Digital Skills Divided:

Technical provision for 16 to 19 year olds

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The Hg Foundation

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The Hg Foundation aims to widen access to high quality careers in technology, focussing on removing barriers to education and skills. It seeks to support groups currently underrepresented in the technology sector, including those from lower income backgrounds, from certain ethnic groups and women and girls. Hg, Europe's leading software and technology services investor, supports the Foundation, enabling access to a network of skills and expertise in technology, as well as a portfolio of technology companies, providing access to work experience and mentoring. The foundation supports programmes in the UK, US and Europe.

The Foundation commissioned this research to better understand the challenges facing young people pursuing technical digital qualifications – and facing colleges in providing these pathways. The results will inform the Foundation's future work in the UK and others working in this space, as well as informing policymakers looking to address the digital skills shortage.

Visit www.thehgfoundation.com

About the Education Policy Institute

The Education Policy Institute is an independent, impartial and evidence-based research institute that promotes high quality education outcomes, regardless of social background. We achieve this through data-led analysis, innovative research and high-profile events.

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Executive summary

In this report we consider the demand for digital skills and the role that technical provision for 16- to 19-year-olds can play in supplying young people with these skills. We consider the take-up of technical qualifications in digital skills by young people, and the capacity of colleges to deliver these qualifications. The evidence comes from a variety of sources, including:

- official government statistics;
- government-commissioned research;
- independent research, for example from the Centre for Vocational Education Research; and
- EPI analysis of administrative education records

Key Findings

There is unmet employer demand for digital skills

- According to official data, one in twenty employers reported a vacancy due to a shortage of skills. Of these vacancies, 29 per cent were related to a lack of digital skills and 17 per cent were related to a lack of advanced digital skills.
- Skills shortages were most likely to be related to a lack of digital skills in the information & communication sector (61 per cent) followed by the financial services and business services sectors (25 and 21 per cent respectively). The West Midlands, the North East, and London all had vacancies more likely to be related to a lack of available digital skills.
- Of the occupations typically undertaken by individuals with intermediate-level technical qualifications there were varying levels of digital skills shortages. For associate professional roles, one in four skills shortage vacancies were related to digital skills, whereas for skilled trade occupations only one in seven were.
- Existing research suggests that taking an intermediate-level ICT qualification is associated with increased earnings by the time employees are in their late 20s (Battiston et al. 2019). For women the financial returns are around 20 per cent, compared with just 4 per cent for men. However, despite the greater relative returns for women, men with these ICT qualifications continue to have higher earnings than women.

Take-up of IT or computing technical qualifications by 16- to 19-year-olds is falling and is especially low for female students

- The number of students taking technical IT or computing qualifications has fallen by one-third since 2015, falling from 33,000 students to just 22,000 students.
- Take-up of IT or computing GCSE, which appears to be highly predictive of take-up in the 16-19 phase, has fallen by 43 per cent since its peak in 2016. This is largely because of the withdrawal of IT GCSE in favour of the less popular Computer Science GCSE.
- There is a significant gender gap in the take-up of technical IT or computing qualifications, with male 16- to 19-year-olds five times more likely to take one than female students. The proportion of students taking these qualifications who were female fell from 23 per cent in 2012 to just 17 per cent in 2020.
- In general, regions with more vacancies related to digital skills also have a higher proportion of 16-19 students taking relevant qualifications. The notable exceptions to this trend are the

South East and the South West, which both have average levels of skills shortages related to digital skills (17 per cent) but have the lowest proportions of students taking IT related qualifications (3 per cent).

- Though students taking the new digital T levels may secure good levels of digital skills, the demanding nature of these qualifications mean they may not be an appropriate choice for many students. Almost two in five of recent students took digital skills qualifications that may be defunded, due to their similarity to digital skills T levels. However, 27 per cent of these students were studying smaller digital qualifications than T levels or do not meet the expected GCSE grade requirements to access these new qualifications.
- The number of apprenticeships in the ICT sector has fallen significantly in recent years. Prior to the pandemic, in 2019/20, starts were half of the number in 2015/16. By 2020/21 the number had fallen further to just 44 per cent of their 2015/16 peak. Though these falls are not unique to apprenticeships in the ICT sector.

The capacity of colleges to deliver digital qualifications may be at risk

- Digital skills teachers in colleges have lower levels of qualifications and industry experience than teachers in most other subjects. Almost one in five digital/ICT teachers are not qualified to teach level 3 qualifications and one-third have no industry experience, higher than the corresponding figures for most other subject areas.
- Recruitment and retention of digital teachers is an issue. Two-thirds of colleges find digital teachers difficult to recruit. In a survey prior to the pandemic almost half of digital teachers said they were likely to leave their role within the next 12 months. Correspondingly, digital teacher roles have a high vacancy rate compared with other subject areas.
- The pay of digital college teachers is similar to that of teachers in other subject areas. However, young people with an ICT degree have higher average earnings than graduates from other subject areas. This suggests that, relative to other subjects, prospective digital teachers may have higher paid options elsewhere in the labour market.

Conclusions and implications for policy

There is substantial employer demand for more young people with digital skills, including those provided through intermediate-level technical qualifications. Correspondingly, there are clear financial benefits for those who take these qualifications.

However, there remain significant obstructions to the pipeline of young people with the right level of digital skills.

It appears that the reforms that led to the withdrawal of the IT GCSE in favour of computing led to a drop in the overall number of GCSE entrants, which in turn may have led to a fall in take-up of technical qualifications in the 16-19 phase. Furthermore, reforms also appear to have further skewed the gender balance away from female students. The government's 2017 Digital Strategy stated their ambition to redress the gender imbalance in these subjects; this has clearly not happened. Indeed, though the 2022 update refers to scholarships for underrepresented groups to take higher education courses in artificial education, it makes make no mention of the gender imbalance in schools and colleges. If the entry rate for young women were to match that of young men, the total number of entries into intermediate-level digital technical qualifications would return to its 2014 peak.

Proposal 1: The government must update their digital strategy with a clear set of proposals to increase entries into technical qualifications from young women. For example, through careers advice and guidance or through targeted work placements.

However, encouraging greater take-up will have limited effect without addressing the difficulties colleges face in recruiting and retaining teachers qualified to teach the necessary digital skills. There is clearly a mismatch between the value put on these skills in the labour market at large, and the pay of digital skills teachers in the further education sector. This mismatch must be addressed if young people are to secure the skills they need. There are already bursaries for skilled individuals to take-up teacher training in shortage subjects in both schools and colleges. However, the "levelling up premium" pay supplements for early career computing teachers in disadvantaged areas are only available for secondary school teachers, despite colleges facing particularly acute staffing difficulties.

Proposal 2: The government must increase incentives to encourage the greater recruitment of digital skills teachers, and of teachers in other subjects with significant shortages across the further education sector. As a starting point the levelling up premium payments, worth between £1,500 and £3,000 annually, should be extended to teachers in the further education sector.

More broadly there is a dearth of analysis and research on the further education workforce, especially by comparison to the school workforce. The first full collection of the new FE workforce census will take place this year. This valuable new data source has the potential to address this gap in order to improve policy making in this area.

Proposal 3: The government must make the FE workforce data available to researchers soon after the first full year of the data collection. Given the apparent level of severe staffing difficulties in the FE sector this data is needed urgently to inform delivery and policy making.

The roll out of three digital T levels will provide many 16- to 19-year-olds with a valuable opportunity to strengthen their skills in this area. However, our analysis suggests the more demanding nature of T levels may mean that many students will not make the transition. The risk is that some students will take qualifications at lower levels. If T levels maintain their current level of challenge, significant uptake will not only rely on the qualifications proving themselves as high quality, with positive outcomes for students, but also on increased GCSE attainment. This may prove to be a significant barrier to the success of T levels.

Proposal 4: The government must ensure that the introduction of T levels does not decrease the proportion of 16-19-year-olds taking level 3 qualification in digital skills. For example, by continuing the availability of alternative level 3 qualifications at least until enough students are able to access T levels.

Young people with digital skills qualifications are in high demand. Yet without further government action to address workforce shortages and recent falls in take up, young people and employers both stand to lose out.

Foreword from the Hg Foundation

The expansion of jobs in technology have not been evenly distributed. Women, those from low-income homes and those from certain ethnic groups are significantly underrepresented in the sector, even as opportunities for employment have expanded and a digital skills shortage has emerged.

At The Hg Foundation our mission is to do something about that, by investing in education and skills-building programmes that support underrepresented communities, and through funding research and analysis that will help us - and others - to better understand the obstacles to a more diverse talent pipeline.

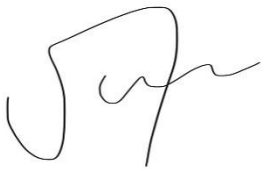
It is early days for our work and we are a young foundation, keen to learn. There are many barriers in place and many great organisations already working to address them, from interventions in schools, through apprenticeships and into higher education and early careers. Our work spans the UK, US and Europe - and while there are many contextual differences, we are firm believers in learning lessons across countries.

The challenges highlighted by this research from EPI point to some of the critical areas where action is needed in the English further education (FE) system - a system that disproportionately serves those from poorer backgrounds and gives important chances to those so often forgotten.

The analysis shows that the introduction of the academically rigorous computer science GCSE has had benefits; but it has also left behind large numbers of young people who were engaged by the GCSE in Information Technology. Similarly, T levels have much promise, but the research in this paper suggests there is a risk that their introduction and the subsequent de-funding of other qualifications may mean large numbers of learners do not have a viable digital skills pathway to follow.

But more than anything, the research points to major workforce challenges in the FE sector. A shortage of suitably qualified individuals working in colleges - and a significant differential in earnings between the education and private sectors - pose a real threat to the future provision of digital skills qualifications. Exploring more ambitious financial incentives for computing graduates to teach in FE and looking at innovative ways for those in the professions to contribute to teaching, are needed more than ever. And every system around the world will be facing similar deep-rooted challenges.

We are grateful for the team at EPI for their work on this important piece of research. And we look forward to seeing what role we can play in making the system fairer so that the technology sector can make full use of the talents of all, regardless of background.



James Turner

CEO of The Hg Foundation

1 Introduction and methodology

New digital technologies, including information and communication technologies, artificial intelligence and robotics, are reshaping the way people live, work and learn. Digitalisation presents immense potential to boost productivity and improve well-being. However, it can also increase inequalities if some groups, including less-academic learners, are left behind. Moreover, since the labour market is demanding higher skill levels the traditional vocational system aimed at manual and routine jobs has become outdated. Evidence suggests that high levels of digital skills often entirely compensate for lower formally-recognised qualifications in terms of labour market outcomes.

This direction of travel has been recognised by policymakers in recent years with the shift in the school curriculum away from Information Communication Technology (ICT) and towards computing and coding skills, the provision of publicly funded basic digital skills training for adults and the introduction of digital skills T levels (the government's new high-status technical alternatives to A levels). This report sets out to increase understanding of the delivery of intermediate-level skills for young vocational learners and to identify where further intervention may be required.

This report presents analysis derived from published government statistics, official reports and existing education and skills research, as well as new EPI analysis of the DfE's National Pupil Database (NPD). As part of the development of this research EPI also held a roundtable meeting with representatives from the further education sector, employers, awarding bodies and the government. The roundtable was used to stress-test the content and findings of the research.

Within this report we term all level 3 non-academic qualifications related to digital or ICT qualifications as technical qualifications. We will also use the acronym IT (information technology) rather than ICT if this is what was used by the original source.

In chapter 2 we report on what provision is available for digital skills, how this is changing and what reforms are taking place with regards to providers and digital/ICT teachers. We focus on the provision of intermediate technical qualifications for 16- to 19-year-olds, but we also cover recent reforms to GCSEs, A levels, apprenticeships and adult skills.

In chapter 3 we report on employer-reported shortages in digital skills. We use the Employer Skills Survey to identify employer demand for advanced digital skills, specifically considering the proportion of skills shortages related to digital skills. We consider how these shortages differ across employment sectors, occupations and regions. We also consider existing research on the financial returns to digital/ICT qualifications, including from both the Department for Education and the Centre for Vocational Education Research.

In chapter 4 we report on the take-up of digital/ICT qualifications. As well as the take-up of technical qualifications we consider take-up at GCSE, A level, and of apprenticeships. We consider how take-up varies across different demographic groups. We also include international comparisons of problem solving in digital environments. This chapter draws on published official statistics supplemented by EPI analysis of the National Pupil Database (NPD). The NPD files are made available to EPI by the Department for Education via the Office for National Statistics Secure Research Service. The NPD dataset covering this phase of education is a combined dataset covering students in school sixth forms as recorded in the school census and students at other further education institutions as recorded on the Individualised Learner Record (ILR). The datasets, including student level information and information on the qualifications they have taken, are compiled by the Department

for Education. Qualifications officially categorised as being in the ICT for users and ICT for practitioners subject areas, as well as a small number of other qualifications identified by EPI as being directly related to digital skills, are included in this analysis. Analysis based on student characteristics is from 2019, prior to the pandemic. Time series analysis includes 2020 data. Chapter 5 also includes information from the OECD's survey of adult skills, PIACC.

In chapter 5 we report on what is known about teachers of digital/ICT skills within further education colleges. We consider levels of teacher experience and qualifications, relative to other subjects, as well as teacher vacancies and recruitment. This analysis is based on published data from the College Staff Survey, commissioned by the Department for Education in 2018 to increase understanding of the workforce in colleges across England. We also consider how ICT/digital teacher pay compares with that of teachers of other subject areas and with graduates with degrees in the same subject areas. This analysis is derived from the Staff Individualized Record (the SIR) data from 2018-2019 published in a report commissioned by the Education and Training Foundation. Data in the SIR is collected voluntarily from further education providers. As not all colleges complete the SIR the results may not be exactly representative of the sector.

2 What provision is available?

In this section we will investigate what digital skills qualifications are available for 16- to 19-year-old students and consider any recent policy developments.

2.1 Digital skills in compulsory education

In 2014 the government introduced coding to the national curriculum for both primary and secondary schools. However, there is no requirement for students to take computing qualifications during Key Stage 4. Although the government considers digital skills to be "basic skills" alongside English and maths, unlike those subjects there is no expectation to meet a minimum qualification level by the time young people reach the end of their compulsory education. [i] Furthermore, in contrast to most upper-secondary education systems, students in England generally select a narrower set of subjects for study, whether in the form of A levels, or for applied or technical qualifications.

2.2 Current digital skills provision

Academic courses - GCSE and A level

In 2015 the DfE announced that both GCSEs and A levels would be reformed to be predominately exam-based, with new content developed by the government and exam boards. As part of the reforms IT GCSE and A level was dropped and computer science GCSE and A level were revised to ensure they remained relevant to modern skills needs.[ii]

The reformed GCSE and A level computer science courses cover the following topics to varying degrees[iii]:

- Following and writing algorithms
- Characteristics of systems architecture
- Fundamentals of programming
- Characteristics of networks
- Systems software
- How to design, write and test programmes
- Systematic approaches to problem solving

Although the new content appears to encompass a wide range of topics relating to digital skills there were mixed reviews when the new course content was revealed. [iv] Whilst some of the IT/digital sector agreed the new curriculum was well suited to students wanting to develop specialised digital skills there were concerns it left a gap for students who needed to develop sufficient skills for the many professions that use, but do not specialise in, digital technology.

Intermediate-level technical qualifications for 16- to 19-year-olds

There are a wide range of intermediate qualifications in digital skills available for 16- to 19-year-olds. For the 2022 exam season there were almost 80 level 3 qualifications at least the size of AS level, though some of these were designed especially for those on apprenticeships. These qualifications vary from those designed to provide access to higher education (e.g., in computing) to those designed to lead young people into specific industries (e.g., gaming). Until recently the government

expected all students wishing to pursue a level 3 non-academic course to be studying qualifications it identified as either:

- Applied general: qualifications that provide broad study of a vocational area. They are designed to lead to higher education and include areas such as performing arts, business and health and social care.
- Tech levels: level 3 qualifications for students wishing to develop specialist skills and knowledge for a technical occupation or industry. They lead to recognised occupations for example in engineering, IT, accounting, or professional cookery.

Though both qualification types are currently eligible for government funding, there is a third significant group of level 3 non-academic qualifications that also receive government funding. However, although these qualifications are funded, the government does not include them in the national or provider-level official statistics. These qualifications make up over half of all funded non-academic level 3 ICT or computing qualifications for 16 to 19-year-olds, and are included in the following analysis.

Unlike with the reformed A level computer science course, the ICT and computer science applied general qualifications remain separate, providing students with the opportunity to pursue different digital routes. Examples include the following:

Information technology courses	Computing courses
▪ Software testing ▪ IT technical support and management ▪ Programming and data modelling ▪ Website development ▪ Big data and business analytics ▪ Creating systems to manage information	▪ Software design and development ▪ IT systems security and encryption ▪ Digital graphics and animation ▪ Website development ▪ Systems analysis and design ▪ Managing and supporting systems

For 18- and 19-year-olds who would like "high value courses" in ICT, the government is offering to fund level 2 qualifications as part of the National Skills Fund.[v] These are specifically targeted at those who have just left school to help develop their skills for further education or a career.

T levels

T level qualifications were launched in September 2020 and are equivalent to 3 A levels. They have been developed with employers to provide progression into higher education or entry into skilled employment. The T level courses combine classroom training with an industry placement to develop the knowledge and practical skills that employers need for specific occupations.

The government strategy for T levels was to simplify choices by providing those students ready to progress beyond GCSE-level with two main options for their classroom based post-16 study: an academic route (such as A levels) which focuses on preparing students for further academic study or a technical route which will mainly centre around T levels and will prepare students for further study or to enter skilled employment. Consequently, as T levels become more available, funding for other level 3 qualifications, such as applied generals, tech levels and other level 3 qualifications will be

stopped where they overlap with T levels.[vi] In May the government published a provisional list of 22 existing qualifications that overlap with the three digital skills T levels.[vii]

These reforms have met some resistance from the sector, principally with regards to the following risks:[viii]

- Whilst applied general qualifications have increasingly been used to access higher education it is unclear to what extent universities will accept T levels.
- T levels will potentially constrain choice for young people, who may not want to take a single large technical qualification in a single subject area. For example, they may wish to mix academic and vocational qualifications in different subjects or may want to take a smaller programme of study. With their options at level 3 constrained, they may be less motivated to achieve or decide to take lower-level qualifications instead.
- The higher standards associated with T levels may limit access to level 3 qualifications for some young people. For example, through providers setting minimum standards in GCSE English and maths in order to access T levels. To mitigate this risk the government has introduced a transition year to prepare students for T levels. Nevertheless, as the success of transition years has yet to be proven, the risk remains.

There will be three digital T levels available for students: digital business services; digital production, design and development; and digital support services.

The digital production, design and development T level has been constructed for young people who would like to go into software or web development. The course covers: designing, implementing and testing software; changing, maintaining and supporting software; and emerging technical trends.[ix]

The digital business services T level focuses more on data manipulation, analysis of data and how to communicate results to prepare students who would like a career in data analysis.[x]

The digital support services T level looks at digital infrastructure, networks and support for the students who would like to go into IT security or IT support.[xi]

All three T levels have core content which covers:

- Testing software, hardware and data
- Using digital technologies to analyse and solve problems
- Digital environments
- Using data in software design

In 2021/22 there were 76 institutions who offer at least one digital T level. The government plans to expand this to 303 institutions in 2023/24.[xii] From September 2024, the government plans to roll out T levels nationally so they can be delivered by any provider who is funded for 16-19 education.[xiii]

Apprenticeships

Along with academic and non-academic qualifications, at the age of 16 students can opt to complete an apprenticeship. This combines on-the-job training with study to give students the skills and knowledge needed for their specific occupation. The government aims to improve the quality of apprenticeships and put employers at the forefront of their development to build a skilled workforce. As part of this, in 2019 the Institute for Apprenticeships and Technical Education (responsible for supporting employers with the development of high-quality apprenticeships)

conducted a Digital Route Review to assess the quality and standards of digital skills apprenticeships.[xiv] Consulting with employers, apprentices and relevant occupational experts, the outcomes of the review were to ensure that apprenticeships met the standards for in-demand occupations by improving and updating course content. These improvements aim to result in apprenticeships which better reflect the genuine demand for occupations and provide apprentices with the technical knowledge and skills employers require.

There are currently eight level 3 digital skills apprenticeships standards available[xv] Broadly, they cover:

- *Digital infrastructure (e.g., cyber security technician or network cable installer):* focuses on installing, configuring, maintaining, testing and certifying various networks or applying procedure and controls to protect against potential security risks;
- *Digital support (e.g., information communications technician or digital support technician):* involves providing support to internal and external customers, maximising the effective use of digital office technology, configuring computer systems and diagnosing software or hardware faults;
- *Data analysis (e.g., data technician):* offers training in data analysis and specifically how to source, merge and manipulate data to be able to get results which can be presented to an audience;
- *Software development (e.g., IT solutions technician or software development technician):* focuses on "DevOps", which involves gathering the requirements of a project, solution development, testing, implementation and ongoing support

Adult skills

In the UK Digital Strategy, published in 2017 and updated in 2022, the government announced that basic training would be made freely available to adults who lack core digital skills.[xvi] All adults now have an entitlement to access digital skills qualifications at entry level and level 1.[xvii]

Launched in April 2021, the National Skills Fund enables adults who don't already hold a level 3 qualification to access their first level 3 qualification in a range of eligible subjects, including digital skills. The offer is also available to adults who earn less than the National Living Wage annually (£18,525) or who are unemployed, regardless of their prior qualification level.[xviii]

The National Skills Fund also includes funding for adults over the age of 19 to access courses up to 16 weeks long in order to develop skills that are in demand in their local area. This includes a wide range of, mostly online, courses across all government office regions.[xix]

2.3 Providers and teachers

Alongside reforms to qualifications and funding the government is also undertaking reforms regarding the institutions and teachers delivering digital skills qualifications and training during the 16-19 phase.

Provider reform

As part of the Digital Strategy and Post 16 Plan the government created the Institutes of Technology, which are a collaboration between further education providers, higher education providers, and employers to deliver technical education which focuses on the skills employers need in local areas.[xx]

The aim of the institutes is to deliver a variety of technical courses such as digital and cyber security, over a range of levels, such as higher apprenticeships, the new T levels and degrees.

In 2016 the government opened Ada, the National College for Digital Skills. The government intends for the college to train students for a wide range of digital careers such as software and database developers, user experience designers and tech entrepreneurs. The college offers computing BTECs in combination with creative digital media, graphic communication, maths, psychology and business studies qualifications. The government set an ambition for 50 per cent of students to be women by 2020. This was met in 2021.

Teacher workforce development

The UK Digital Strategy, published in 2017, referenced a range of new and recent reforms intended to improve digital skills. The most relevant reforms to the workforce teaching in the 16-19 phase were:

- Funding for the Computing at School Network of Teaching Excellence in Computer Science, whose network of over 350 Master Teachers will provide continuing professional development to teachers needing to further develop their computing expertise;
- The continuation of bursaries and scholarships to encourage those with high level computing skills into teaching. For schools, Initial Teacher Training (ITT) bursaries are available for graduates who train to teach computing.[xxi] For colleges Further Education Initial Teacher Education (ITE) bursaries are available for individuals who train to teach computing, and hold at least a level a level 3 or relevant industry experience in computing.[xxii] For the 22/23 academic year ITE bursaries are set at £26,000, whilst ITT bursaries are set at £24,000. In 23/24 ITT bursaries are expected to increase to £27,000.

More specifically for the college sector, following the introduction of the adult entitlement to basic digital skills training, the Education and Training Foundation (ETF, the professional development body for colleges and training providers) has rolled out a CPD programme to prepare teachers to deliver the new qualifications.[xxiii] However, these qualifications are for provision at level 1 and below, and therefore the associated CPD will not prepare teachers for delivering provision in intermediate-level (level 3) digital skills. The ETF has also introduced a CPD programme to improve the integration of digital technology into teaching.[xxiv] Again, this is not specific to preparing teachers to deliver level 3 qualifications in digital skills, though it may assist in improving the integration of digital skills across provision more broadly, as teachers may integrate more digital technology into their teaching.

For those teachers who are or will be teaching one of the three digital T Levels the ETF has introduced short courses that focus on delivery and assessment methods and content, critical legislation or planning considerations, and teaching approaches. These are delivered through a combination of eight hours of self-guided online learning, and a one-day face-to-face event.

3 What is the demand for these skills?

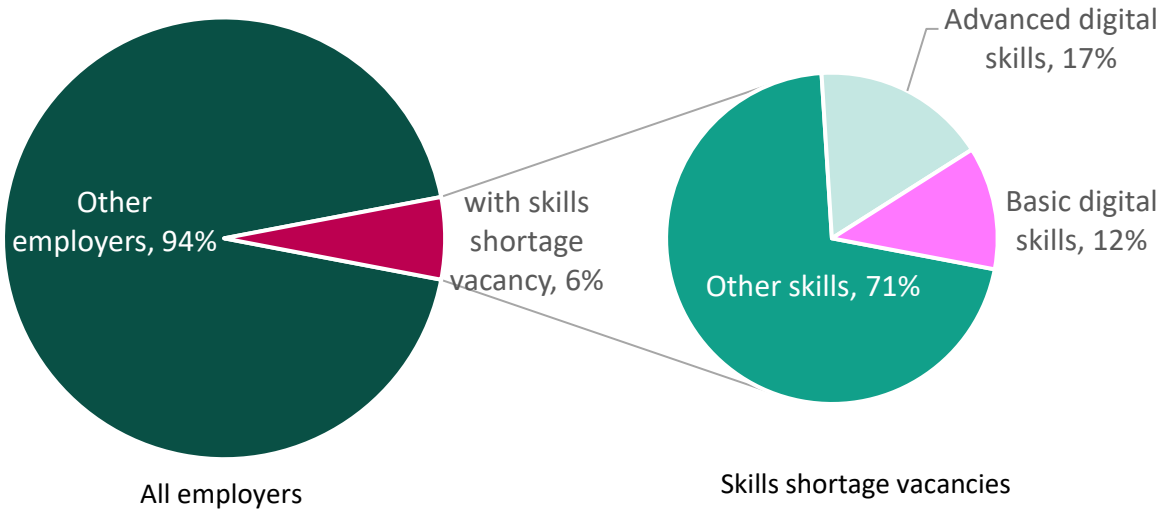
A 2021 YouGov survey of 1,000 employers found that 27 per cent say the majority of their workforce require advanced digital skills.[xxv] However, the increasing prevalence of roles requiring more advanced digital skills means that many employers have a shortage of employees with the required skills. A 2018 survey of 250 businesses from the CBI and TATA found that 67 per cent reported a digital skills shortage, with data analytics and software development the hardest skills to access, with 43 and 37 per cent of businesses reporting shortages respectively.[xxvi]

In this chapter we consider the degree to which employer demand for these skills is not being met by considering the prevalence of digital skills shortages reported by employers. We also consider the financial returns to young people studying subjects in this area and the future demand for advanced digital skills.

3.1 Skills shortage vacancies

The Employers Skills Survey provides information about skills gaps and vacancies facing employers. The survey defines a 'skill shortage vacancy' (SSV) as a vacancy that an employer is struggling to fill due to a lack of skills, qualifications, or experience among applicants.[xxvii]

Figure 1: Proportion of employers with skills shortage vacancies and proportion of those vacancies related to digital skills, 2019[1]



Source: Employers Skills Survey England: 2019 (DfE)

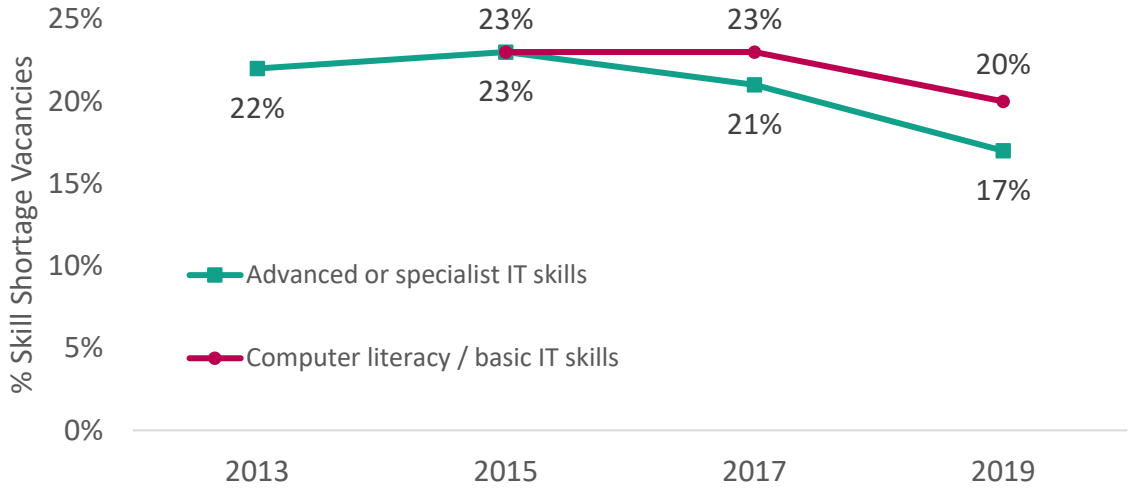
As shown in Figure 1, 6 per cent of employers have at least one vacancy related to a skills shortage. Of these vacancies 29 per cent were related to shortages digital skills (at any level), and 17 per cent are related to advanced digital skills. The remaining skills shortage vacancies were related to other skills such as other technical, practical, people or soft skills.

Figure 2 shows that since 2015 there has been a slight decrease in the proportion of skill shortage vacancies that were related to a lack of advanced or specialist digital skills among applicants. There

[1] The figure for basic skills excludes those skills shortage vacancies that are also related to advanced digital skills (8 per cent). These are included in the figure for advanced digital skills.

was a smaller fall in vacancies related to basic digital skills, which now represents 20 per cent of all skill shortage vacancies.

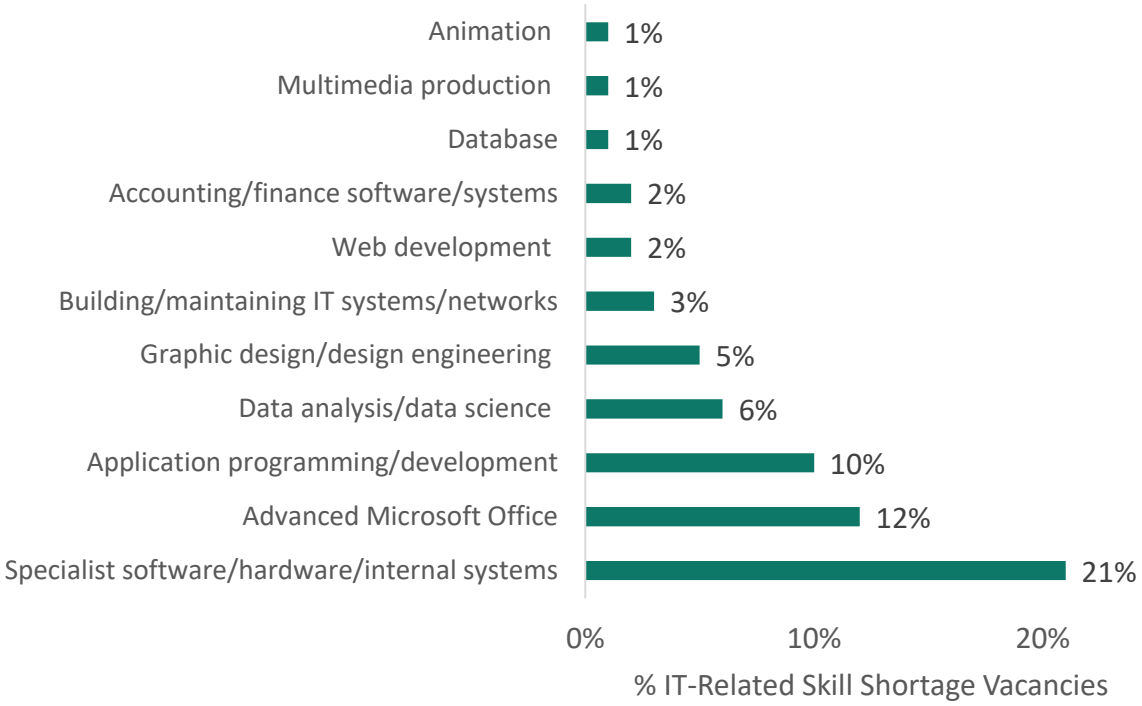
Figure 2: Proportion of skill shortage vacancies related to a lack of digital skills, by year



Source: Employers Skills Survey England: 2013-2019 (DfE)

Figure 3 shows the percentage of digital skills shortage vacancies related to specific digital skills, for employers who reported finding digital skills difficult to obtain from applicants. The advanced digital skills in most shortage are specialist software or hardware skills (21 per cent of the IT-related SSVs were due this), advanced Microsoft Office skills (12 per cent) and application programming and development skills (10 per cent).

Figure 3: Advanced digital skills lacking in applicants for establishments with digital-related skills shortage vacancies, 2019

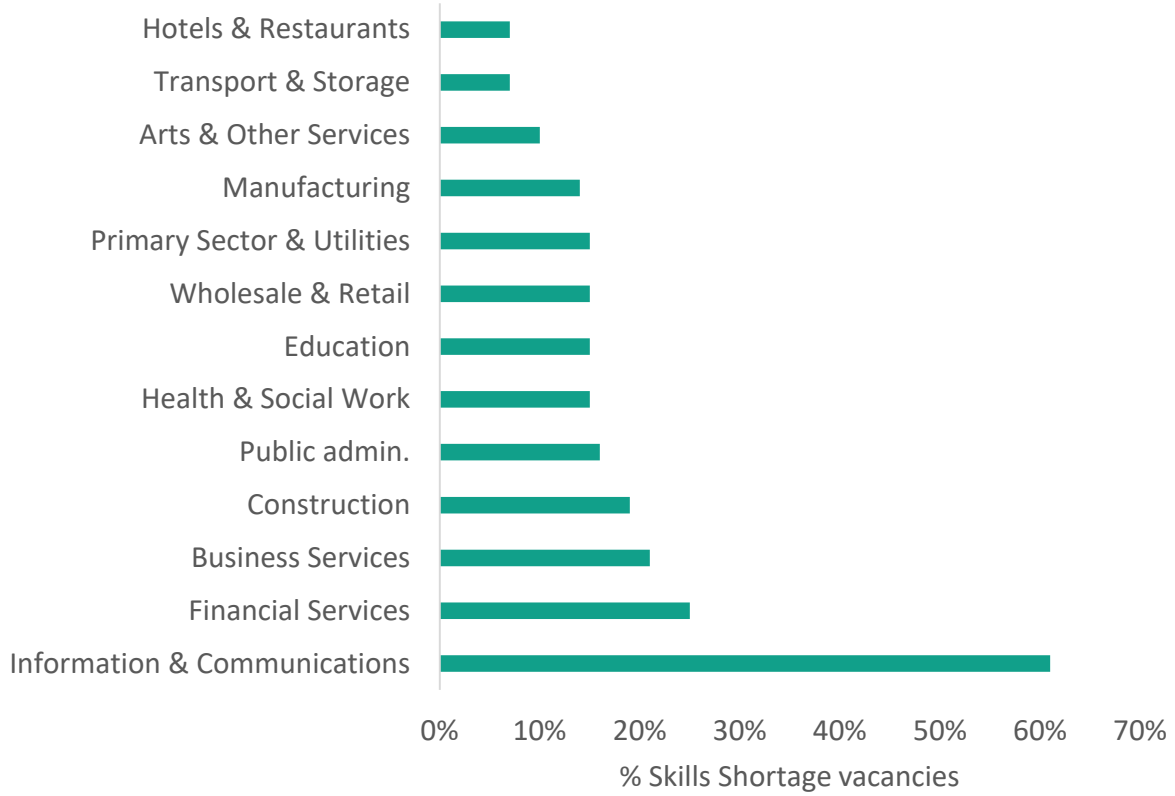


Source: Employers Skills Survey England: 2019 (DfE)

Shortages by sector

Figure 4 shows the information and communications sectors had the highest proportion of vacancies related to digitals skills, at 61 per cent. This was followed by financial services (25 per cent), business services (21 per cent) and construction (19 per cent). In the majority of the remaining sectors around 15 per cent of the skills shortage vacancies were related to digital skills.

Figure 4: Proportion of skill shortage vacancies related to a lack of digital skills, by sector, 2019



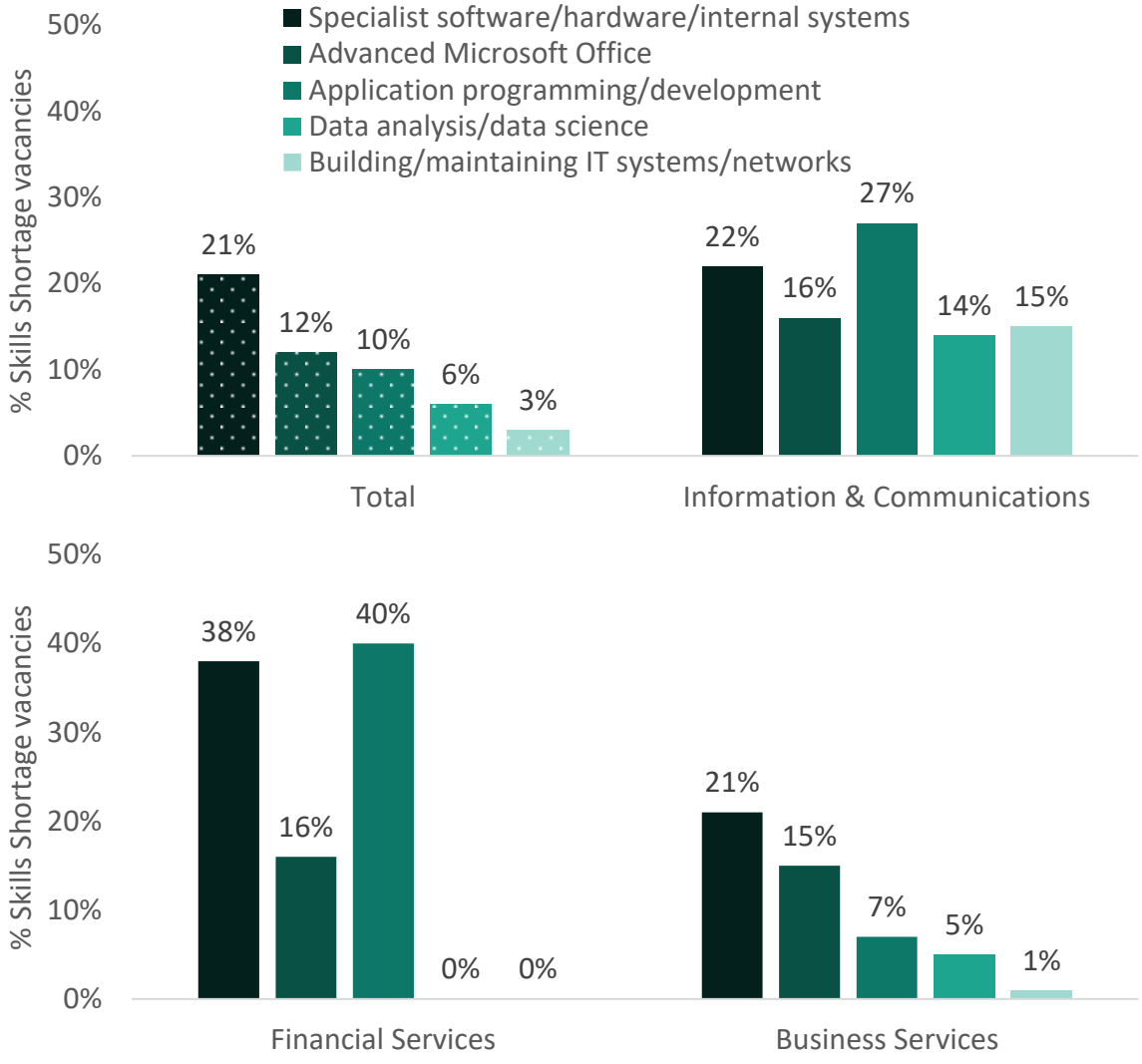
Source: Employers Skills Survey England: 2019 (DfE)

Figure 5 shows that, within both the information and communications and financial services sector, it is applications programming and development skills that are most in shortage, followed by knowledge of specialist systems. However, for the business services sector it is knowledge of specialist systems followed by advanced Microsoft Office skills that are most in shortage.

The information and communications sector reported 15 per cent of IT-related SSVs being at least partially related to building and maintaining IT systems. This is higher than in any other sector and highlights the importance of these specific advanced digital skills in this sector.

Considering the digital skills courses investigated in section 3, the qualification specifications covered a lot of technical content that employers have identified as being lacking in applicants. However, across the three sectors, advanced Microsoft Office skills are equally lacking, and this is not a skill that is explicitly covered in any of these courses.

Figure 5: Advanced digital skills lacking in applicants for establishments with IT-related skills shortage, vacancies by establishments in the digital and IT sectors, 2019

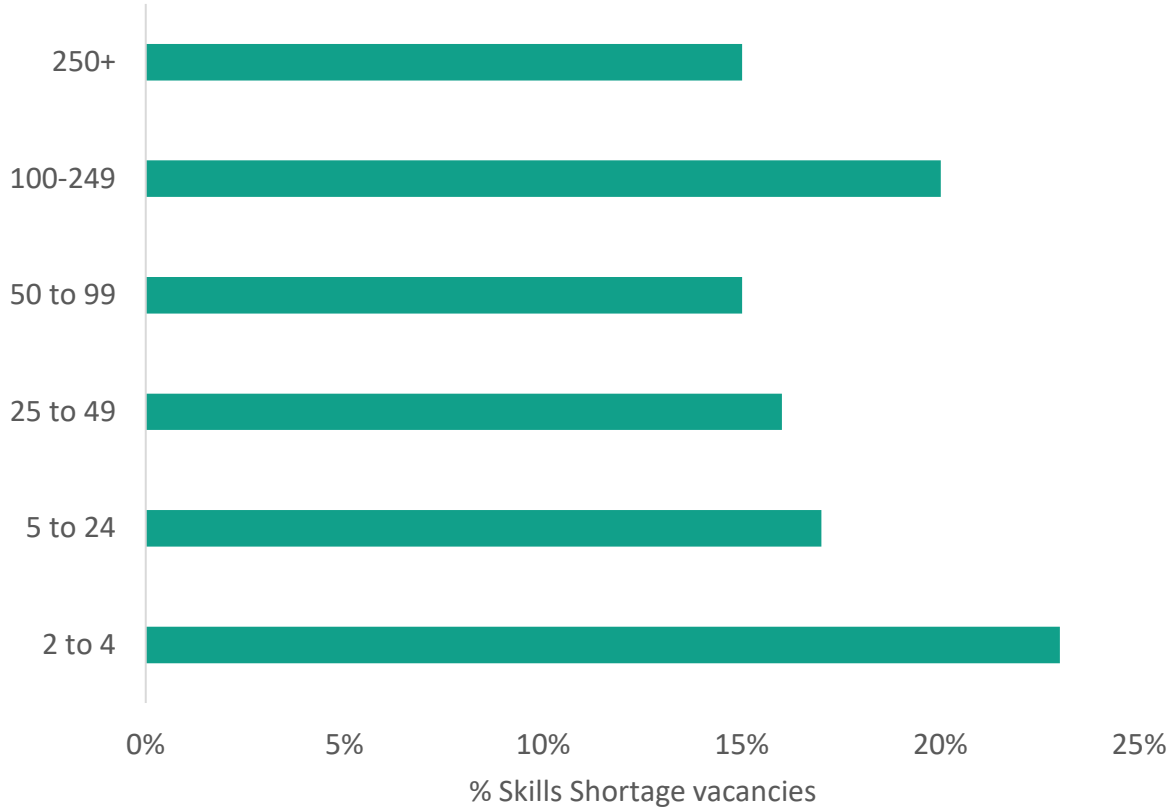


Source: Employers Skills Survey England: 2019 (DfE)

Shortages by establishment size

Figure 6 shows that very small (two to four employees) and large establishments (100 to 249 people) had the highest proportion of vacancies related to digitals skills, at 23 and 20 per cent respectively.

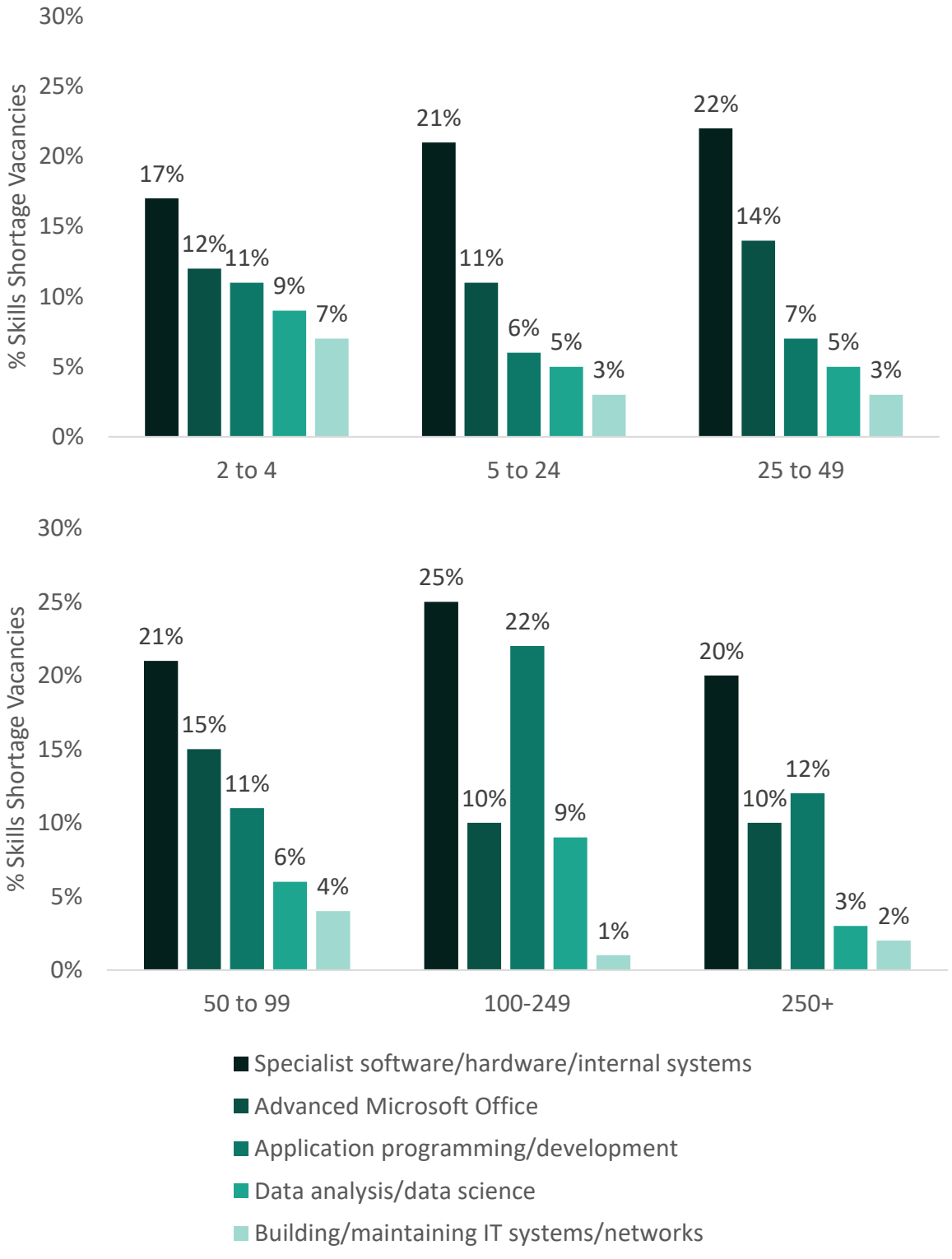
Figure 6: Proportion of skill shortage vacancies related to a lack of digital skills, by establishment size, 2019



Source: Employers Skills Survey England: 2019 (DfE)

Figure 7 shows that, for each establishment size, specialist software or hardware skills were universally the most difficult digital skills to obtain in applicants. For most establishments sizes this is followed by advanced Microsoft Office skills and then application development/programming. However, within establishments of 100 to 249 employees, application development/programming skills were in almost as short supply as knowledge of specialist systems. This could be because larger companies have more sophisticated digital and IT systems that applicants would need to use, but they may find it harder to recruit skilled employees than establishments of 250 or more people.

Figure 7: Advanced digital skills lacking in applicants for establishments with IT-related skills shortage vacancies by establishment size, 2019

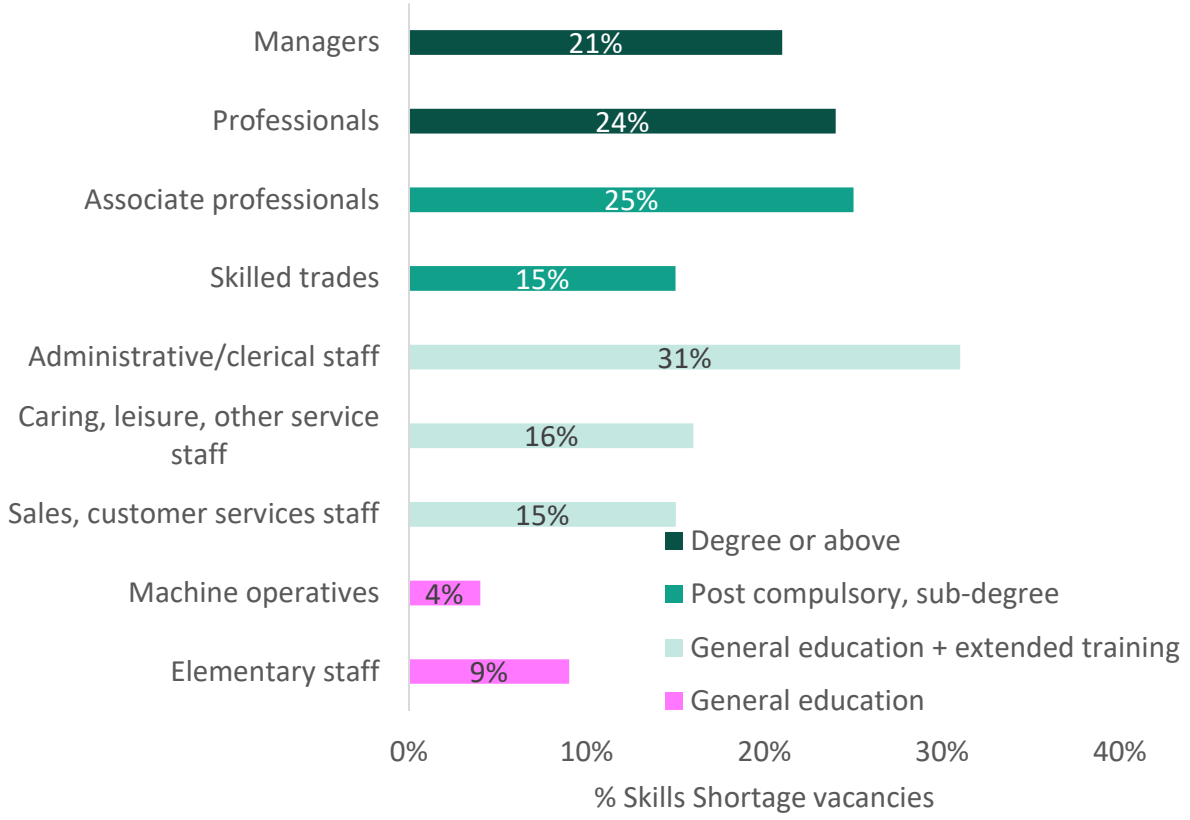


Source: Employers Skills Survey England: 2019 (DfE)

Shortages by occupation

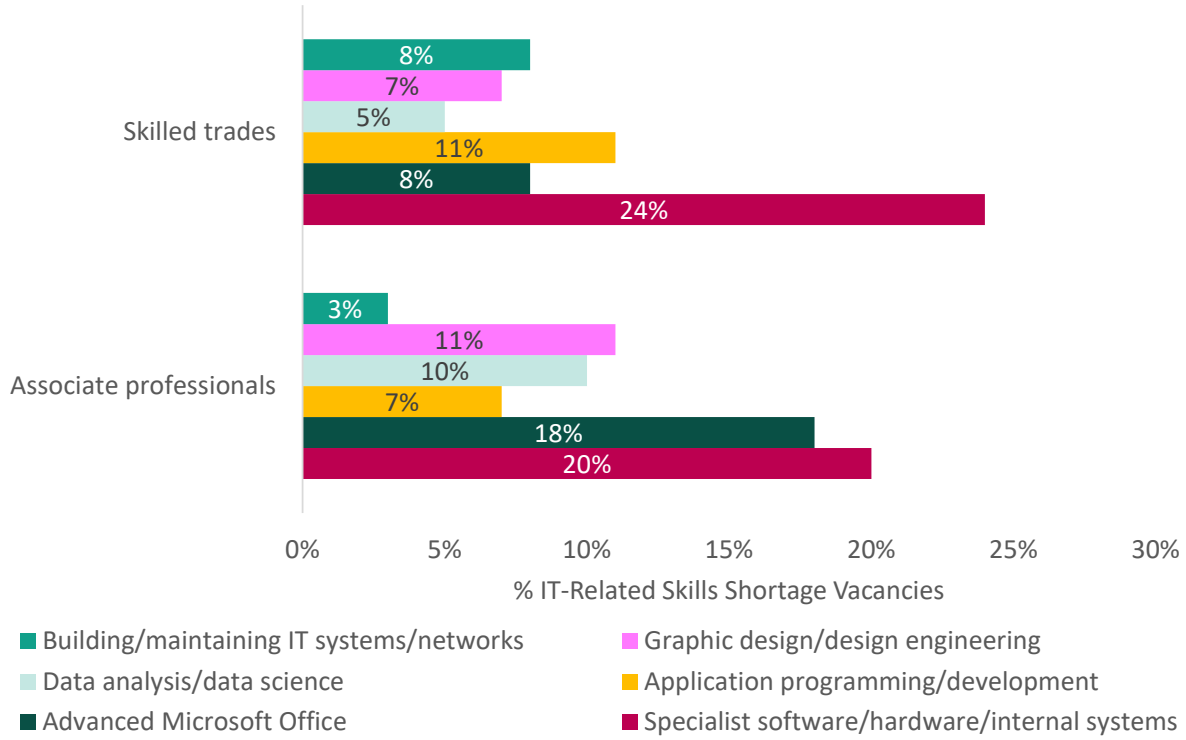
Figure 8 shows that skills shortage vacancies for administrative staff are the most likely to be related to a lack of digital skills (31 per cent). This is followed by associate professionals (25 per cent) and professionals (24 per cent). It's notable that skilled trade occupations, which along with associate professionals would typically be occupied by individuals with intermediate-level technical qualifications, have a relatively low level of shortages related to digital skills, at just 15 per cent.

Figure 8: Proportion of skill shortage vacancies related to a lack of advanced digital skills, by occupation, 2019



Source: Employers Skills Survey England: 2019 (DfE)

Figure 9: Advanced digital skills lacking in applicants for establishments with IT-related skills shortage vacancies, middle skilled occupations, 2019[2]



Source: Employers Skills Survey England: 2019 (DfE)

Figure 9 shows the specific skills shortages for the occupations most likely to be filled by individuals with intermediate-level technical qualifications - skilled trade and associate professionals. These vacancies are most likely to be related to a lack of knowledge of specialist systems, accounting for 24 per cent and 20 per cent of digital skills shortage vacancies in skilled trade and associate professional occupations respectively. For associate professionals this is closely followed by advanced Microsoft Office skills (18 per cent), but the figure for skilled trade occupations is only 8 per cent.

[2] Note: Unclassified Staff have not been included in Figure 4.4, neither has some digital skills as figures are low.

Shortages by region

Figure 10: Proportion of skill shortage vacancies related to a lack of digital skills, by region, 2019

Source: Employers Skills Survey England: 2019 (DfE)

Shortages in digital skills are particularly prominent in vacancies in the West Midlands (22 per cent), the North East and London (both 21 per cent), as shown in Figure 10. However, the particular digital skills in short supply vary between these regions, as shown in Figure 11. In the North East basic digital or internet skills are in short supply, whilst in London knowledge of specialist systems is more of an issue and in the West Midlands it is a lack of advanced Microsoft Office skills.

Figure 11:Advanced digital skills lacking in applicants for establishments with IT-related skills shortage vacancies by region, 2019

Source: Employers Skills Survey England: 2019 (DfE)

3.2 Future demand

It is expected that demand for digital skills will continue to increase in the future. Research from World Skills UK, the Learning and Work Institute, and Enginuity found that 60 per cent of employers surveyed expected to see a rise in their reliance on digital skills in the next five years, with 19 per cent expecting demand to increase significantly.[xxviii] Similarly, a survey of 250 businesses in 2018 from the CBI and TATA found that 95 per cent of business expected their digital skills needs to grow, whilst 58 per cent said they would need significantly more digital skills within the following five years.

Additionally, Burning Glass Technologies produced a report for the Department of Digital, Culture, Media and Sport which investigated the demand for digital skills in 2019.[xxix] This report was based on data mined from online job adverts posted by employers. They identified data analysis as one of the skills which is likely to expand the quickest over the next five years, if current trends continue.

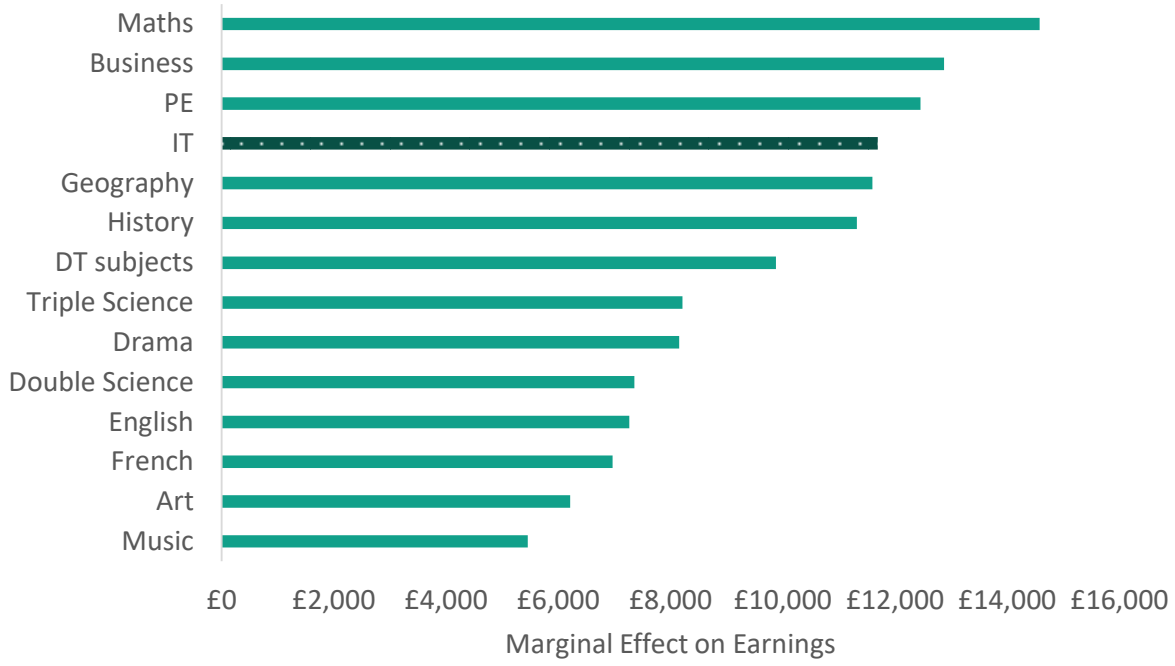
Of course, forecasts about future labour market demand are inherently uncertain, but there is currently little reason to believe that the high demand for digital skills will abate in the years to come.

3.3 Financial returns associated with digital skills qualifications

A 2019 study of online job adverts, from Nania et al., found that high skill job roles that require digital skills pay 33 per cent more than roles that do not, and for middle skill roles they pay 19 per cent more. To be successful in applying for these types of job roles they found that employees were required to have advanced digital skills such as being proficient in software programmes and data analysis.

The average increase to a student's lifetime earnings if they achieved an improvement of one grade in GCSE IT, and other subjects, can be seen in Figure 12.[xxx] We see that a one grade improvement in IT is associated with an average increase of almost £12,000 in lifetime earnings. IT is in the top five subjects that have the highest effect on lifetime earnings due to improved GCSE performance. This highlights the value placed on this subject and the associated skills by employers.

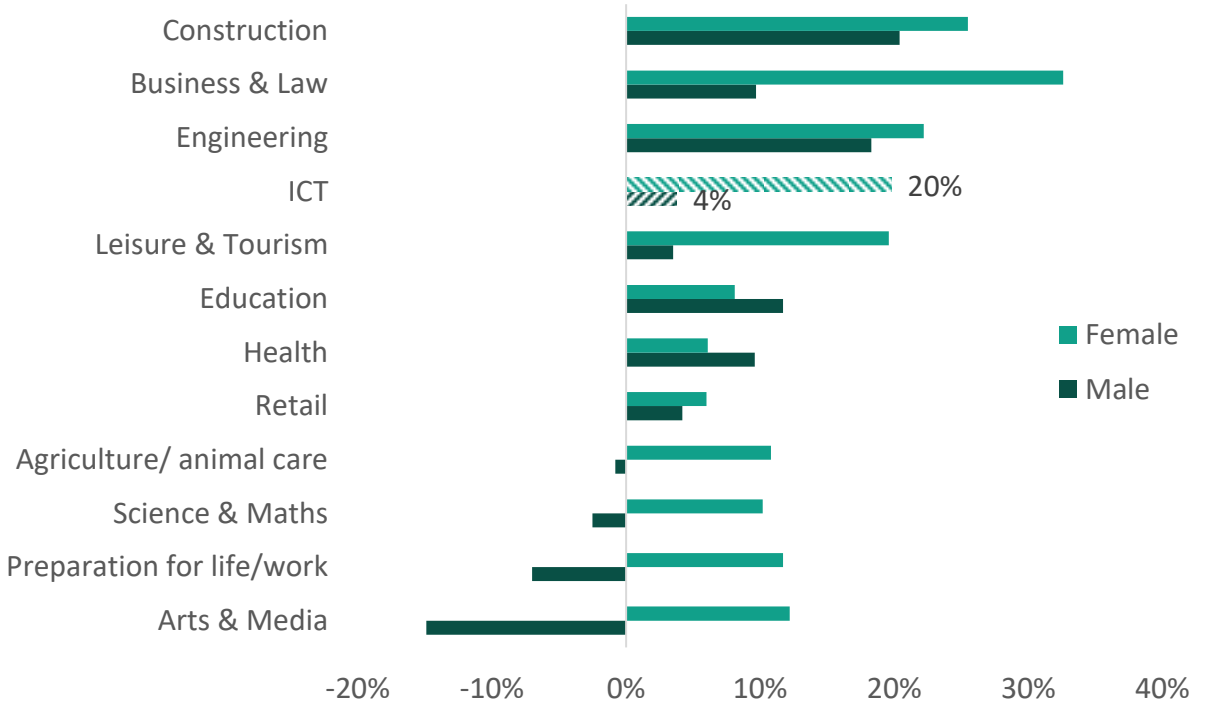
Figure 12: Average marginal effects of a one grade increase on lifetime earnings by GCSE subject



Source: GCSE Attainment and Lifetime Earnings: 2021 (DfE)

Similarly, we can see in Figure 13, labour market returns by subject area for vocational courses, derived from research by the Centre for Vocational Education Research.[xxxi] Compared with those with only a level 2 qualification, women with level 3 vocational ICT qualifications saw returns of around 20 per cent by the age of 28. Estimated returns for men with these qualifications were smaller, but still positive, at 4 per cent. It should be noted that although the marginal percentage returns are larger for women, the median annual pay for women with level 3 ICT qualifications is 24 per cent lower than that for men with level 3 ICT qualifications. The returns for women remain larger than men as the gender earnings gap in the counterfactual group (highest qualification is any level 2) is even more significant, with women earning 42 per cent less than men.

Figure 13: Marginal effects of vocational level 3 qualifications on daily earnings at age 28 by subject area and gender



Source: Labour market outcomes disaggregated by subject area using the LEO data: 2019 (CVER)

We can see that there are positive returns if a student studies technical computing/ICT courses, further demonstrating employer demand for young people with digital skills. Returns appear to be particularly strong for women, though there remains a gender pay gap.

4 What is the take-up of qualifications?

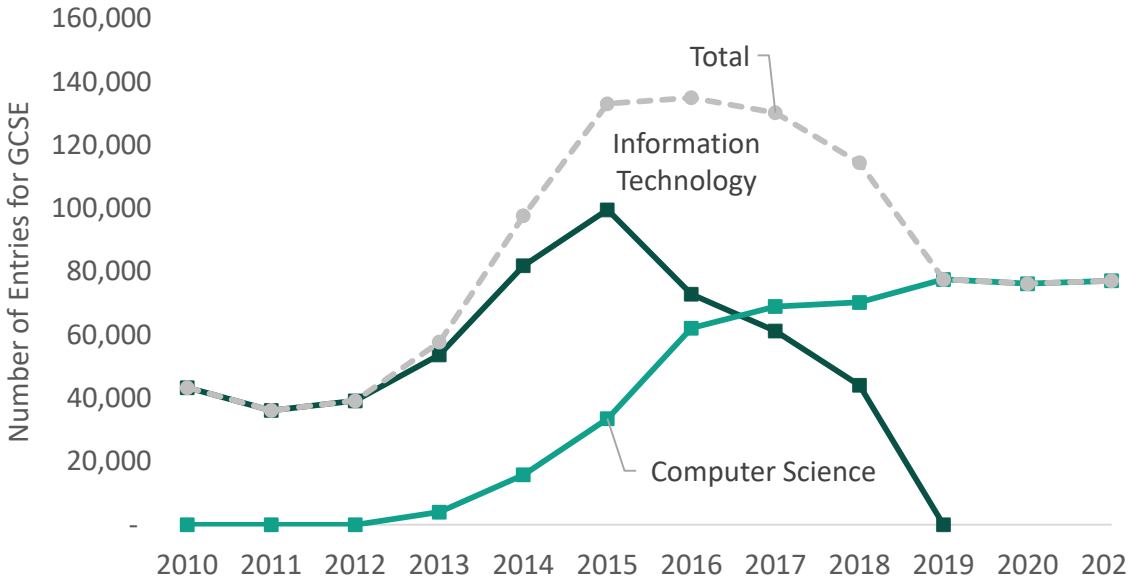
In this section we consider how many students are entering IT and computer science courses, and the characteristics of those students.

4.1 Take-up at GCSE

As mentioned previously, after the 2015 GCSE reforms, the IT GCSE was dropped and the computing GCSE was redeveloped to become computer science, which would include both coding modules and information technology topics. Figure 14 shows that the number of students entered in GCSE IT steadily rose until the peak in 2015 and then rapidly decreased after the GCSE reforms were implemented. The IT GCSE was finally discontinued in 2019.

The GCSE computer science entries have been increasing since 2013, and there was an increase of around 20,000 students into the course between 2016 and 2019. However, entries have plateaued since 2019. The total number of students who have taken either IT or computing GCSE has been decreasing slowly since 2016. By 2021 the number of entries into either qualification was 43 per cent lower than at its peak in 2016. This suggests that the students who would have taken the IT GCSE, had the reforms not happened, have not all chosen to take computer science.

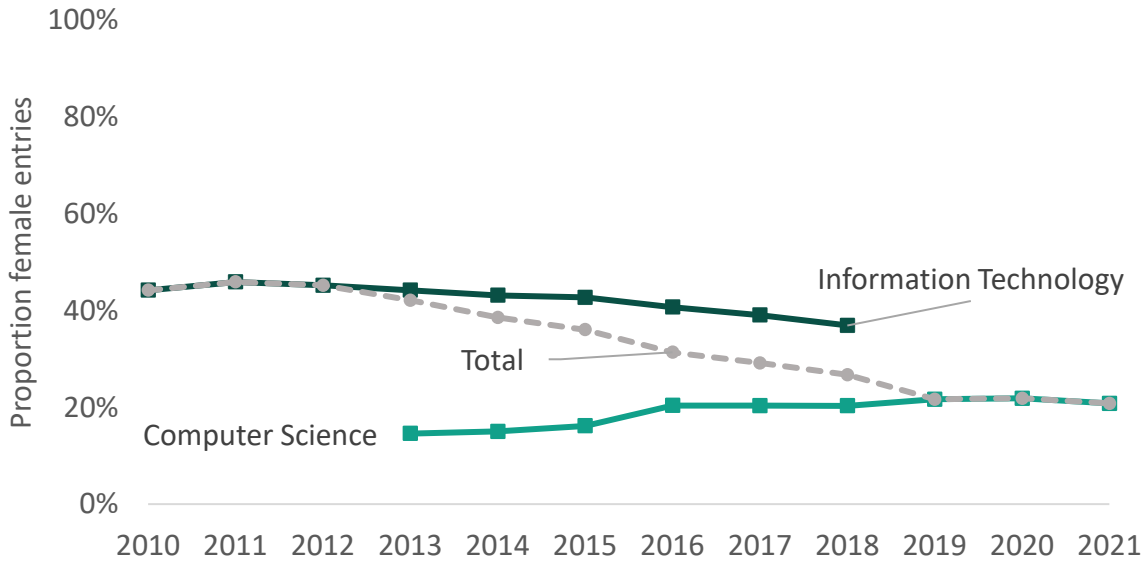
Figure 14: Number of entries for IT and Computer Science GCSE courses by year



Source: Key Stage 4 Performance 2021 (DfE)

Figure 15 shows the proportion of these GCSE entries that were from female students. In 2011, 46 per cent of IT entries were from female students, but by 2018 this figure had dropped to 37 per cent. Meanwhile, since its introduction in 2013, the proportion of female entries in computer science rose from 15 per cent to 21 per cent in 2019. As the proportion of female entries was historically higher in IT than in computer science, the shift towards computer science saw the proportion of female entries in either subject fall from 46 per cent in 2011 to 21 per cent in 2021. The proportion has not increased since 2019.

Figure 15: Entries for IT and Computer Science GCSE courses by gender and year



Source: Key Stage 4 Performance 2021 (DfE)

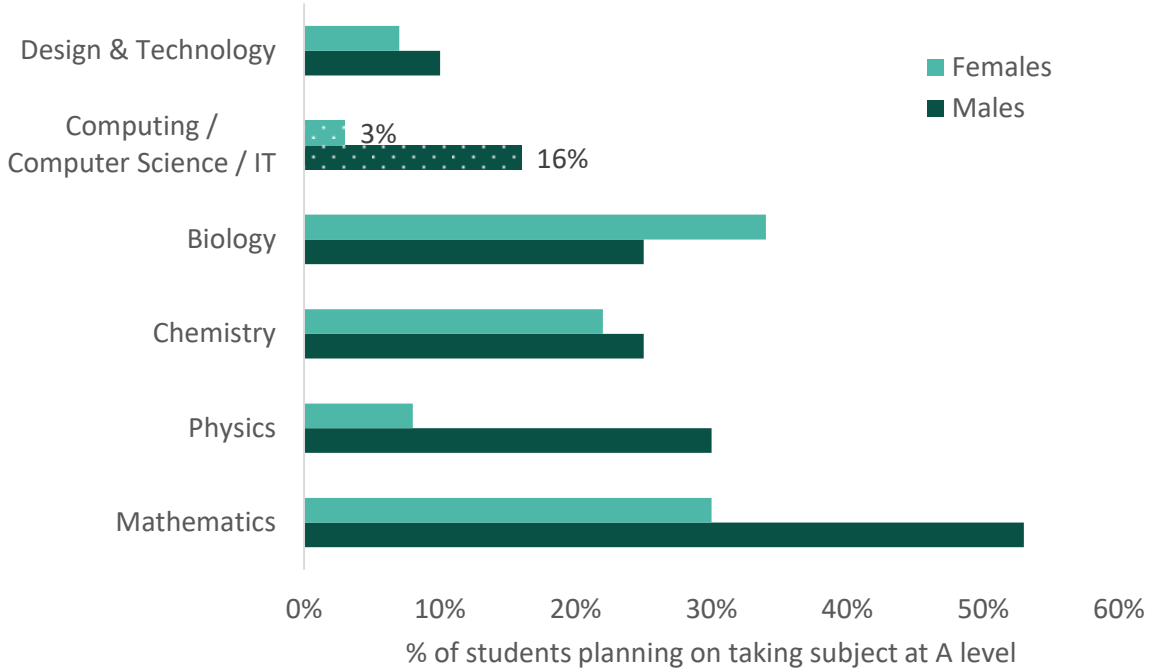
Student attitudes to ICT and computing GCSEs

In 2019, the Department for Education (DfE) conducted research to understand the attitudes key stage 4 students had towards different subjects.[xxxii] Around 10,000 students were asked about their career plans and school subjects while studying for their GCSEs. The research showed that 17 per cent of male students and only 6 per cent of female students thought that studying IT (including technology) would most likely lead to a future job.

The difference in opinions of male and female students towards studying IT was highlighted when they were asked which subject they enjoyed the most and which they felt they were best at. Amongst male students, 17 per cent ranked IT first in terms of enjoyment and 14 per cent felt it was their best subject. This is in comparison to just 4 per cent and 5 per cent respectively for the female students. The considerably lower number of female students who enjoy IT and feel it is their best subject could be contributing to the low GCSE uptake numbers.

Of the original sample, half were planning to study A levels and had already decided on their subjects. For this group, Figure 16 shows the proportion of students planning on studying different STEM subjects. Male students were five times more likely to plan on studying computing/computer science/IT than female students. This is a bigger proportional gap than in any other STEM subject.

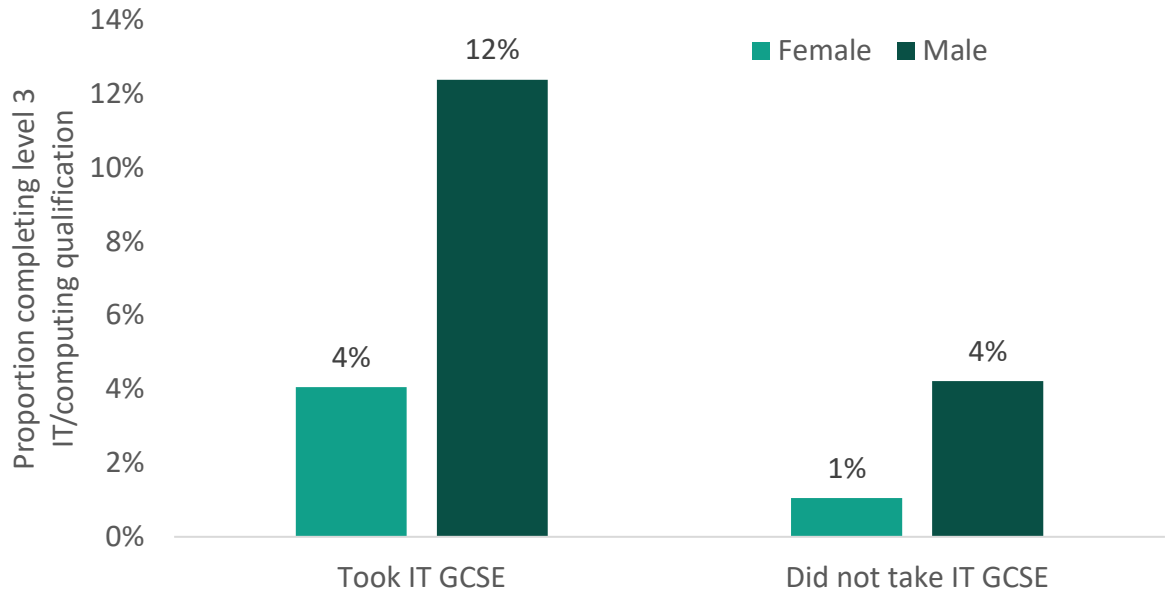
Figure 16: Percentage of students planning to study STEM subjects at A level



Source: Attitudes to STEM subjects by gender at KS4: 2019 (DfE)

Figure 17 shows that 4 per cent of all female students, and 12 per cent of male students, who had taken IT or computing GCSE during key stage 4, went on to take a level 3 technical IT/computing qualification. This compares with just 1 per cent of female students, and 4 per cent of male students, who did not take the GCSE. This shows that both male and female students are much more likely to take a level 3 technical IT/computing qualification if they previously took similar subjects during key stage 4. Moreover, although the take-up figures for female students are lower in both cases, take-up at GCSE appears to almost quadruple the likelihood a female student will take a level 3 qualification, whilst it only triples the likelihood for male students. This suggests trends in GCSE take-up are likely to follow through into take-up in the 16-19 phase, particularly for female students.

Figure 17: Proportion of students in 16-19 education completing level 3 IT qualifications, by take-up of IT/computing during key stage 4

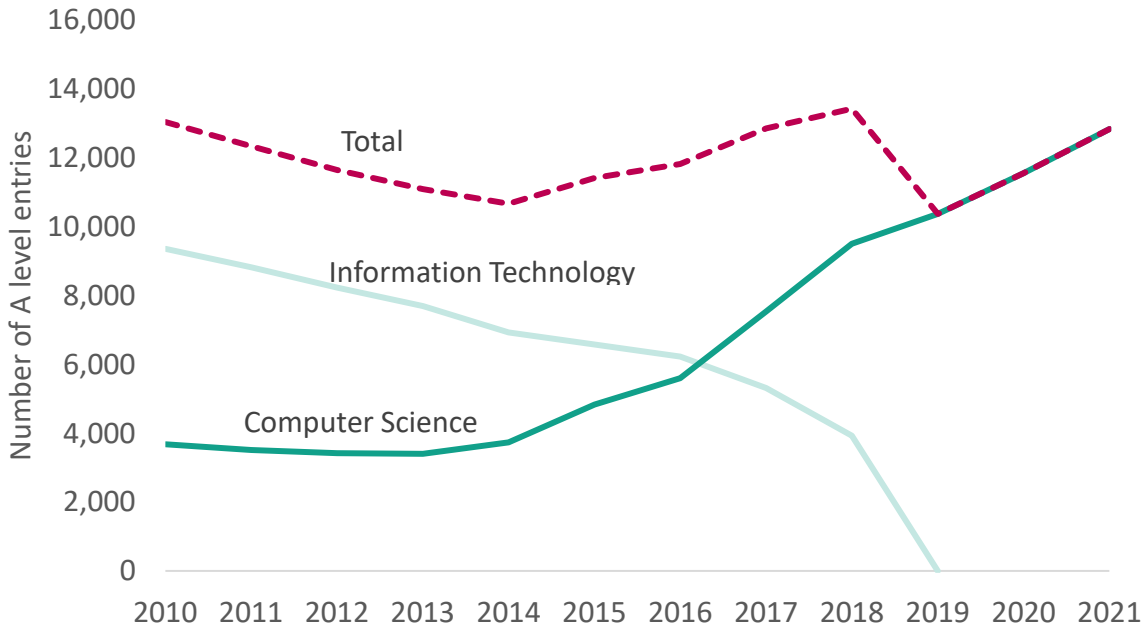


Source: EPI analysis of National Pupil Database

4.2 Take-up of A levels

Figure 18 shows that, as with GCSEs, the number of students entering A level qualifications in IT was steadily declining before the 2015 reforms, prior to being eventually fully discontinued in 2019. In contrast, since 2016 the number of students entering computer science A levels has more than doubled.

Figure 18: Number of entries for IT and Computer Science A level courses by year

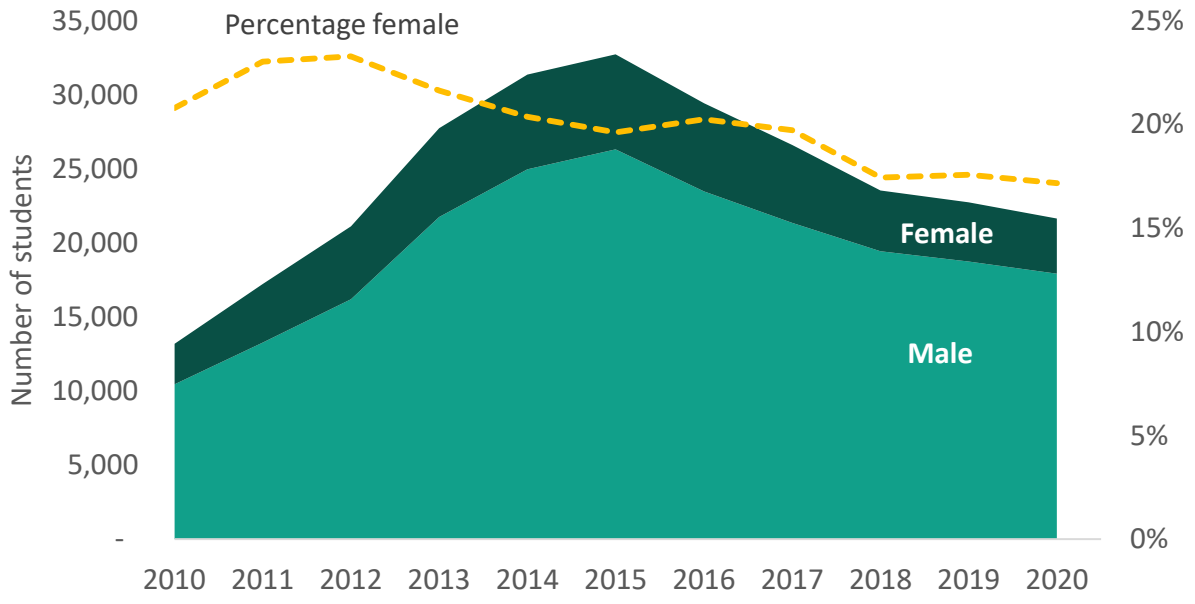


Source: A Level and Other 16 to 18 Results (DfE)

4.3 Take-up of level 3 technical qualifications

Figure 19 shows the number of students taking level 3 IT/computing technical qualifications. The number peaked in 2015 with 33,000 students, but has since declined by a third to just 22,000 students. The proportion of these entries from female students fell from 23 per cent in 2012 to just 17 per cent in 2020. As such, male students are currently almost five times more likely to take these qualifications than female students, echoing the trends seen in GCSE take-up. Research from the Social Mobility Commission highlights the importance of gender roles and (a lack of) role models in driving these disparities.[xxxiii]

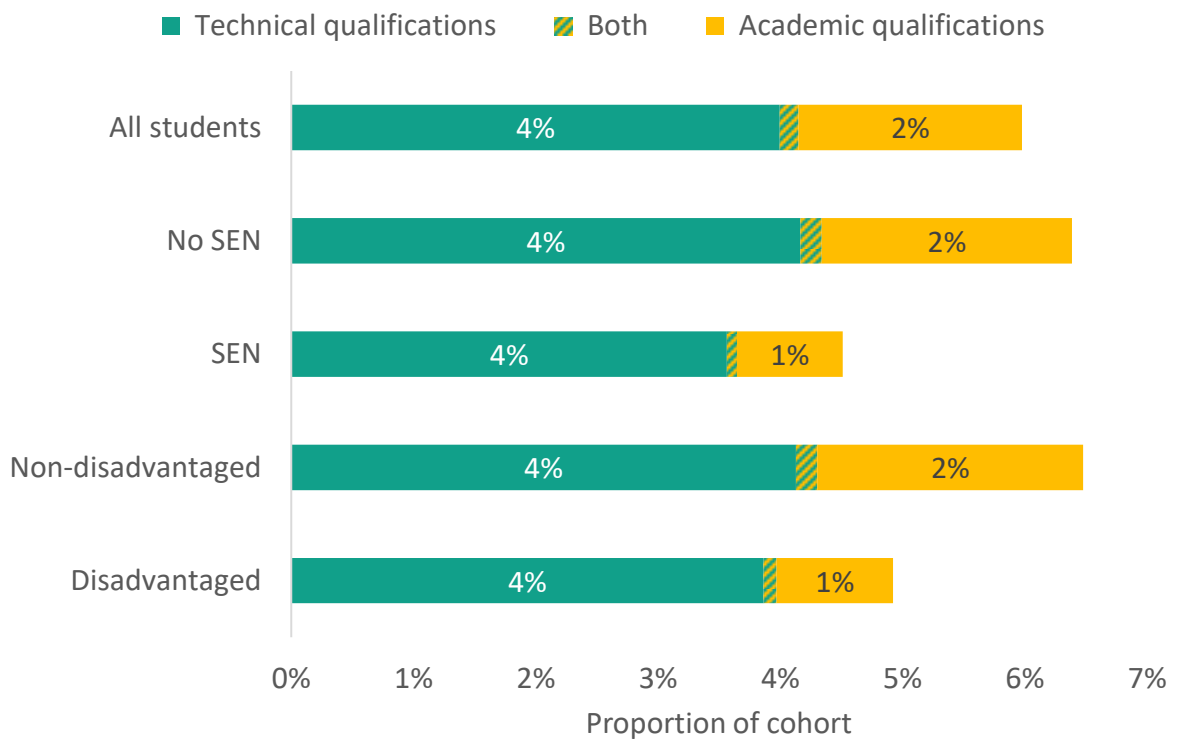
Figure 19: Students completing level 3 technical qualifications in IT/computing, by gender and year



Source: EPI analysis of National Pupil Database

Figure 19 shows the proportion of students with special educational needs and of disadvantaged students completing IT or computing qualifications, either technical or academic (A levels or AS levels). This shows that there is little difference between the groups, with 4 per cent of all groups of students taking a technical qualification in IT or computing. However, it appears that students with special education needs and disadvantaged students are half as likely to take academic qualifications than their peers. More broadly, research from World Skills UK, the Learning and Work Institute and Enginuity suggests that many students do not consider careers that require advanced digital skills as they believe they do not have the necessary skills.[xxxiv] The research shows that, although 51 per cent of young people were interested in careers that require advanced digital skills, only 18 per cent of the young people in their survey were very confident that they have the advanced digital skills employers require.

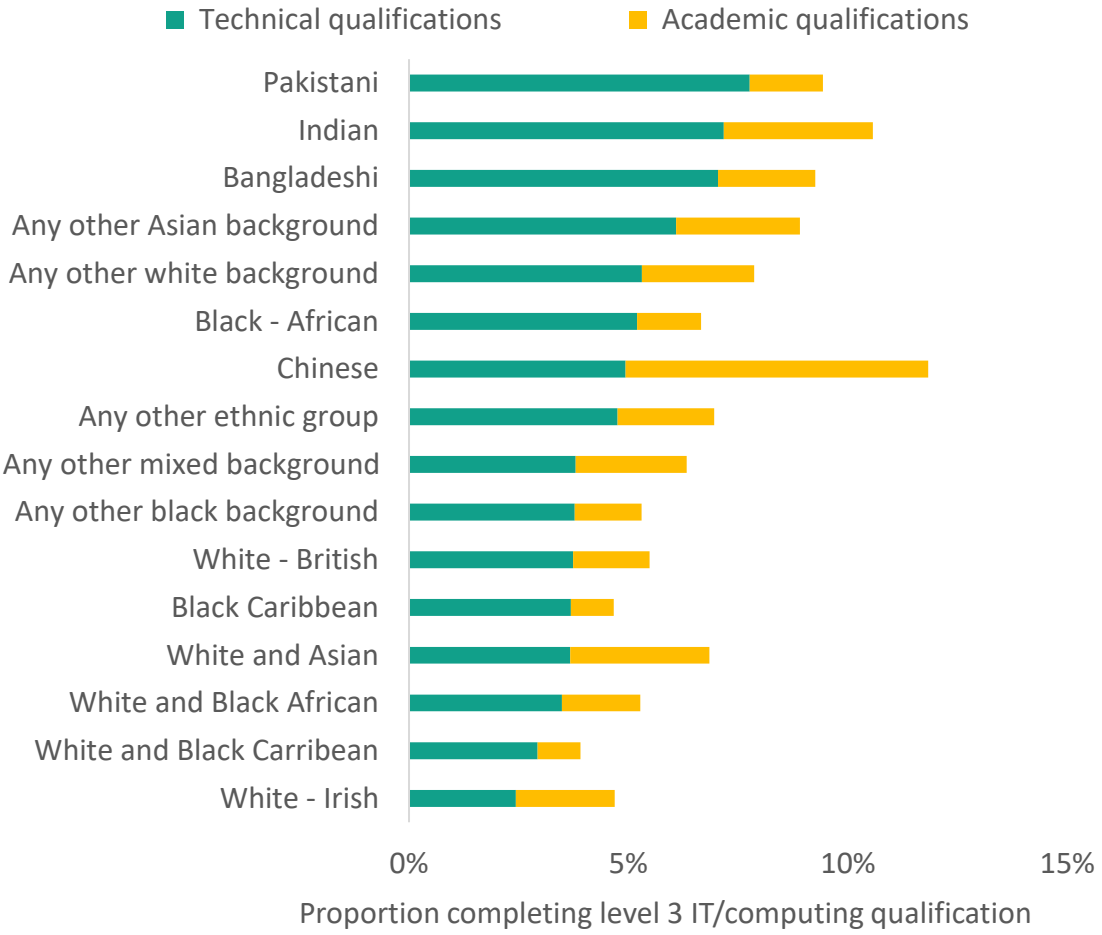
Figure 20: Proportion of students in 16-19 education completing any level 3 IT/computing qualifications, by qualification type and student characteristic



Source: EPI analysis of National Pupil Database

Figure 21 shows take-up by ethnicity. Pakistani ethnicity students are the most likely to take these qualifications, with take-up by almost one in thirteen students. Chinese ethnicity students were the most likely to take either a technical or an academic qualification, with one in eight Chinese ethnicity students taking any level 3 qualification in IT or computing. White and Black Caribbean and White Irish ethnicity students were the least likely to take technical qualifications in IT or computing (three and two per cent of student respectively).

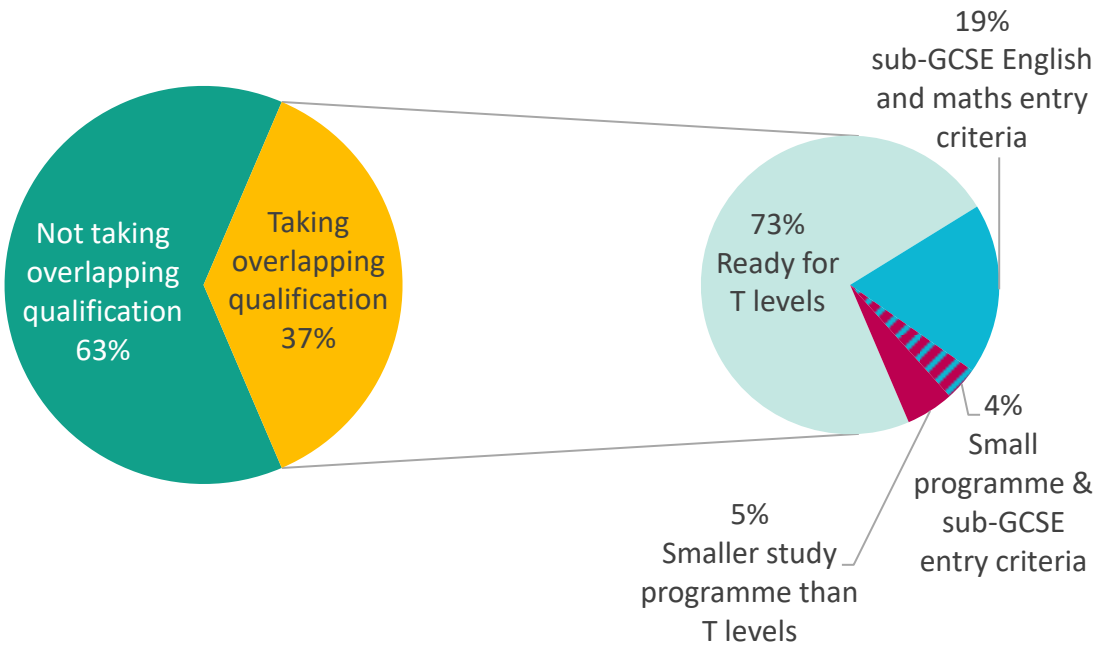
Figure 21: Proportion of students in 16-19 education completing level 3 IT qualifications, by student ethnicity[3]



Source: EPI analysis of National Pupil Database

[3] Students taking both academic and technical qualifications are included in the technical category. Students of Gypsy/Roma or Traveller of Irish Heritage ethnicities are excluded due to small numbers.

Figure 22: Proportion of students in 16-19 education completing level 3 IT/computing qualifications that overlap with T levels, proportion of those "ready for T levels" 2021



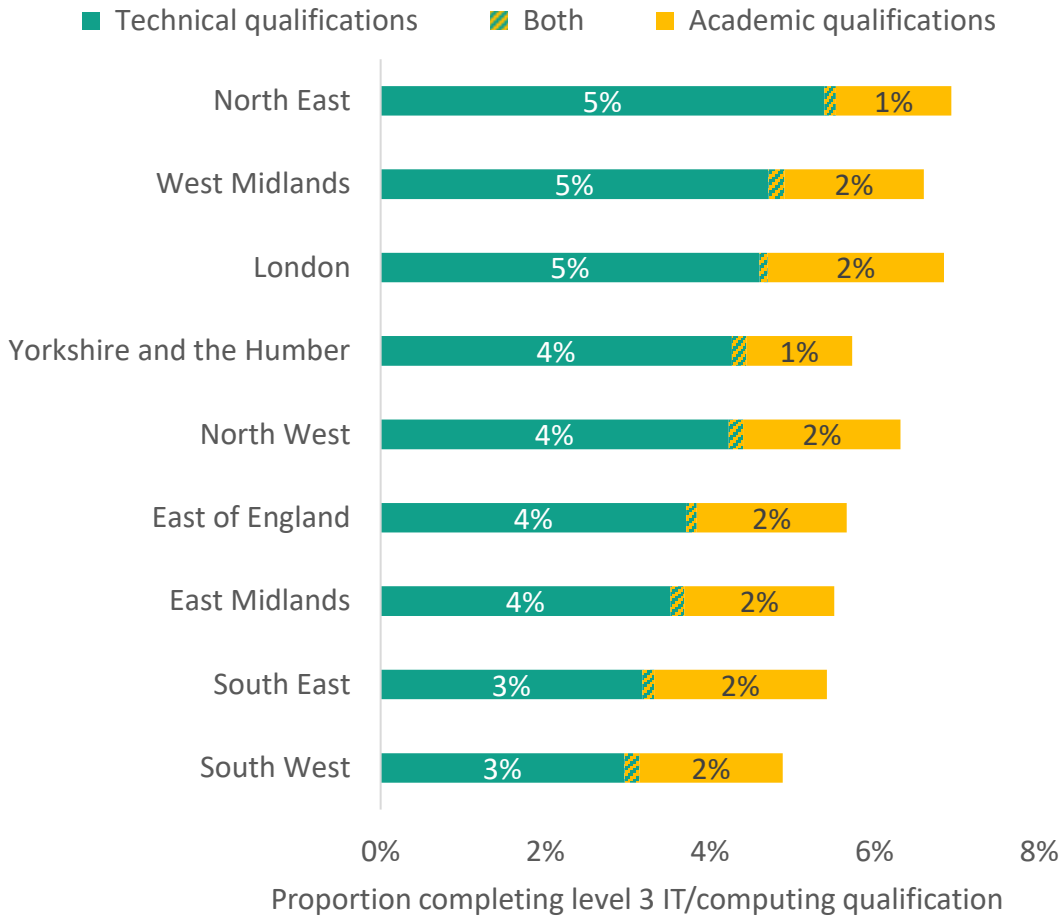
Source: EPI analysis of National Pupil Database

Figure 22 shows the proportion of recent students taking IT/computing qualifications that may soon have funding removed from them, as they have been judged to overlap significantly with digital skills T levels. Overall, 37 per cent of 2021 students took qualifications that may no longer receive funding.

Of those 16-19 students taking the affected technical IT qualifications, 22 per cent had not achieved a grade 4 or above in both GCSE English and maths. In addition, 9 per cent were taking a study programme smaller than the equivalent of three A levels (in terms of learning hours). Taken together, 73 per cent of the students taking affected technical IT qualifications were taking IT qualifications at least as large as three A levels and had also achieved the GCSE English and maths threshold.

As mentioned in section 2, concerns about the removal of other non-T level qualifications include that the size and more demanding nature of the T level programme may see more students pushed towards other qualifications instead. The analysis above suggests that almost one in four of students who would otherwise take technical qualifications that may lose funding may not automatically make the transition to T levels due to the size and challenge of the qualification. Many will succeed in the transition, but nevertheless this remains a risk for many students who would otherwise be interested in studying a technical IT or computing qualification.

Figure 23: Proportion of students awarded level 3 IT qualifications in 2019, by region

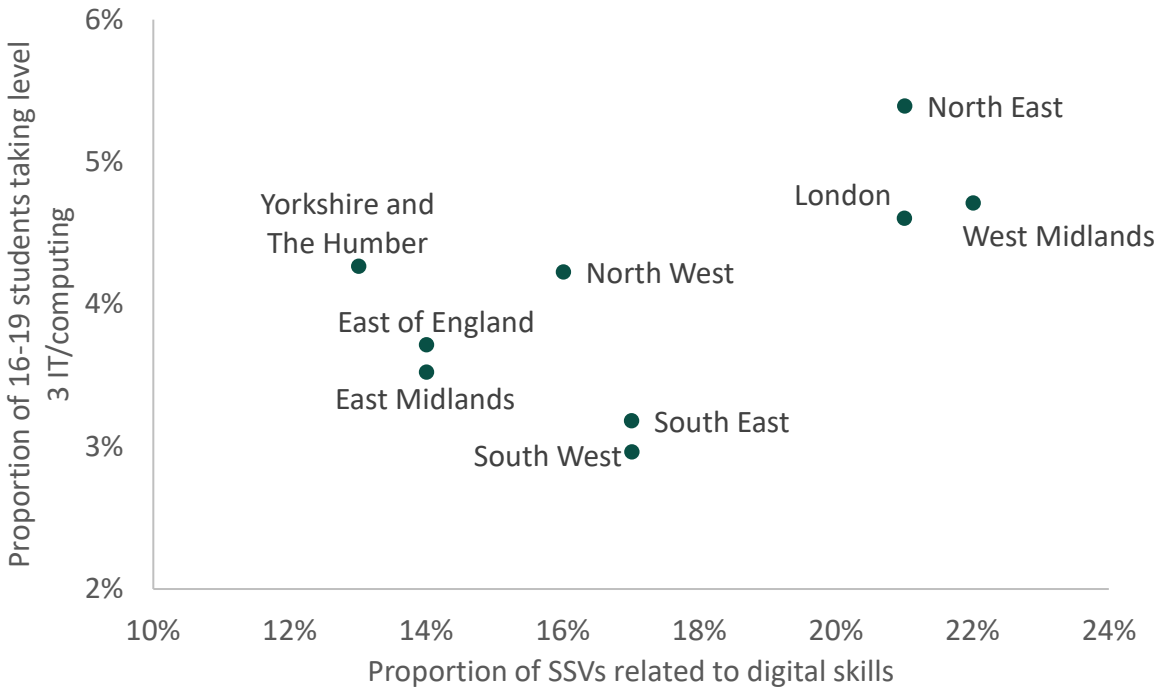


Source: EPI analysis of National Pupil Database

Figure 23 shows the proportion of 16-19 students in each region that took a level 3 IT or computing qualification, either academic or technical. The North East, West Midlands and London had the highest proportions of students taking a level 3 IT qualification, all at 5 per cent. The South West and South East had the lowest proportions, both at just 3 per cent.

In section 3 we considered the prevalence of advanced digital skills shortages by region. Figure 24 shows how the regional prevalence of digital shortages is correlated with the proportion of students taking level 3 IT qualifications. We can see that, in general, regions with higher prevalence of digital skills shortages tend to have more students taking IT qualifications. For example, London, the North East and the West Midlands have the highest proportions of both skills shortages related to digital skills and students taking IT qualifications. The most notable exceptions to this trend are the South East and the South West, which both have average levels of skills shortages related to digital skills (17 per cent), but have the lowest proportions of students taking IT related qualifications (just 3 per cent).

Figure 24: Proportion of 16-19 students awarded level 3 IT qualifications and digital skills shortages vacancies, by region



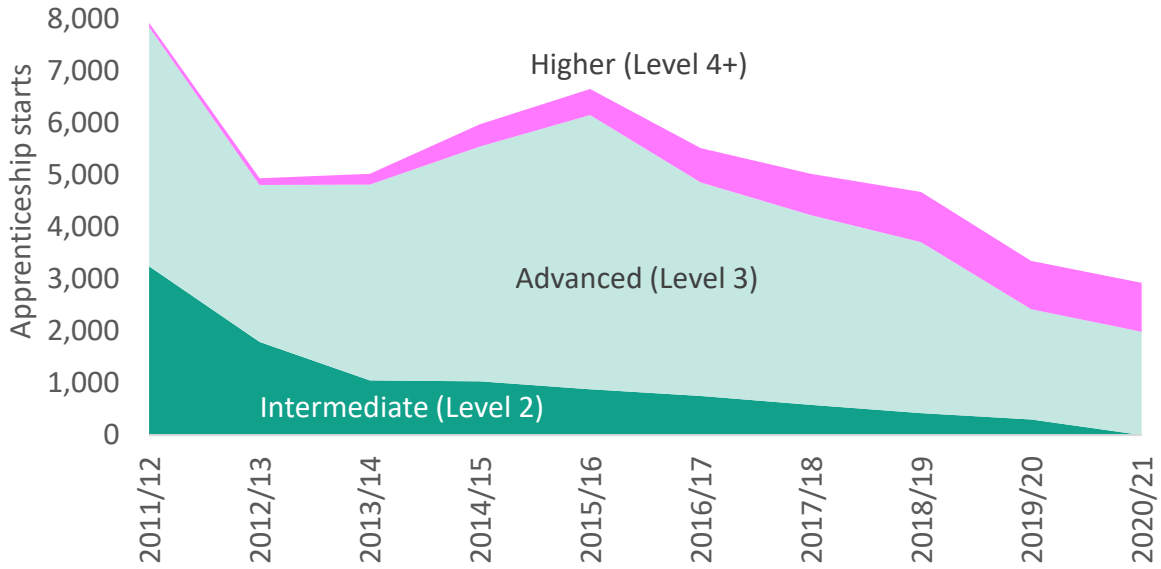
Source: EPI analysis of National Pupil Database, Employers Skills Survey England: 2019 (DfE)

4.4 Take-up of Apprenticeships

Figure 25 shows that, since 2016/17, there has been a steady decrease in the number of apprenticeship starts in the information and communication technology sector, with a sharper decline from 2019/20 onwards when the Covid-19 pandemic hit. Just prior to the pandemic, in 2019/20, starts were half of the number in 2015/16. In 2020/21 the number had fallen further, to just 44 per cent of their 2015/16 peak. Despite this overall fall there has been an increase in starts for higher level apprenticeships (at level 4 or above), which have more than doubled since 2014/15, to almost 1,000 thousand starts annually in 2020/21.

The overall falls are not unique to the ICT sector. Indeed, ICT apprenticeships have remained at around 4.5 per cent of all under 19 apprenticeship starts since 2015/16. This decline coincides with the introduction of the apprenticeship levy alongside increased regulation of apprenticeships[xxxv].

Figure 25: Number of under 19 starts for ICT apprenticeships by year

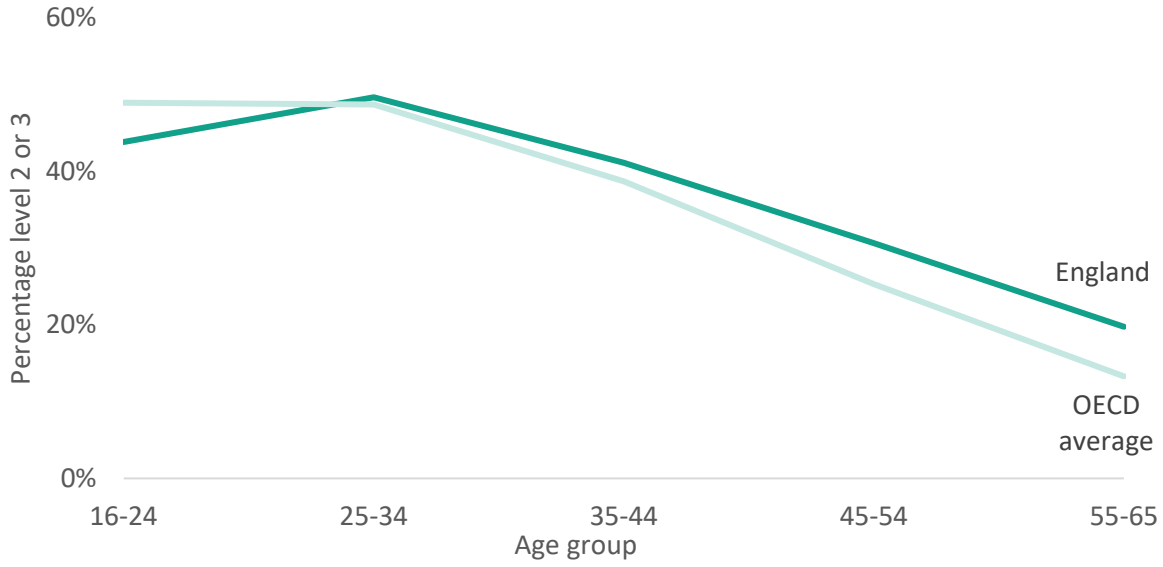


Source: Apprenticeships and Traineeships: 2022 (DfE)

4.5 International comparisons – problem solving in technology-rich environments

According to a 2016 international comparison of adults' ability to solve problems in technology rich-environments, almost two thirds (63 per cent) of the adult population in England are categorised as level 1 or below in ICT proficiency.[xxxvi] This means they have 'no ICT skills at all or can only carry out the simplest of tasks such as writing an email or browsing the web'. This is a similar proportion to the average across advanced economies of 65 per cent. Figure 26 shows that whilst the performance of young people is above that of older generations, they are lagging behind their international counterparts.

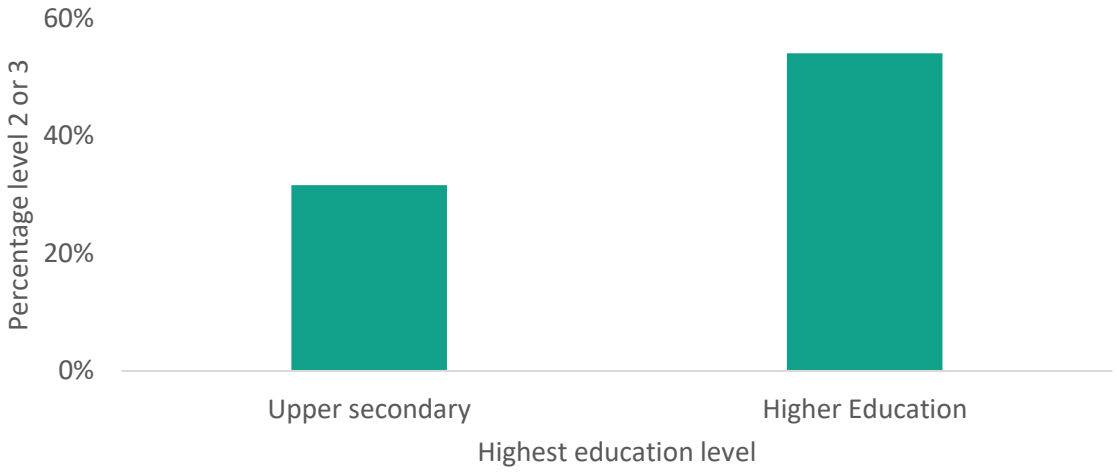
Figure 26: Problem solving in technology-rich environments by age group, England and OECD average



Source: Skills Matter: Further Results from the Survey of Adult Skills (OECD 2016)

Furthermore, as demonstrated in Figure 27, those educated to upper secondary level (typically to age 18 or 19) are much less likely to achieve higher levels of digital proficiency than their peers continuing to higher education.

Figure 27: Problem solving in technology-rich environments by highest level of education, England



Source: Skills Matter: Further Results from the Survey of Adult Skills (OECD 2016)

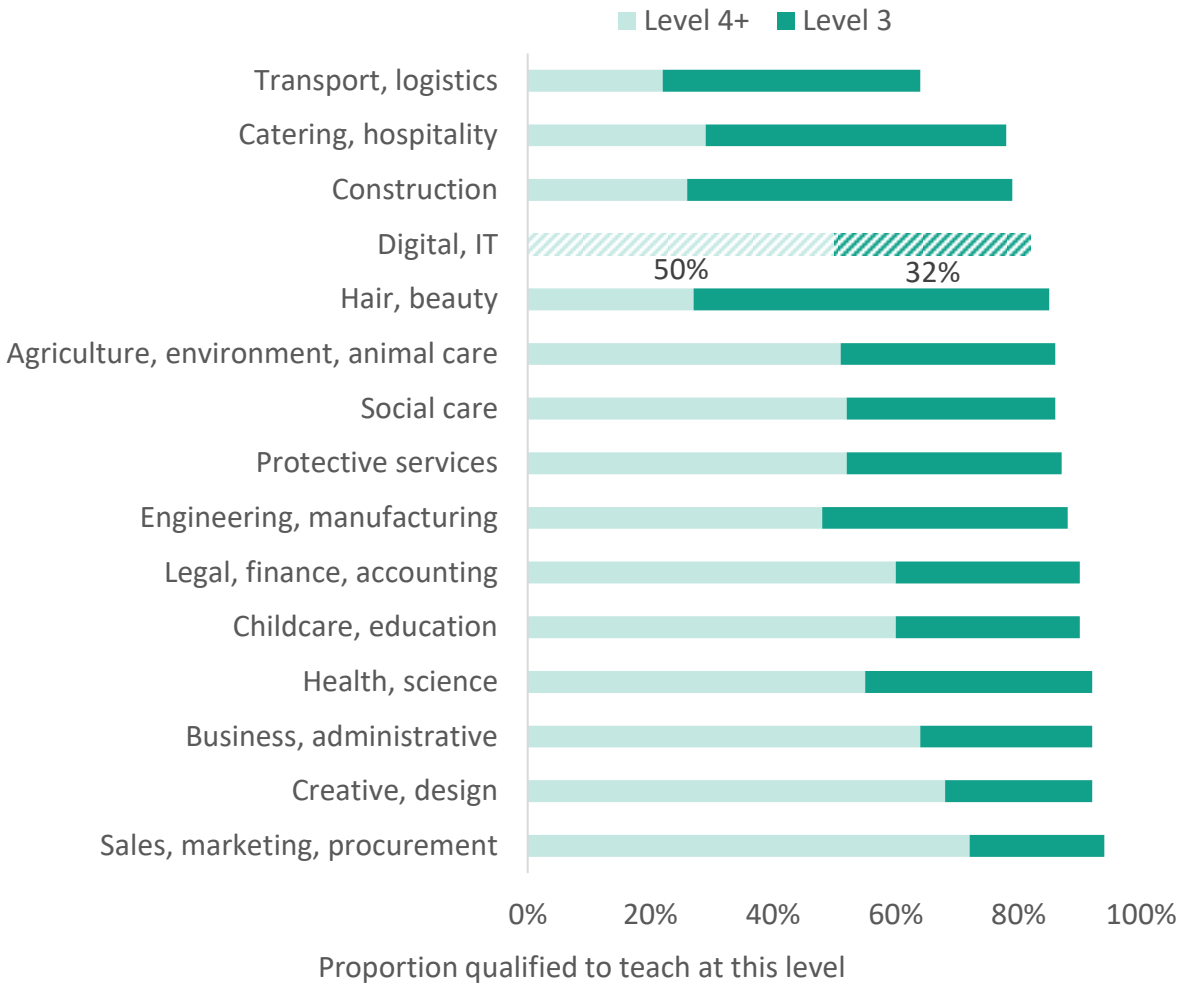
5 Do colleges have the capacity to provide these qualifications?

In this section we investigate the experience and qualifications of the teachers delivering digital skills qualifications in the further education (FE) sector, and the difficulties college leaders are having in recruitment for these roles.

5.1 Teacher experience and qualifications

The College Staff Survey was commissioned by the Department for Education in 2018 to increase understanding of the workforce in FE colleges across England.[xxxvii] From the survey, there were an estimated 35,000 to 40,000 teachers teaching at least one vocational subject, out of a total of 59,000 teachers in the sector. Of these, an estimated 1,980 were teaching digital/IT related vocational subjects. Of the digital/IT teachers, the gender split is almost equal with 56 per cent being male and 77 per cent over the age of 35. This is a more equal gender split than in any other subject.

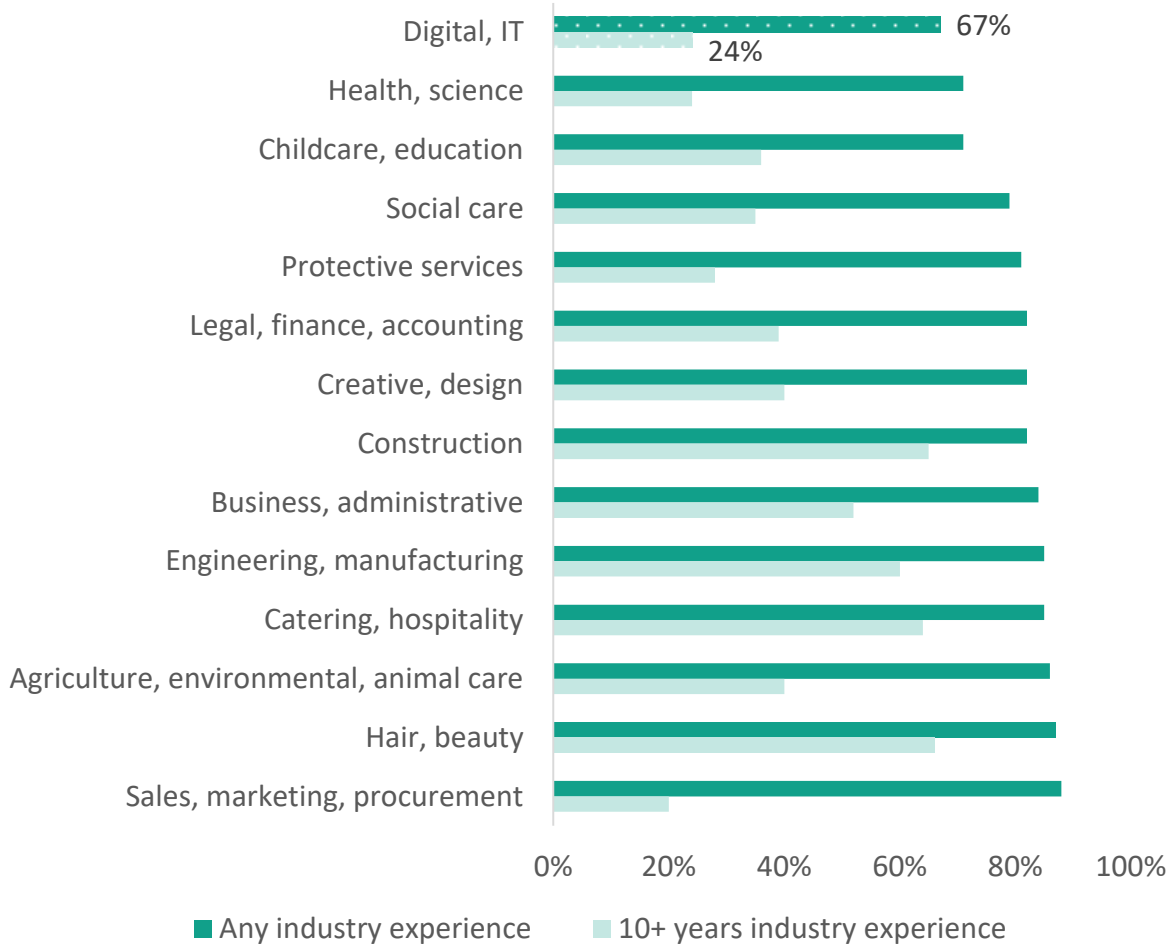
Figure 28: Proportion of teachers qualified to teach to each level by subject area



Source: College Staff Survey: 2018 (DfE)

Figure 28 shows that around 82 per cent of digital/IT teachers were qualified to teach the subject to level 3, and 50 per cent of digital/IT teachers were able to teach to level 4+. With almost one in five teachers not qualified to teach level 3 qualifications, digital/ICT teachers are less qualified than teachers of all but three other subject areas. Industry experience may compensate for a lack of formal qualifications in providing high quality teaching. However, here again digital/IT teachers lag behind their counterpart teachers in other subject areas. Figure 29 shows that one-third of teachers had no industry experience, and only one quarter had 10 or more years of industry experience. We cannot tell from the available data whether those who were not qualified to teach at level 3 or above (in Figure 28), were those teachers who had relevant teaching experience. It should also be noted that much digital provision in colleges will be at below level 3, especially given the adult entitlement to basic digital skills.

Figure 29: Proportion of FE teachers with industry experience and proportion of FE teachers with 10+ years of industry experience by subject area

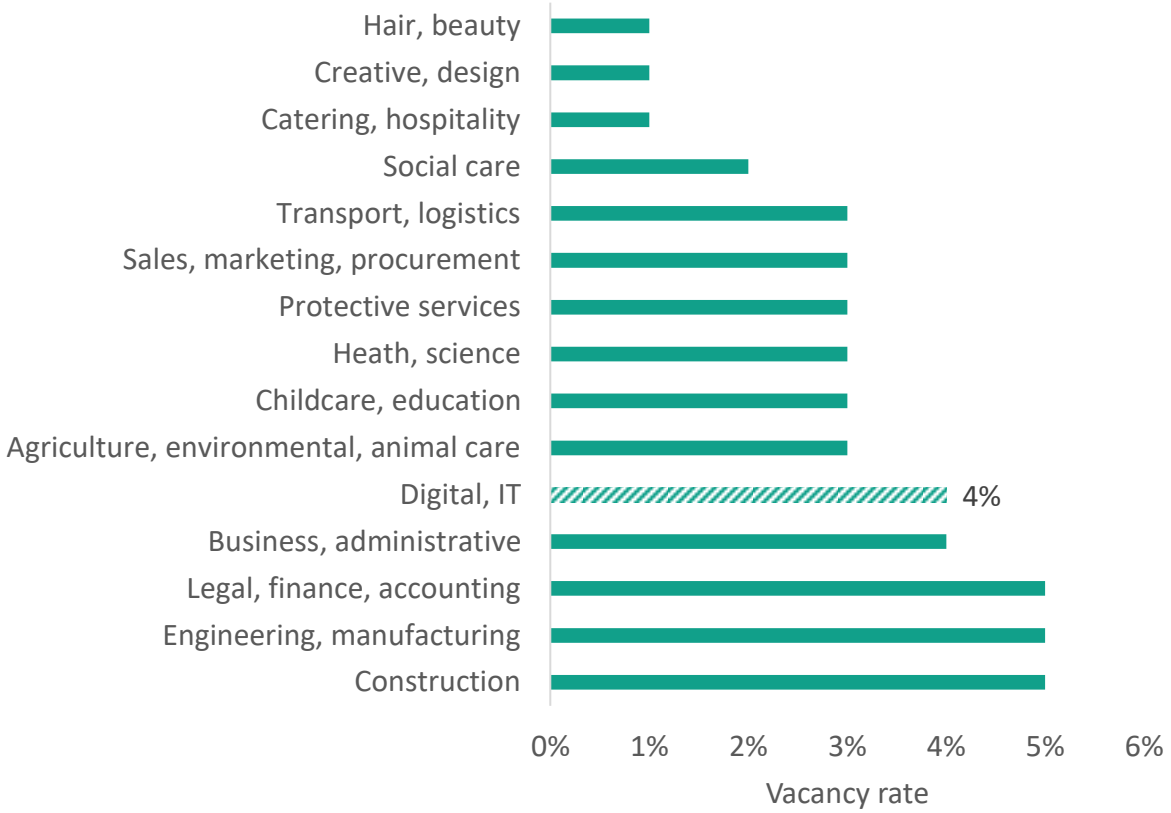


Source: College Staff Survey: 2018 (DfE)

5.2 Teacher vacancies and recruitment

Figure 30 shows the vacancy rate in FE colleges by subject area. The vacancy rate is the number of vacancies as a proportion of all staff teaching each subject, during spring 2018. The vacancy rate for digital or IT teachers is four per cent, making it the subject area with the (joint) fourth highest vacancy rate. Construction, engineering and manufacturing and legal, finance and accounting have the highest vacancy rates.

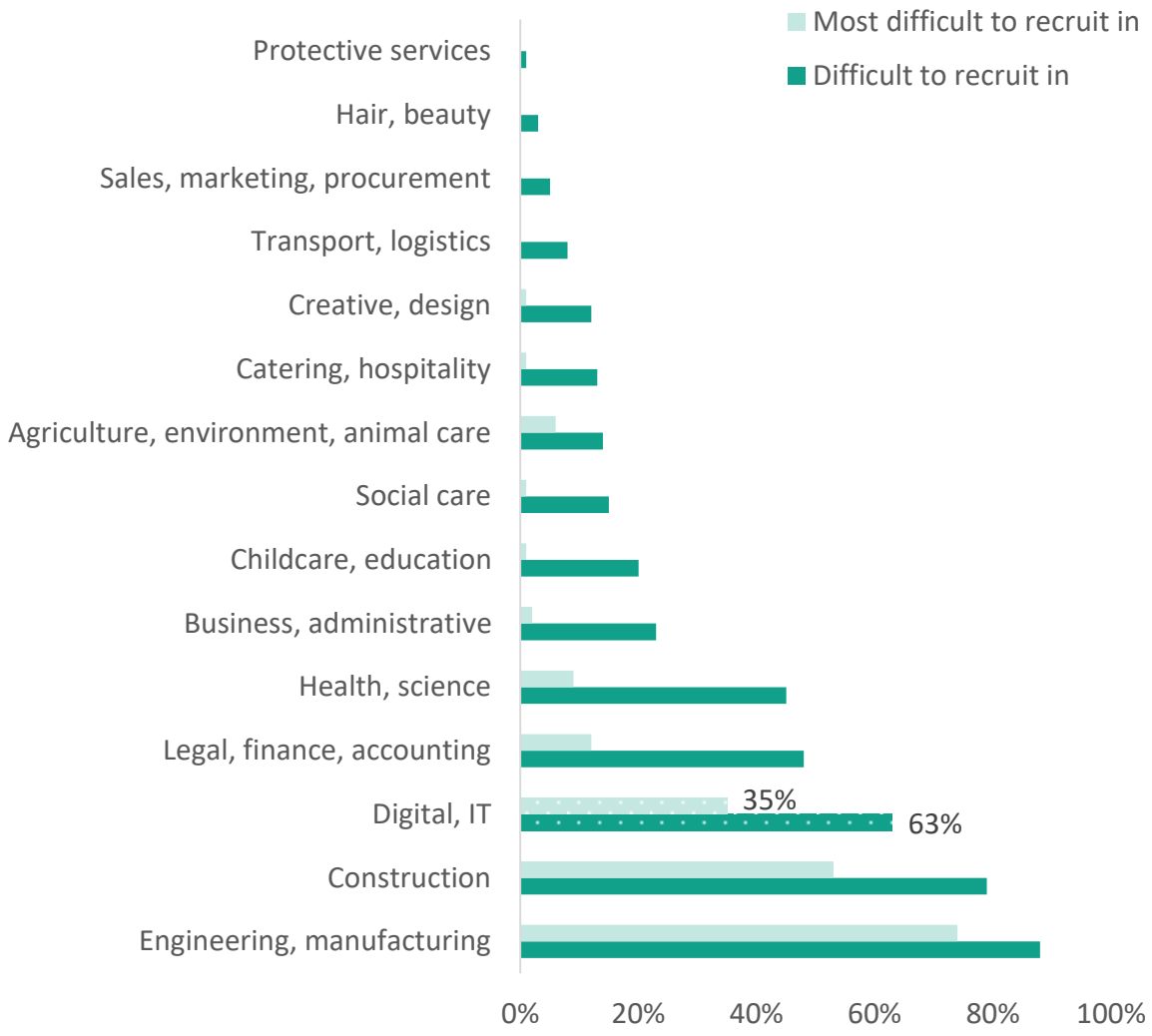
Figure 30: Vacancy rate by subject area



Source: College Staff Survey: 2018 (DfE)

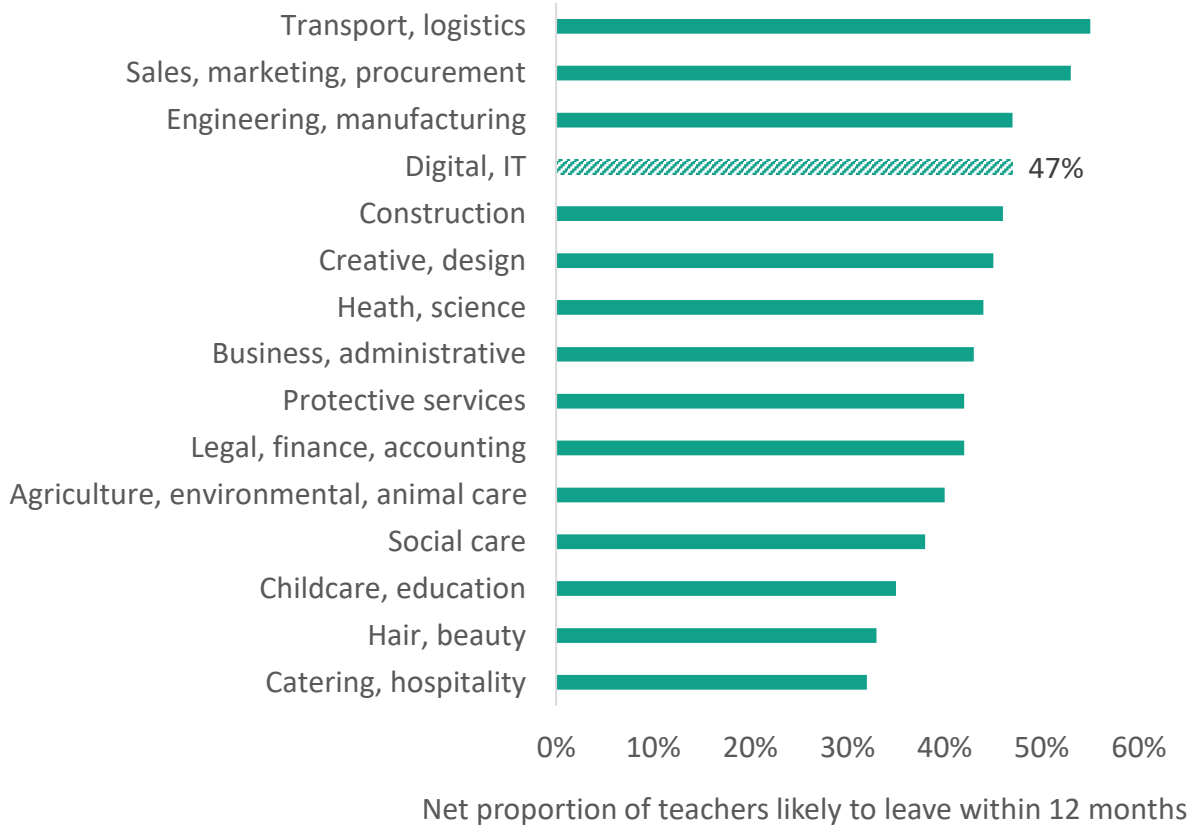
The lack of qualifications and industry experience and high vacancy rate are likely to be a result of the difficulties colleges have in recruiting. Figure 31 shows that two-thirds of colleges find digital/IT difficult to recruit in, the third highest figure across subject areas, behind only engineering/manufacturing, and construction. One third of colleges find digital/IT the most difficult subject to recruit in. When principals were asked to comment on recruitment in general (not focused on digital/IT teacher recruitment), 18 per cent said that recruitment was difficult due to a lack of qualified staff and 3 per cent said there were skill shortages. To add to this, 41 per cent said that pay impacts recruitment because salaries are higher in industry (22 per cent) or in schools (17 per cent).

Figure 31: Vocational subjects that college leaders find difficult to recruit in



Source: College Staff Survey: 2018 (DfE)

Figure 32: Proportion of teachers likely to leave within 12 months, by subject area



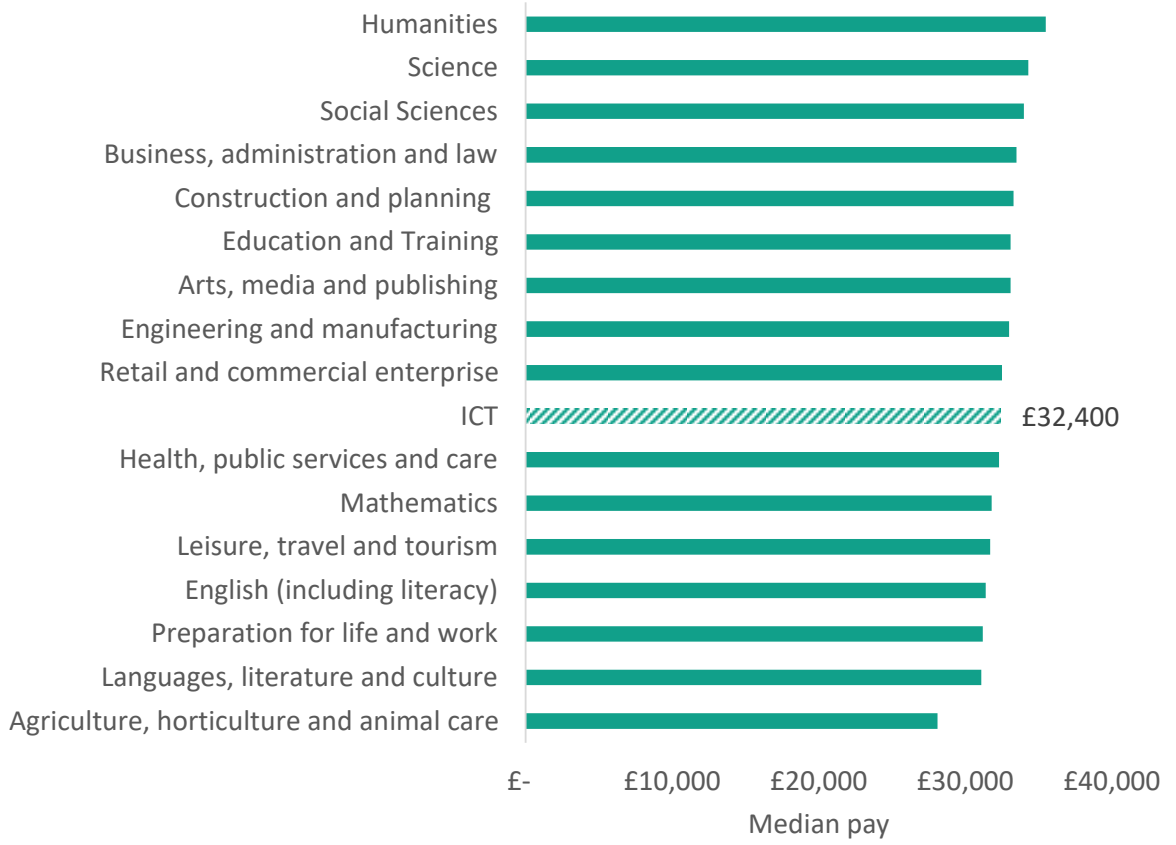
Source: College Staff Survey: 2018 (DfE)

Along with recruitment challenges, retention of digital/IT teachers is also difficult, with 47 per cent of digital/IT teachers asked in the College Staff Survey saying they were likely to leave their role within the next 12 months, as shown in Figure 32. Digital/IT teachers were the fourth most likely to state their intention to leave. Of all teachers (not only digital/IT teachers) who were considering leaving, workload, college management and pay were the three top reasons cited.

5.3 Teacher pay

Figure 33 shows how salaries for further education teachers vary across subject areas, according to a voluntary data collection by the Education and Training Foundation[xxxviii]. With a median salary of £32,400 ICT teachers are towards the middle of the distribution of subject areas.

Figure 33: Average FE teacher salary by subject area

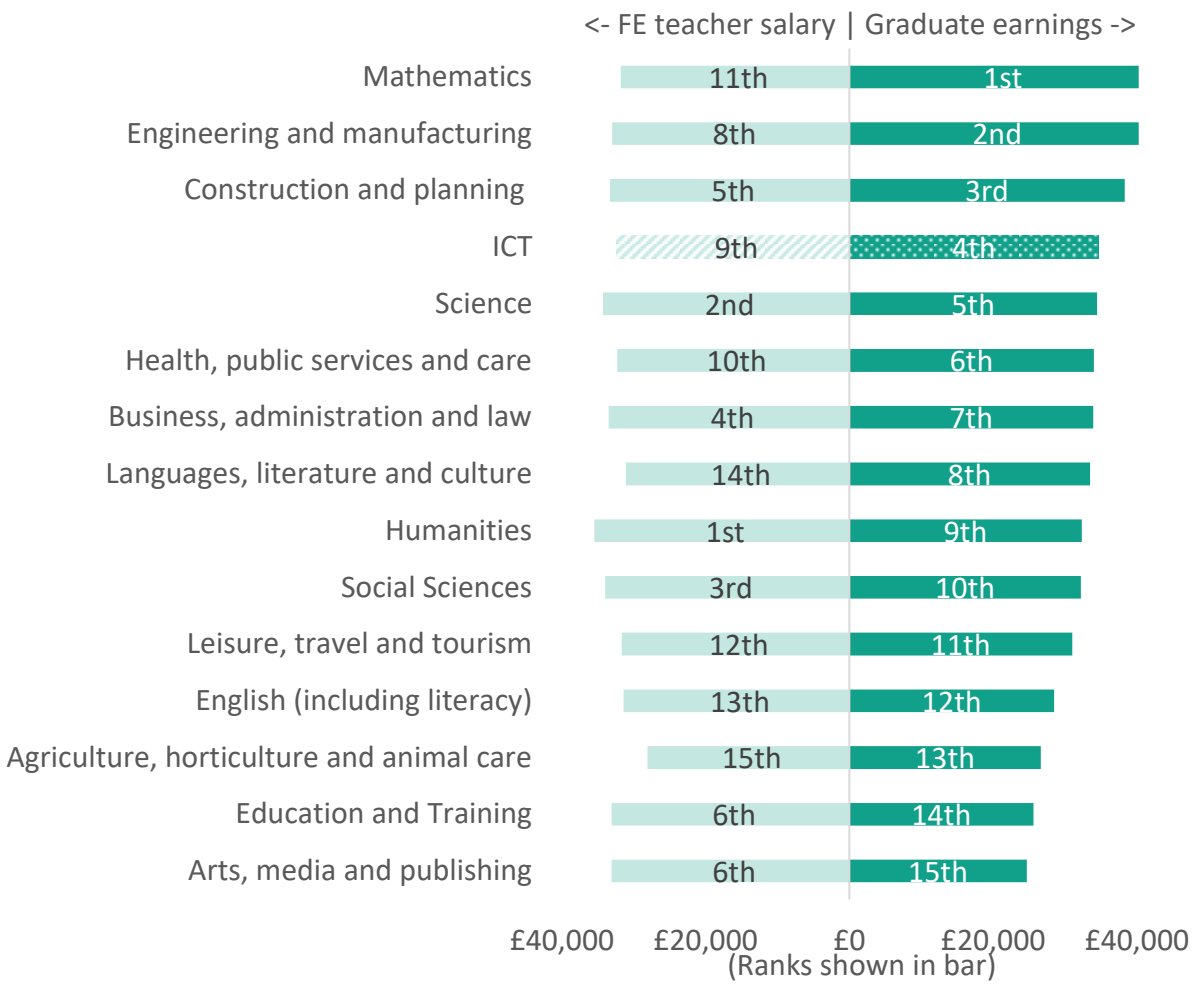


Source: Staff Individualised Record (ETF, Frontier Economics)

However, difficulties in recruitment of digital/IT teachers may be less likely to be related to the salaries of teachers in other subject areas, than to the salaries of those with digital/IT qualifications working in other sectors.

Figure 34 shows the average salaries of teachers in the FE sector against average graduate earnings 10 years post-graduation, by subject area taught or degree studied. The graduate earning figures are derived from matched education and employment outcomes administrative data.[xxxix]

Figure 34: Average FE teacher salary and average graduate earnings, by subject area



Source: Staff Individualised Record (SIR) and LEO graduate outcomes

Though the earnings data from the two sources are not directly comparable, as they are derived using different methodologies and with different coverage, the comparison is still instructive. ICT graduates are the fourth highest earning group out of the 15 subject areas (£34,700 in 2018/19), whilst ICT teachers are the 9th highest earning group (£32,400 in 2018/19). This suggests that, relative to other subjects, prospective ICT teachers may have better options elsewhere. Indeed, it is notable that the other subjects with relatively high graduate earnings, but only average FE teacher salaries, are also those where colleges report significant recruitment difficulties.

As demonstrated in previous EPI research, secondary schools have also had issues recruiting and retaining qualified teachers, especially in subjects where pay outside of the profession is relatively more generous[xl]. Though the current lack of comprehensive data for the FE sector makes direct comparisons difficult, the issues appear more acute in the FE sector. A 2019 comparison from Frontier Economics suggested an 11 per cent, or £3,400, pay gap between the sectors across all subjects.[xli] And whilst Figure 30 suggests a vacancy rate of 4 per cent for ICT teachers, school workforce data from the same year provides a figure of 1.6 per cent for IT teachers and 0.9 per cent for computing teachers. [xlii] Although the data sources in each case are not directly comparable, it seems that the situation is indeed more challenging in colleges.

As mentioned in section 3.3. the government has introduced bursaries to support recruitment of individuals with higher levels of computing skills into both schools and colleges. In addition, to support the retention of teachers in secondary schools, the government has introduced financial incentive payments for early careers teachers working in shortage subjects in disadvantaged areas.[xliii] These payments, known as the levelling up premium, are paid to chemistry, physics, maths and computing teachers working in schools in more disadvantaged areas and areas with historically low attainment levels. The payments range from £1,500 to £3,000.

Such salary supplements have been shown to be effective in retaining teachers in shortage subjects. [xliv] However, whilst bursaries exist for trainee teachers in both phases, there is no equivalent salary supplement scheme for teachers in colleges.

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