education provider)

What can government, the training sector and employers do?

As part of the qualitative research, all types of stakeholders were asked to identify one key change they would like to see in the skills policy and/or training landscape to help people from non-traditional backgrounds to overcome barriers to developing digital skills and entering digital/tech jobs. Actions identified by interview participants, reflect some of the key challenges and opportunities that have been highlighted in this research. These include calls for change in relation to the following:

▪ Funding model for skills bootcamps

The research found evidence of positive outcomes from Skills Bootcamps that are specifically targeted at people from diverse and disadvantaged backgrounds where funding, and the delivery model, supports more intensive 1-1 and follow up support. Such programmes are typically funded by Government and charities. However, in general there was a consensus among policy stakeholders we spoke to that the funding model, broad eligibility criteria and employment targets mean that, in practice, Skills Bootcamps that are solely Government funded are not accessible or working for people from non-traditional backgrounds.

As discussed in previous chapters, providers also expressed frustration with the Bootcamps funding model, as they lose out financially if participants do not attend an interview or fail to secure specific employment outcomes in digital/tech roles linked to their training. This discourages them from recruiting participants facing additional barriers to employment, who they perceive to be less likely than others to find work.

Several providers called for funding for Bootcamps to be targeted at disadvantaged groups, and one provider suggested that funding should be targeted towards towns and cities in areas of deprivation. The level of funding should reflect the higher costs of supporting people from non-traditional groups who have additional support needs. This includes 1-1 pastoral support, mentoring, and follow up support on completion of the bootcamp to achieve and sustain positive employment outcomes.

A combined authority stakeholder identified the potential for Skills Bootcamps to support social mobility but recognised the inequalities in current participation and highlighted changes needed to make DfE funded Bootcamps a more effective tool for non-traditional groups.

'One of the things we've got to do through bootcamps is ...make sure it reaches the right people who might engage, and so because people may not feel confident, may not feel financially able to do it, which are two key drivers, it's then making sure we've got the right coaching, mentoring, support around the programme, and that also, it properly fits around-, it enables people to pick it up while they've got all the other things they want to do.'

(Regional policy stakeholder).

Another combined authority suggested that a longer, more flexible funding settlement, especially for Skills Bootcamps would allow them to commission multi-year delivery with the same providers and undertake evaluation of outcomes feeding into the next round of learning, helping to support improvements to delivery.

▪ Development of inclusive progression pathways

The vast majority of digital/tech apprenticeships start at Level 3, and it was recognised that this means that for many people from lower-socioeconomic groups, apprenticeships do not currently provide an effective pathway into digital/tech jobs.

A consistent theme in suggestions for change from policy stakeholders was the need for greater investment in lower-level digital apprenticeships or other bridging programmes that provide pathways from Level 2 to higher level qualifications and entry level roles in digital/tech. However, some stakeholders acknowledged financial barriers for people from lower socio-economic groups to participating in apprenticeships due to the Apprentice Minimum Wage. Though it should be noted that a large proportion of employers pay above this.

Although development of basic digital skills is not a specific focus of this research, several stakeholders highlighted that lack of essential digital skills is a significant issue in their region, impacting on access to digital skills training. Some pointed to a need to ensure that the development of digital/tech progression pathways, aimed at bringing people from non-traditional groups in at a lower level, recognises that for some, development of essential digital skills is a crucial first step.

Different types of stakeholders highlighted the benefits of modular digital skills training in enabling people to develop and build up skills incrementally, and work towards a qualification.

One independent training provider for example has worked with partners to develop digital certification for their digital skills training programmes - including Digital Bootcamps and a longer, full time programme targeted at people from disadvantaged backgrounds - these recognise all types of learning undertaken by an individual including informal learning. The badges contain a description of what has been learned and the specific skills, using the type of language used by employers. This provides the individual with a record of achievement that they can build up over time and share on platforms such as LinkedIn to demonstrate their skills to potential employers. They also help to give people with low levels of skills and attainment the confidence that, from the start they are developing skills that are valued by employers. An HE partner described how other programmes are also moving in the direction of digitising/badging their qualifications and how this helps to support people from disadvantaged backgrounds.

'Lots of programmes do this, because it's incredibly encouraging for students and get them used to the professional environment and how things work today, because we're not a paper-based society any more. We're a digital one and it's getting them used to presenting themselves'

(Provider partner)

The flexibility that modular learning offers can also be particularly valuable for learners from non-traditional groups.

'[With full time provision if] you're starting to struggle, then there is really very little option for you other than to drop out. If we could have a flexible model where people were-, if they encounter problems in their lives, or if things are starting to get a bit difficult, then they could potentially drop out of the course, and then join the next cohort, and take up again the learning where they left off when the course runs again. By that time their issues that they were facing may be addressed. That would be beneficial.' (Adult Education provider)

Modular training, such as digital badges, was also identified as very popular with employers – both for recruitment, allowing them to understand the specific skills of applicants, and as a means to upskill staff.

'So this, kind of, pick and mix, 10 hours of this, 20 hours of that, has always been really popular, but it's never been funded. So, it's always been through a project rather than it being a mainstream. So, I think, you know, if we could find some way to reinvigorate that over the next 12 months, I think people would be biting our hands off for that.' (Adult Education provider)

▪ Awareness of digital/tech opportunities

Findings from across the research suggest that action to address barriers to digital/tech starts with ensuring that people from all backgrounds have a good understanding of the digital/tech employment options available to them and the skilling pathways to get there, and that they see digital/tech as a realistic option for them. In interviews across the different stakeholder groups, it was a consistent theme that people further from the labour market often cannot see themselves in digital/tech jobs - their image of the tech sector often doesn't match their experience.

'Sometimes getting the learners can be hard for tech programmes. [We] have done research to find different ways to talk about digital careers -'because when you say data careers to somebody who is not in that world, they find it very scary...They think they could never be a data-something. And that's one of the big challenges. You've got to make sure your programme is attractive to learners as well.'

(National policy stakeholder – Scotland)

One combined authority spoke about working with local business networks to try and address this challenge. Another policy stakeholder pointed to the importance, when promoting digital/tech opportunities to non-traditional groups, of focusing on the skills and experience that individuals already have that equips them for these opportunities, and how they can develop the additional skills they need. It's not enough to simply tell people what digital/tech skills training and employment opportunities there are.

'Perceptually, I think digital is seen as a niche/geek profession that people of a particular persuasion would go for. I think the reason for that is people don't really understand the skills that you need and ...the skills they've already got that makes them, you know, halfway there, so to speak. Unless there is investment and indeed focus in this area, you're going to have an awful lot of people who are capable and willing to participate in this part of industry that are not going to take it up because they don't know, what they don't know.'

(Policy stakeholder)

Job shadowing was identified as an effective approach to support an individual's understanding of a job role and what additional skills they need to develop to do it. Work placement opportunities were seen as similarly effective, although it is recognised that securing these opportunities is increasingly difficult.

Policy makers also pointed to the importance of relatable role models in building awareness of digital/tech opportunities among people from underrepresented groups.

'Somebody else from the similar background, you know, 3 months ago was doing the same job as you, is now doing this.'

(Policy stakeholder)

Several providers saw the education system as a block to developing digital/tech talent, perceiving related subjects as under resourced and not prioritised in schools. Another provider suggested that, given the importance of digital/tech skills, IT should be taught to at least Level 2 to all students, as is the case with English and maths. This would ensure that all school leavers have a basic level of digital literacy when entering the workforce and could potentially increase interest in digital/tech jobs from young people of all backgrounds.

Direct engagement with employers in the digital/tech and other sectors through, for example, visits to schools was identified as an effective way of stimulating interest.

'[The] education system [is] offering something which is essentially unpopular, dull, boring and not taught particularly well.'

(Provider)

Providers also recognised that they could play a role in encouraging young people to consider digital/tech pathways.

'The tech industry is crying out for diversity, and I think that can only come from the funnels of education, we need to attract people at this point. I think we need to go a step further. I think we need to go into schools, and really show people that this is an option.'

(Independent training provider)

Several participants reflected that typically, young people are pointed towards further and higher education as the standard route to develop digital/tech skills and pursue a career in tech and pointed to a need for better information and advice in school, and through other services, about alternative routes.

▪ **Education and support for employers**

The research shows that the majority of employers recruit people with degrees to digital/tech roles - almost seven in ten workers in digital/tech occupations are graduates. Recruitment from a more diverse base, supported by more diverse recruitment practices, is essential to drive social mobility and enable more people to develop the skills employers need to address digital skills gaps. While some, mainly larger, employers have used a wider range of recruitment options and adapted recruitment practices to try and bring people in from more diverse backgrounds in response to changing digital skills needs, smaller employers in particular face a range of barriers to diversifying their recruitment approaches.

Stakeholders identified a number of key actions to increase engagement with SMEs in relation to digital skills, and to facilitate changes in employer behaviour in relation to recruitment and training.

The research findings indicate that some SME employers either do not have a good understanding of the benefits of diversifying their workforce or face barriers to doing so due to financial/commercial pressures. Employers discussed the costs of investment in training for new employees who lack previous experience or skills at the level required and potential loss of income during the first few months of employment while they get up to speed.

'That's the main barrier [to hiring diversely], 'Well, how much are we going to have to spend on them before they're actually profitable?'

(Small Employer)

Consequently, one employer expressed a view that employers, particularly SMEs, should be incentivised to take on people who lack qualifications or experience, and invest in their skills.

As discussed in Chapter 2, employers suggested that more flexibility around use of the apprenticeship levy could incentivise them to hire diverse candidates. The apprenticeship levy can currently only be used to employ apprentices. Interview findings suggest that this is not the preferred recruitment option for many employers, with some viewing apprenticeships as too rigid and inflexible to meet their needs. They explained that introducing flexibilities to the use of the levy would allow them to explore alternative, non-traditional training pathways, through which they could invest in recruiting candidates from disadvantaged groups.

Policy stakeholders highlighted a need for support and guidance for employers, particularly smaller employers, on identifying how they can make their recruitment practices more inclusive e.g. using skills-based recruitment, and the business case for diversifying their talent pool. It should also include financial support to address financial disincentives for SMEs to recruit applicants with less experience of tech or with lower levels of qualifications, for example, exploration of financial incentives to encourage and stimulate employer investment in skills.

Nonetheless, some policy stakeholders expressed a view that employers in general are increasingly open to recognising the wider skills, experience and qualities that an individual brings to their business, in order to address their digital skills gaps.

'I don't know how much the government needs to prioritise and how much of it is ultimately employer behaviour, because things like Skills Bootcamps and apprenticeships are employer led. I already see that happening driven by employer behaviour and employers recognising the types of skills that those non-traditional applicants might bring. I don't necessarily think there needs to be loads of government intervention to drive that... I think employers are quite open minded and they're recognising the sort of skills that those types of candidates bring, which is something different and it's something they've been lacking. So, I think we're already on that journey, to be honest.'

(National policy stakeholder)

One employer said that they would benefit from guidance and advice on the specific support needs of people from non-traditional backgrounds in the workplace and how to provide effective support in the first few months of employment.

'...I think what would be useful for us is just, I suppose, how these people [non-traditional] need to be supported in the first, say, 3 months, 6 months, whatever it might be. To make sure that they are happy with what they're doing at somewhere like [this], they're engaged, they know what to expect, and they're ultimately going to be assets when they go onto projects.'

(Employer)

This point was reinforced by a policy stakeholder who highlighted a need to work with employers to ensure that suitable support is in place for people from non-traditional backgrounds to sustain and be successful in digital/tech roles.

▪ Support for individuals in-work

One stakeholder in Scotland highlighted that in their region digital/tech skills training for people from disadvantaged groups are currently focused on people who are unemployed or economically inactive. These learners, who are typically further away from the labour market, require much more intensive and longer-term support to become work ready and to develop the digital/tech skills that employers need to address their digital skills gaps. Instead, they identified that efforts to improve social mobility in digital/tech should be focused on people from lower socio-economic groups who are in work and face financial barriers to accessing digital/tech skills training.

'A lot of the time it's people already working that need that offer... They're not going to give their jobs up to come on a 16-week... course. They're not going to do that, because me and you wouldn't do that... So it's policy changes like that that I think need to happen. Not only ...removing the barriers of access to equipment and access to funding, but it's just access to the opportunity that fits around a working life needs to happen.'

(National policy stakeholder - Scotland)

The same stakeholder is currently exploring options with colleges and universities in the local area to offer training in the evenings and weekend when more people can access it.

Summary

Findings from the research indicate that action to improve access to digital/tech skills training, jobs and careers should be a priority for government and employers, to ensure that more people can develop the digital skills needed to address skills gaps, boost economic growth and improve social mobility.

Stakeholders see plans for the extension of the powers of devolved authorities as the right way to go. However, this does not include responsibility for all aspects of the skills system, and while combined authorities do not necessarily seek budget holding responsibility, they would welcome opportunity to influence strategic thinking on apprenticeships to ensure that policy developments meet regional skills needs. The introduction of Skills England is viewed as a positive opportunity to feed into and shape policy on digital skills.

The research suggests a need for more digital/tech skills provision at lower levels, particularly Level 2 apprenticeships. Stakeholders called for greater investment in Level 2 apprenticeships or other bridging programmes, such as pre-apprenticeships that provide pathways to higher level qualifications and entry level roles in digital/tech. The new government's Youth Guarantee, and greater flexibility for employers in how they use their growth and skills levy are seen as opportunities to explore new initiatives like this.

In Scotland, policy stakeholders pointed to a need for a more defined and targeted approach to digital/tech skills and implementation of recommendations from the Withers Review.

Other key policy changes that stakeholders would like to see to reduce barriers to digital/tech for people from non-traditional groups include changes to the funding model for DfE Bootcamps, to target funding at disadvantaged groups. This requires increased investment to reflect the much higher level of support needs of these participants.

Findings from this and wider research show that people from disadvantaged groups have lower levels of awareness and negative perceptions of digital/tech that can lead them to think that 'tech jobs aren't for me'. This suggests a need for action to ensure that people from all backgrounds have access to appropriate information and guidance on the digital/tech jobs available, what skills they have and can bring to these roles, and how to get there.

Currently employers either do not have a good understanding of the benefits of diversifying their workforce and/or face financial barriers to doing so. Employers and wider stakeholders identified a need for incentives to encourage employers to take on people who lack qualifications or experience – including flexibility around use of the growth and skills levy. They also called for increased engagement and more support and guidance for SMEs on how they can make their recruitment practices more inclusive and how they can best support people from disadvantaged backgrounds, in the workplace.

To improve social mobility and increase the pool of skilled labour, stakeholders also highlighted a need for increased focus on digital/skills training provision for people from disadvantaged groups who are in work, as well as for those not working and further away from the labour market.

5.

Conclusions and recommendations from Learning and Work Institute

Digital and technology skills will be important if the UK Government is to meet its ambition to increase UK economic growth. They are important in their own right and also as enablers of growth, allowing businesses to make the most of innovation and opportunities.

Yet the evidence suggests the UK is facing significant digital/tech skills shortages: a high proportion of vacancies in these roles are reported as being due to employers being unable to find people with the right skills and one half of employers polled for this report said they struggle to recruit workers with the digital/tech skills they need.

Digital/tech skills encompass a wide range of roles and skills. Skills shortages appear particularly acute in higher and more technical skills: there is a relatively small number of vacancies for IT specialist managers, but 64% of those are reported as hard to fill. Our research also found reported gaps in senior roles, which require technical skills but also wider leadership and management skills. Such shortages affect businesses of all sizes but, can perhaps have particularly challenging effects for SMEs who may lack HR resources to help identify skills needs and implement a plan to tackle them.

Our research found that businesses have responded in a range of ways to their skills and people needs. This includes reporting that they have invested in internal training to increase the skills of existing staff, looking at new ways of recruiting, and engaging in publicly-funded skills programmes such as apprenticeships.

However, our research identified ways in which this is not meeting the scale of the challenge:

- **Recruitment approaches still focus most on recruiting graduates.** By definition, this limits the talent pool that employers can recruit from.
- **Apprenticeships could be more widely used at different levels.** The number of apprenticeships fell by one third following the introduction of the apprenticeship levy and other reforms in England, with falls particularly stark for young people and at lower levels. The number of ICT apprenticeships has bounced back more than the average to stand at 25,200 in 2022/23, but with the biggest increase seen at Level 4+, again limiting employers' talent pool. Meanwhile, Skills Bootcamps in England offer more potential for flexibility, but are disproportionately focused on people already with higher education qualifications and in the higher socioeconomic groups.
- **Employer investment in skills has fallen across the economy.** L&W research found that employers in the economy as a whole are investing half the EU average in training per person, and have cut their training spend per employee by 26% since 2005.
- **Awareness of the digital/tech careers available and the skills required could be improved.** The research has identified that people from groups underrepresented in digital/tech jobs see them as 'not for them' or can lack knowledge of the roles available and skills needed. This limits the pool of potential applicants for jobs.

There is a clear potential win here. The Government has set an ambition for an 80% employment rate, which will require an additional 2.4 million people in work.⁶¹ There are three million people who are out of work and say they would like a job. And employers are reporting skills gaps and finding it challenging to fill vacancies.

If the UK can better match those who are out of work or wanting to change jobs or careers with employers that need new digital/tech skills or roles, and also update and improve the skills of those already in work, there is a prize in enabling economic growth.

Achieving this will require better information for people on the roles available and skills required so they can make informed choices, new action by employers individually and collectively to widen their recruitment approaches and invest more in skills, and support from the Government to enable this and target public investment where it can have most effect.

Recommendations for policymakers, commissioners and employers⁷³

- 1. Target support and aim high: Local growth plans, such as City Region and Growth Deals in Scotland, and Local Skills Improvement Plans in England should include assessment of tech/digital skills needs, with employers investing more and public funding targeted on those that need the most help.** Meeting skills needs is a partnership between individuals, employers and the Government, and it is important to get that balance of responsibilities right. The best provision already does this and there are excellent examples across the country.

The Government has said it wants local areas to draw up growth plans, which will bring together the range of infrastructure, business support, skills and other conditions needed to increase growth. Local Skills Improvement Plans have already been developed in many areas across England by business representative groups. As each of these is developed and refreshed, they should ensure they include assessment of the need for digital/tech skills and plans for how to meet this, including how employers will increase their investment. Employers, including those in the tech/digital sectors, should ensure they engage in these processes and also consider what actions they can take themselves (see below for more details).

Different sources of funding, such as the Adult Skills Fund, the UK Shared Prosperity Fund and Investment Zone Funding, should be aligned with local plans to ensure that people from disadvantaged backgrounds, who need the most support, are able to benefit from opportunities. Public investment should be focused on market failures and where there is a social justice requirement, with employers and individuals focusing their investment (of time and money) where they will directly benefit and are able to do so. The principles of Skills Bootcamps in England (shorter training, designed with employers who guarantee completers an interview) are good, but, overall, they are not currently meeting this test. The flexibility of the policy means that there is vast variation in the design and delivery of Digital Skills Bootcamps. While employers and providers felt that Digital Skills Bootcamps which include at least some element of charitable funding often attract diverse participants and often secure good outcomes, DfE evaluation data does not differentiate by how programmes are funded and shows that, overall, Skills Bootcamp participants are most likely to be graduates and from the top three socioeconomic groups. There is also little data on outcomes or value for money, which means it is difficult to understand and differentiate the relative effectiveness of Skills Bootcamps which do and do not draw on charitable funding to support people from diverse and disadvantaged groups. It is important that published data and evaluations of the programme effectively distinguish between different types of learner, for example people from lower socio-economic groups, who often face barriers to digital/tech employment, and those already in digital/tech roles who take part to upskill. Having a separate programme also adds to complication for people and employers.

Skills Bootcamp funding should be folded into a single employment and skills funding pot for devolved areas in England. They can then decide how best to spend this funding to achieve employment and skills outcomes set out in devolution agreements. It would have the potential for strategic stakeholders and existing providers in devolved areas to deliver support and training that is tailored to the needs of digital and tech employers, and local people who need help the most. Devolved areas and the UK Government may decide to continue with a standalone programme, or to build the approach into their mainstream funding.

Either way, future funding (whether in a continuation or evolution of Skills Bootcamps or other work-related learning route) should better incentivise a focus on people from lower socio-economic groups and with lower qualifications. This could come through a mix of:

- **Financial incentives.** Such as differential funding rates for people with different qualification levels, or a requirement for co-funding from the employer or individual for learners already qualified at Level 3 and above. As part of this, ensuring funding is available for people who face specific barriers to employment, recognising the cost of the higher and more intensive support that is often crucial in enabling them to secure good employment outcomes.

⁷³ Specific recommendations for policy makers and commissioners, and for employers are listed separately in Appendix 2.

- **Commissioning structures.** Such as setting a requirement that each provider only has, say, 25% of participants who already have a Level 3 qualification or higher, or only 25% are in work or have been out of work for six months or less, or setting benchmarks or incentives to engage underrepresented groups such as people with disabilities or from specific minority ethnic backgrounds.

To make informed decisions, the Government should publish timely data and commission robust independent evaluations of all publicly funded provision. Understanding the performance and value for money of different programmes in supporting people from disadvantaged backgrounds into employment is crucial. Published data is currently inconsistent across programmes and does not provide evidence of the comparative value of different interventions in reaching the people who need the most help and supporting them into work.

- 2. Find hidden talent: Employers, working with national and local government, should consider how they can promote careers in digital/tech, widen recruitment approaches and build career pathways.** Digital and tech careers should be accessible to everybody. Widening the talent pool that digital/tech workers are drawn from will help mean employers get the best possible workers and that people have the best possible opportunities. Employers need to do this both individually and working together in local areas and within sectors.

A first step should be considering how best to raise awareness of the careers available in digital and tech, across all sectors of the economy, building information on these into careers services for young people and adults. In this way, setting out the career ladders available and how to climb each rung. That should include use of role models – ‘people like me’ – from under-represented backgrounds who work in digital/tech. One way to do that would be to promote entries to Festival of Learning’s adult learning awards, England’s largest lifelong learning celebration.⁷⁴

Beyond this, employers and employer groups should consider how they can individually and collectively reach some of the hidden talent they are missing out on. That could include: engaging with schools, colleges and training providers to offer visits and work placements; working with Jobcentre Plus and employment services to offer work trials; considering where and how to advertise vacancies; working with local government, particularly where they have developed hubs or gateways to bring people, employers and learning together; and working with learning providers, community groups and others to raise awareness.

Given that the majority of UK employers are SMEs, and report lack of awareness and capacity to broaden recruitment approaches, larger employers and employer groups should play a leading role in taking this agenda forward.

- 3. Invest in skills. Employers should increase investment in digital/tech training, supported by the Growth and Skills Levy and a new Skills Tax Credit.** Investing more in training staff, including supporting new recruits as apprentices, can aid productivity, business success, and meeting skills needs.

Policy needs to better support and target training at work. The Growth and Skills Levy should take the ‘flex and match’ approach proposed by Learning and Work Institute.⁶³ Under this approach, large employers in England should have flexibility to spend some of their levy payments on non-apprenticeship training, but only matched up to the amount they invest in apprenticeships for young people.

The Government has said that Skills England will determine which learning is eligible for funding under the Growth and Skills Levy. Employers, trades unions and local government should be able to input into this decision. It should include, where appropriate, tech/digital skills learning, including modular and bite size training to reflect the need for shorter courses employers have identified as important, and with the flexibility that is valued by people who face barriers to employment. It could also include pre-apprenticeship provision or pre-employment support that reaches underrepresented groups.

It should also be able to be regularly and swiftly updated, to reflect rapidly changing technology and skills needs. It could also potentially include pre-apprenticeship learning programmes, where these are focused on under-represented groups and demonstrate a good track record of progression onto apprenticeships, jobs and other learning.

⁷⁴ <https://learningandwork.org.uk/what-we-do/lifelong-learning/festival-of-learning/>

Evidence from the former traineeship programme in England showed that provision that focussed on enabling young people to develop job specific skills, in response to skills gaps, such as digital/tech, were highly valued by employers and young people, and likely to produce the best employment outcomes. Government should ensure that lessons from traineeships inform future policy.

Employers also need to invest in training beyond the levy, increasing current investment to meet their digital skills needs and unlock growth potential. That includes SMEs, who do not currently pay the levy. To incentivise this, the Government should introduce a Skills Tax Credit, providing financial incentives for firms to invest in accredited learning, particularly in essential skills like literacy, numeracy and digital, and up to Level 5. Sectors should also consider whether to introduce a skills levy to tackle sector-specific skills issues, as construction and other sectors have done. This could include where shortages of digital and tech skills are identified.

Combined authorities should have a responsibility for driving demand for apprenticeships in their region as part of their role in shaping and creating a coherent local skills and employment system.

- 4. Simplify the employment and skills system and make training flexible: The employment and skills system should be simplified, joined up, and able to adapt to rapidly changing digital and tech skills needs.** The employment and skills system is complex for both employers and people, too often disjointed, and afflicted by short-term limited funding and rapid change. This can particularly impact on sectors, such as digital and tech, where needs are rapidly changing.

The content of qualifications, other learning, and apprenticeships needs to be updated more speedily to reflect changing needs in digital and tech roles. If it changes too slowly then employers are unable to get the skills they need. That could include exploring a more modular approach to apprenticeships, that allows some tailoring of the content to specific roles or technologies.

We also need to make it easier for employers looking to recruit digital and tech roles and people looking to move into those occupations to find the right help. Devolution within England offers an opportunity to build this approach, and indeed some areas, like London, have already started to try and develop it. Local areas, across England and Scotland, should work with employers to understand the pathways into digital and tech roles and what employers need, and build support and careers advice around this.

As a whole, accountability, commissioning and ways of working need to focus more on the outcomes they are seeking to achieve (more people in work, including in digital and tech roles, and earning more) than on individual programmes and the number of participants on each. Longer-term funding settlements, such as at least three year budgets for further education colleges and other institutions, could help with building relationships with employers.

Appendix 1: Definition of tech occupations

Definition for digital and tech occupations included in the secondary data analysis

| SOC code | SOC Name |
|----------|---|
| 2131 | IT project managers |
| 2132 | IT managers |
| 2133 | IT business analysts, architects and systems designers |
| 2134 | Programmers and software development professionals |
| 2135 | Cyber security professionals |
| 2136 | IT quality and testing professionals |
| 2137 | IT network professionals |
| 2139 | Information technology professionals (not elsewhere classified) |
| 2141 | Web design professionals |
| 2142 | Graphic and multimedia designers |
| 3131 | IT operations technicians |
| 3132 | IT user support technicians |
| 3133 | Database administrators and web content technicians |
| 3573 | Information technology trainers |
| 5244 | Computer system and equipment installers and servicers |

Appendix 2: Summary of recommendations

This appendix summarises the recommendations for policymakers and commissioners, and for employers.

Recommendations for policymakers and commissioners

- **Local growth plans, such as City Region and Growth Deals in Scotland, and Local Skills Improvement Plans in England should include assessment of tech/digital skills needs, with public funding targeted on those that need the most help.**
- **Different sources of funding, such as the Adult Skills Fund, the UK Shared Prosperity Fund and Investment Zone Funding, should be aligned with local plans** to ensure that people from disadvantaged backgrounds, who need the most support, are able to benefit from opportunities.
- **Skills Bootcamp funding should be folded into a single employment and skills funding pot for devolved areas in England.** This would enable them to decide how best to spend this funding to achieve employment and skills outcomes set out in devolution agreements.
- **Future funding should better incentivise a focus on people from lower socio-economic groups and with lower qualifications.** This could come through a mix of:
 - **Financial incentives.** Such as differential funding rates for people with different qualification levels, or a requirement for co-funding from the employer or individual for learners already qualified at level 3 and above.
 - **Commissioning structures.** Such as setting a requirement that each provider only has, say, 25% of participants who already have a Level 3 qualification or higher, or only 25% are in work or have been out of work for six months or less, or setting benchmarks or incentives to engage underrepresented groups such as people with disabilities or from specific minority ethnic backgrounds.
- **The Government should publish timely data and commission robust independent evaluations of all publicly funded provision.** Understanding the performance and value for money of different programmes in supporting people from disadvantaged backgrounds into employment is crucial.
- **National and local government, working with employers, should consider how they can promote careers in digital/tech, widen recruitment approaches and build career pathways to ensure that digital and tech careers are accessible to everybody.** A first step should be considering how best to raise awareness of the careers available in digital and tech, across all sectors of the economy, building information on these into careers services for young people and adults.
- **Policymakers should design the Growth and Skills Levy to take a ‘flex and match’ approach.** Under this approach, large employers in England should have flexibility to spend some of their levy payments on non-apprenticeship training, but only matched up to the amount they invest in apprenticeships for young people.
- **In determining which learning is eligible for funding under the Growth and Skills Levy, the Government, through Skills England, should ensure that employers, trades unions and local government can input into this decision.** It should include, where appropriate, tech/digital skills learning, including modular and bite size training to reflect the need for shorter courses employers have identified as important, and with the flexibility that is valued by people who face barriers to employment. It could also include pre-apprenticeship provision or pre-employment support that reaches underrepresented groups.
- **Government should ensure that training eligible for funding under the Growth and Skills Levy is regularly and swiftly updated, to reflect rapidly changing technology and skills needs.**

- **Policymakers should ensure that lessons from the former traineeship programme in England inform future policy around pre-apprenticeship learning for young people.**
- **Government should introduce a Skills Tax Credit to incentivise employers to invest in accredited learning, particularly in essential skills like literacy, numeracy and digital, and up to Level 5.**
- Government should give combined authorities a responsibility for driving demand for apprenticeships in their region as part of their role in shaping and creating a coherent local skills and employment system.
- **Policy makers should consider ways to ensure that the content of qualifications, other learning, and apprenticeships can be updated more speedily to reflect changing needs in digital and tech roles.** This could include exploring a more modular approach to apprenticeships, that
- allows some tailoring of the content to specific roles or technologies.
- In designing and commissioning digital skills provision, policy makers
- **and commissioners should focus more on the outcomes they are seeking to achieve** (more people in work, including in digital and tech roles, and earning more) than on individual programmes and the number of participants on each.
- Government and local area commissioners should also consider introducing longer-term funding settlements, such as at least three year budgets for further education colleges and other institutions. This could help with building relationships with employers.

Recommendations for employers

- **Employers, including those in tech/digital sectors, should engage in processes to assess the need for digital/tech skills and plans for how to meet this,** as part of the development and refresh of City Region and Growth Deals in Scotland and Local Skills Improvement Plans in England.
- **Employers, working with national and local government, should consider how they can promote careers in digital/tech, widen recruitment approaches and build career pathways.** Employers need to do this both individually and working together in local areas and within sectors.
- **Employers and employer groups should consider how they can individually and collectively reach some of the hidden talent they are missing out on.** This could include: engaging with schools, colleges and training providers to offer visits and work placements; working with Jobcentre Plus and employment services to offer work trials; considering where and how to advertise vacancies; working with local government, particularly where they have developed hubs or gateways to bring people, employers and learning together; and working with learning providers, community groups and others to raise awareness. Larger employers and employer groups should play a leading role in taking this agenda forward.
- **Employers should increase investment in digital/tech training, supported by the Growth and Skills Levy. Employers also need to invest in training beyond the levy, supported by the introduction of a Skills Tax Credit, for accredited learning, particularly in essential skills like literacy, numeracy and digital, and up to Level 5.** Sectors should also consider whether to introduce a skills levy to tackle sector-specific skills issues, as construction and other sectors have done. This could include where shortages of digital and tech skills are identified.



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