

VIRTUAL FESTIVAL OF **DIGITAL SKILLS**

2021 THE ECONOMIC ROAD AHEAD



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This learning pathway addresses the current skills gap in AI and provides a learning journey for career changers.

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TABLE OF CONTENTS

| | |
|--|-----------|
| INTRODUCTION | 04 |
| SKILLS AND IT LEADERS | 05 |
| AI AND SKILLS | 07 |
| MENTAL HEALTH, IT AND JOB EFFECTS | 09 |
| SECURITY SKILLS | 13 |
| A SNAPSHOT OF THE UK'S DIGITAL SKILLS | 17 |
| BCS MAKING A DIFFERENCE | 18 |
| A NEW WORLD OF TRAINING OPPORTUNITY | 21 |
| SMEs AND THE GOVERNMENT'S JOB PLAN | 25 |
| THE IMPACT OF APPRENTICESHIPS | 28 |

INTRODUCTION

COVID-19 has caused an awful lot of suffering and misery, impacting many people's lives and livelihoods. Economically the people who suffered disproportionately have been those who were in jobs that couldn't be home based, or where the organisations they worked for couldn't adequately move their operations online.

Conversely, companies that succeeded in automating services and business functions through technologies such as machine learning, that have invested in upskilling their staff and provided them with the resources to be properly effective online, moved their business functions into the cloud, and supported their whole value chain to do the same, have proved resilient and in some cases even thrived.

Our response to the pandemic has revealed we can rapidly overcome barriers to adopting digital technology when we choose to. The way GPs have overnight become digital-first has been a revelation. Many companies also virtually overnight got employees working from home whenever they could and have realised that in most cases people are just as effective working from home as when they're in the office. It's hard to imagine working life ever fully returning to being desk-based in an office.

The pandemic has driven home a fundamental truth that ours is now a digital world, where the level of your digital skills are key to your success whatever job you have, in whatever sector that's in, and wherever you live. It's also made us realise how much digital technology is becoming ubiquitous in the delivery of the public services we depend on in times of crisis.

The pandemic has also made us realise that, more and more, high-stakes decisions about our lives are being based on the outputs of data-driven algorithms. This has thrown up serious issues around trust, and the need for openness and transparency. It's shown us that to have a properly informed debate we as a society need to be better educated about what technologies such as machine learning can and can't do, but at the same time it's unrealistic to suppose we can all become experts in such highly technical areas. Which means we must ensure the people who develop these kinds of automated information systems are highly competent, highly ethical, working for the public good and can be held to account against widely recognised standards. In other words, we can trust they are professional and they can prove to us that they truly are.



Paul Fletcher

CEO, BCS, the Chartered Institute for IT

The Festival of Digital Skills has come at exactly the right time for us to take stock and explore how to harness digital technology to recover from the current situation as fast as is humanly possible. Through this festival we will examine the digital skills needed to nurture future resilience across areas such as education, training, healthcare, social care, and that will create a thriving, prosperous economy that helps all of us in every part of the UK.

SKILLS AND IT LEADERS

This extract from BCS’ Digital Leaders research focuses on the skills landscape.

The IT landscape is ever-changing - technologies, standards and approaches ascend and descend in popularity. As such, different talents, capabilities and skills are always in demand.

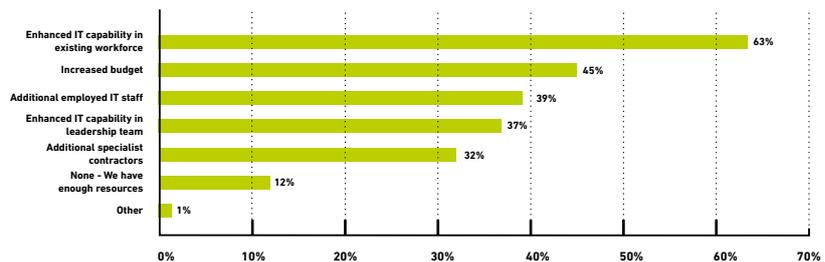
When it comes to meeting new tech trends, the requirement for ‘enhanced IT skills among the existing workforce’ is rated as the top requirement in the 2020 report, with 63% rating this as their top resourcing need.

The need to upskill existing staff is a constant theme in previous reports. Indeed, from 2014 onwards, we have seen leaders report that enhanced skills among their existing workforce is their most pressing resourcing issue.

There are, of course, many ways in which organisations can enhance their workforce’s IT skills. And this learning and development space is one where BCS is very active. We provide tools that enable organisations to understand and map the skills held within teams and departments, such as SFI*Apus*. BCS also offers professional certifications across specialisms such as Agile, DevOps, security, software testing and more.

BCS’ many member communities – both regional and discipline specific – all regularly hold events where members meet and share skills.

Figure 1:
ADDITIONAL RESOURCES NEEDED



Source: BCS

Along with upskilling existing staff, our body of IT Leaders Reports – taken together (2014-2020) – also shows that new and additional suitably qualified staff are always in demand. Dating back to the 2014 report, acquiring new staff with suitable qualifications has generally lagged marginally behind enhancing skills among existing workforces.

Take these two requirements together and we can quite safely conclude that the acquisition, maintenance and growth of a skilled and qualified IT workforce is a major resourcing challenge for organisations.

When it comes to capability gaps, the 2020 survey found that cloud, data and development skills were most in demand. Elsewhere in the 2020 report, we saw cloud rate very highly as a technology priority; so it would seem reasonable that, where demand for technology leads, the demand for talent follows.

To gain a further understanding of skills gaps, the 2020 survey took a qualitative approach, asking respondents for opinions, ideas and observations. Noteworthy observations were:

- *‘A huge shortage of specialists with the right skill set(s) in AI and data analytics. This also extends into cyber.’*
- *‘Skills that match the pace of changing technology in all areas, ranging from network and telecommunication to applications development platforms and latest systems monitoring tools and performance tuning. We also have a gap in implementing successful agile principles in managing projects and development of fit-for-purpose IT solutions for our customers.’*

SKILLS GAPS

In our research, we asked organisations where they found the biggest skills gaps. The answers were provided in the form of free text and give a qualitative view on the types of capabilities organisations find it hardest to find.

A broad tally of responses revealed that skills relating to 'cloud' were most in demand. This seems very plausible given the cloud's high ranking in our list of technology priorities.

We also saw statements relating to 'data', 'data science', 'development', 'DevOps', 'cyber' and 'security' reoccurred frequently. Again, these align with our research into organisations' high-level priorities.

Noteworthy comments from respondents included:

- Huge shortage of specialists with the right skill sets in AI and data analytics. This also extends into cyber.
- Lack of broad knowledge of developing Microsoft technologies and cloud solutions.
- Cloud native DevOps capabilities, such as serverless.
- Understanding the business requirements and objectives and how IT can help deliver them
- There is a need to better understand the value business analysis skills can bring to the public sector in both policy and technical spheres, beyond the service design and user-centred design currently adopted.

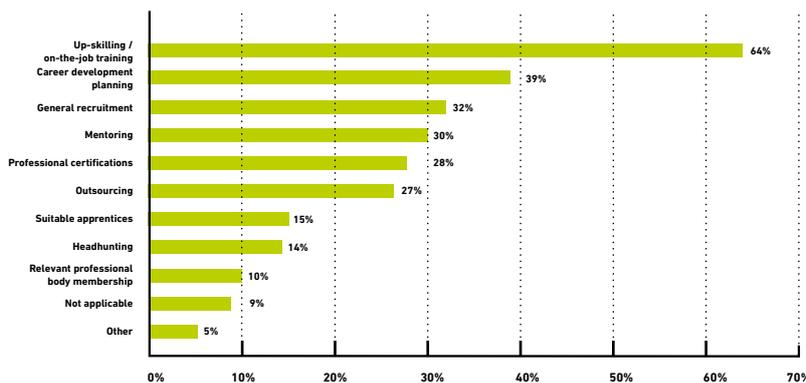
ADDRESSING THE GAPS

We asked BCS members and other IT leaders how they plan to address any skills gaps that may exist in their organisations. Up-skilling and on-the-job training (64%) was the resounding skills solution of choice.

More BCS content, policy papers and views are available at:

BCS members can see additional material via the MyBCS portal.

Figure 2:
ADDRESSING THE SKILLS GAP



Source: BCS

AI AND SKILLS

This extract from BCS' AI research focuses on the skills landscape.

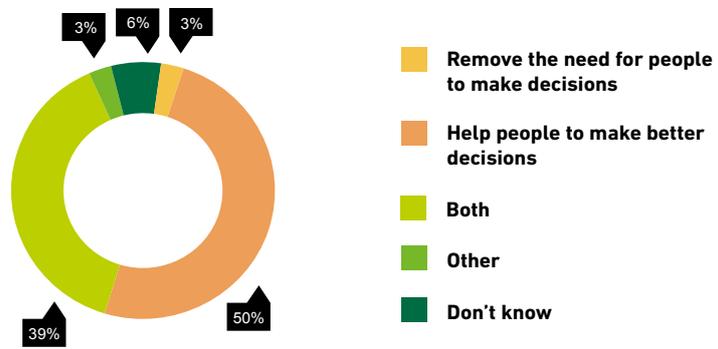
Is AI about to remove people and their skills from IT? In the BCS research only 3% said they were looking at removing the need for people in the process, whereas 50% cited their motivation being 'to help people to make better decisions' and 39% went for a combination of the two. These are very top line results, of course, but perhaps indicate that job panic is still premature.

Those being more specific in their answers seemed to follow the idea that assisting decision-making, or, as one person wrote: *'helping people make sufficiently accurate assessments and decisions significantly more efficiently and with less effort,'* seemed to be the balance. This was also reflected in the 80% who felt that the more desirable approach to decision-making was augmenting it for people, rather than removing people from that process.

But undoubtedly each new tranche of technology makes a change in the work landscape and society as a whole, so what professions may be in danger?

Figure 3:

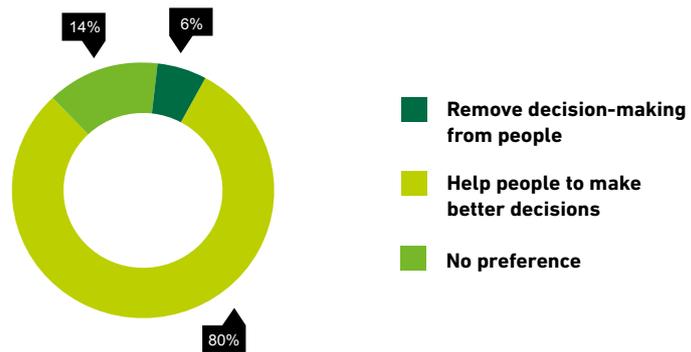
ARE YOU (OR WILL YOU BE) DEVELOPING AI SYSTEMS THAT WILL REMOVE THE NEED FOR PEOPLE TO MAKE DECISIONS OR HELP PEOPLE TO MAKE BETTER ONES?



Source: BCS

Figure 4:

WHICH DO YOU THINK IS MORE DESIRABLE – AI SYSTEMS THAT REMOVE DECISION-MAKING FROM PEOPLE OR SYSTEMS THAT HELP PEOPLE MAKE BETTER DECISIONS?



Source: BCS

The above question endeavours to get a feel for changes 10 years out – a big ask. We also asked members which roles they expected to see replaced by AI within five years. Some answers were adamant that there would be none, with reasons varying from ‘reliable systems need clear architectural decisions,’ to the (perhaps justifiable and very specific) contextual fears of ‘working in nuclear engineering systems.’

However, most respondents expected a shift in working. Said one commenter: *‘I expect people will think that testing can be automated by AI.’* Another remarked that the replacement of roles would consist of *‘almost everything, except where human emotions are involved – caring, sales, cooking.’*

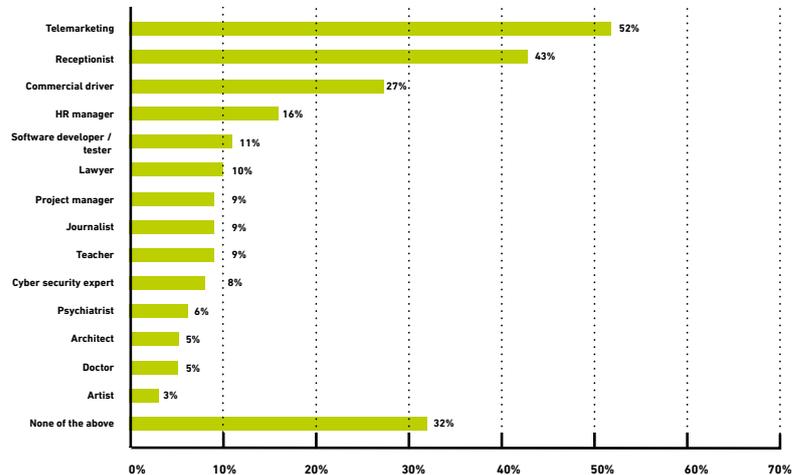
WHAT OTHER ROLES ARE IN DANGER?

Some specifics mentioned in the comments included:

- Call centre staff. Said one commenter: *‘there is a massive opportunity to revolutionise the customer-facing activities in our organisation. From being the first point of contact to contextually sign-posting relevant materials, through to full automation of certain requests, we could both improve user experience and extend support hours without incurring massive additional costs.’*
- Middle management and its attendant roles – planning, survey analysis (irony?).
- Traditional administrative and clerical roles: claim handling, credit approval, underwriting, stock ordering, receptionists.
- Junior professional functions such as those in law,

Figure 5:

WHICH OF THESE PROFESSIONS, IF ANY, DO YOU THINK WILL BECOME OBSOLETE WITHIN THE NEXT 10 YEARS AS A RESULT OF AI?



Source: BCS

- accountancy, finance, risk management, trading and book-keeping.
- Advice services (as one commenter summarised: ‘anything rule-based’): legal, translation checking, finance and HR, data entry.
- Medical diagnostics, radiology.
- Crime reporting.

WHAT ABOUT NEW ROLES?

The changes provoked by new technologies also provide more opportunities, and could be viewed as a checklist for future training and skills enhancement. So, although taking a long view, we asked commenters to theorise which jobs may be created over the next ten years. In AI itself, as a discipline, there were a number of recurrent themes:

- AI Auditors.
- AI specialist developers.
- AI testing roles.

- AI detectives (to discover error sources in systems).
- Application of AI frameworks in industry.
- AI explainers – for lay audiences.
- AI ethics auditor.
- AI model builder.
- AI algorithm tuner.
- RPA business analyst.
- AI standards certification.
- AI legal specialists.
- AI body of knowledge curator.
- Decision interpreter / referee.

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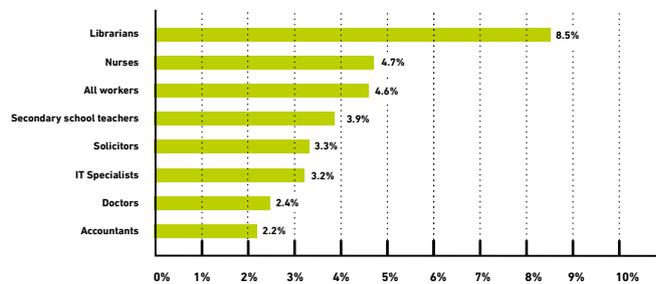
MENTAL HEALTH, IT AND JOB EFFECTS

This extract from BCS’ analysis of ONS mental health research focuses on the skills landscape, IT professions, work-types and skills.

To set the context, as illustrated within the chart below, the incidence of mental health conditions amongst IT specialists appears relatively low compared to many other ‘recognised professions’ – notably librarians who were around two and a half times more likely to report having mental conditions over the 2014-18 period (8.5% in this case).

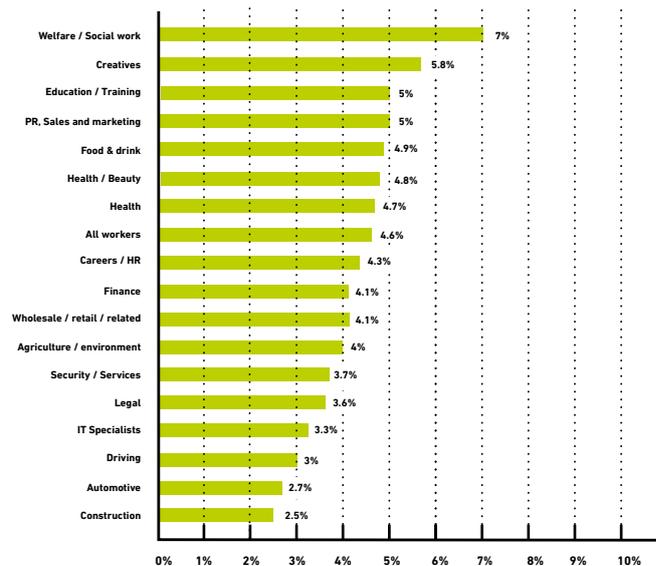
A comparison with other ‘career paths’ or ‘wider occupational groups’¹ again shows IT specialists as being relatively less likely to have mental health conditions.

Figure 6: INCIDENCE OF MENTAL HEALTH CONDITIONS BY SELECTED ‘PROFESSIONS’, 2014-18



Source: BCS analysis of data from the ONS Labour Force Survey

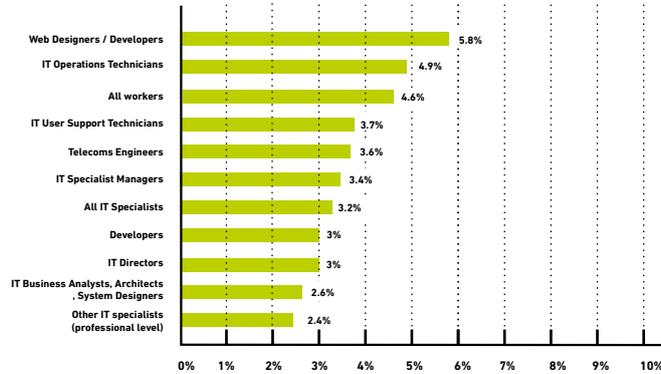
Figure 7: INCIDENCE OF MENTAL HEALTH CONDITIONS BY SELECTED OCCUPATIONAL GROUP, 2014-18



Source: BCS analysis of data from the ONS Labour Force Survey

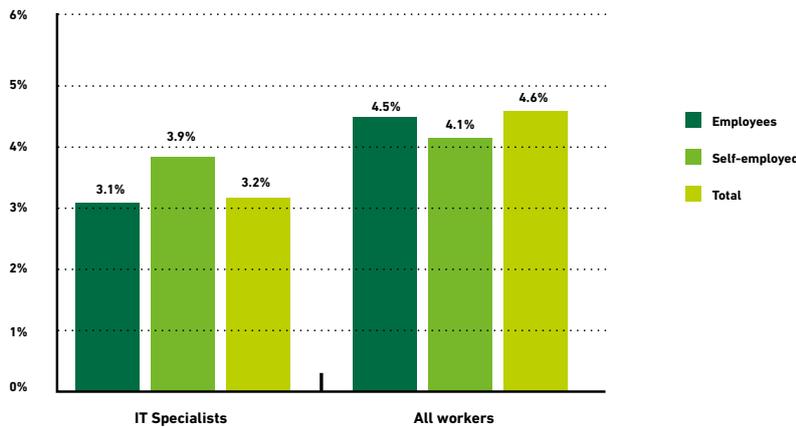
¹ Groups presented here are ‘non-standard’ combinations of Standard Occupational Classification (SOC2010) codes drawn up by BCS for comparison purposes in this report. Details are available on request.

Figure 8:
INCIDENCE OF MENTAL HEALTH CONDITIONS BY IT OCCUPATION, 2014-18



Source: BCS analysis of data from the ONS Labour Force Survey

Figure 9:
INCIDENCE OF MENTAL HEALTH CONDITIONS BY CONTRACTUAL STATUS, 2014-18



Source: BCS analysis of data from the ONS Labour Force Survey

WHAT ABOUT IT OCCUPATIONS?

Amongst those working as IT specialists it would appear that mental health conditions are most often apparent for web designers/ developers – 5.8% of whom on average stated that over the 2014-18 period they had experienced; ‘depression, bad nerves or anxiety’, or ‘mental illness, or had suffered from phobia, panics or other nervous disorders’ for a period of 12 months or more – a figure notably higher than that recorded for IT specialists in general and workers as a whole.

Aside from web designers/ developers, IT operations technicians were also noted as being much more likely to have had mental health conditions than most other (IT) workers (i.e. 4.9% stating this to be the case over the 2014-18 period), whilst by contrast, the incidence of such conditions amongst ‘Other’ IT specialists (professional level) in particular was much lower at just 2.4%.

A BENEFIT OF CONTRACTING?

Mental health conditions appear more common amongst IT contractors (i.e. the self-employed) than those working as employees (3.9% against 3.1% in the 2014-18 period) which is contrary to situation within the workforce as a whole (comparison figures of 4.1% and 4.5% respectively).

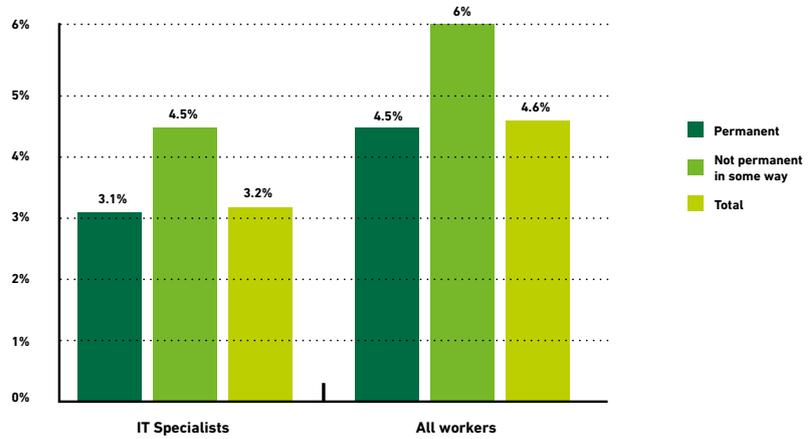
That said, the incidence of mental health conditions appears to be even higher amongst individuals working under other contractual arrangements (i.e. government schemes and unpaid work for family), or at least within the wider workforce² and for those working under such an arrangement, the likelihood of having a mental health condition is almost four times higher than for workers in general (i.e. 17.3% versus 4.6% over the 2014-18 period)

The incidence of mental health conditions also varies with permanency of employment and, like other workers, IT specialists working on non-permanent contracts are more likely to have mental health conditions than those in 'secure' work (4.5% compared versus 3.1% respectively during the 2014-18 period as illustrated overleaf).

MENTAL HEALTH AND HOURS OF WORK

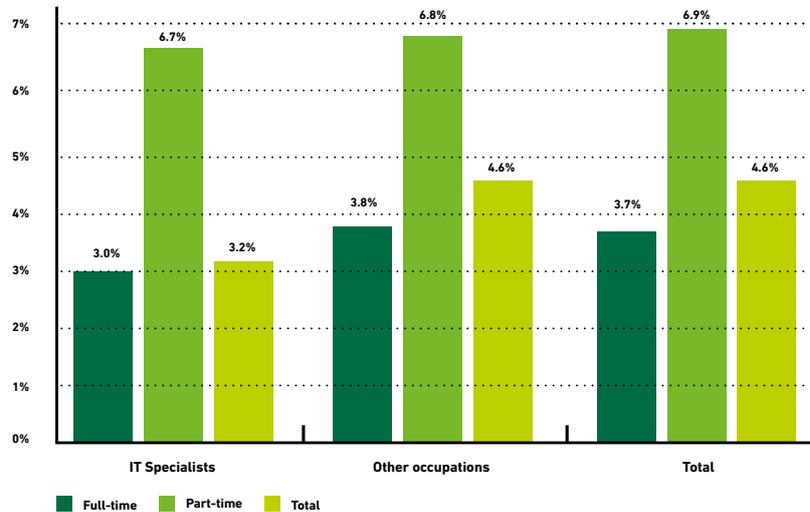
Part-time IT specialists are more than twice as likely to have mental health conditions as those working full-time hours (6.7% versus 3.0% during 2014-18) and this was much the same as the situation reported by workers as a whole (6.9% versus 3.7%).

Figure 10:
INCIDENCE OF MENTAL HEALTH CONDITIONS BY PERMANENCY OF EMPLOYMENT, 2014-18



Source: BCS analysis of data from the ONS Labour Force Survey

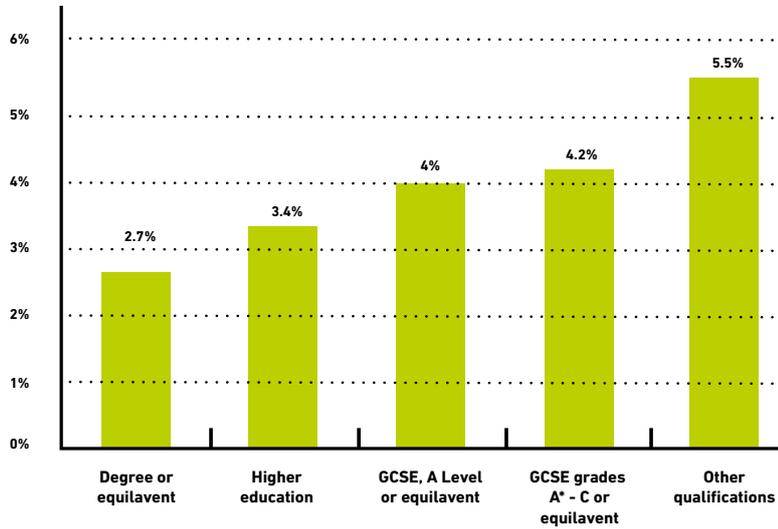
Figure 11:
INCIDENCE OF MENTAL HEALTH CONDITIONS AMONGST FULL AND PART-TIME IT SPECIALISTS 2014-18



Source: BCS analysis of data from the ONS Labour Force Survey

² Comparison figures for IT Specialists unavailable due to limitations of the data.

Figure 12:
 MENTAL HEALTH CONDITIONS AMONGST IT SPECIALISTS BY
 EDUCATIONAL ATTAINMENT 2014-18



Source: BCS analysis of data from the ONS Labour Force Survey

MENTAL HEALTH AND SKILL LEVELS

There is a negative correlation between skill level and the incidence of mental health conditions amongst IT specialists – using educational attainment as a proxy for skill level it can be seen that the incidence rises from 2.7% amongst IT specialists with degrees/equivalent to 4.2% of those whose highest qualification is at GCSE level and over 5% amongst those with ‘other’ qualifications.

By comparison however, there appears to be little correlation between the incidence of mental health conditions and educational attainment amongst the UK workforce as a whole over this period.

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SECURITY SKILLS

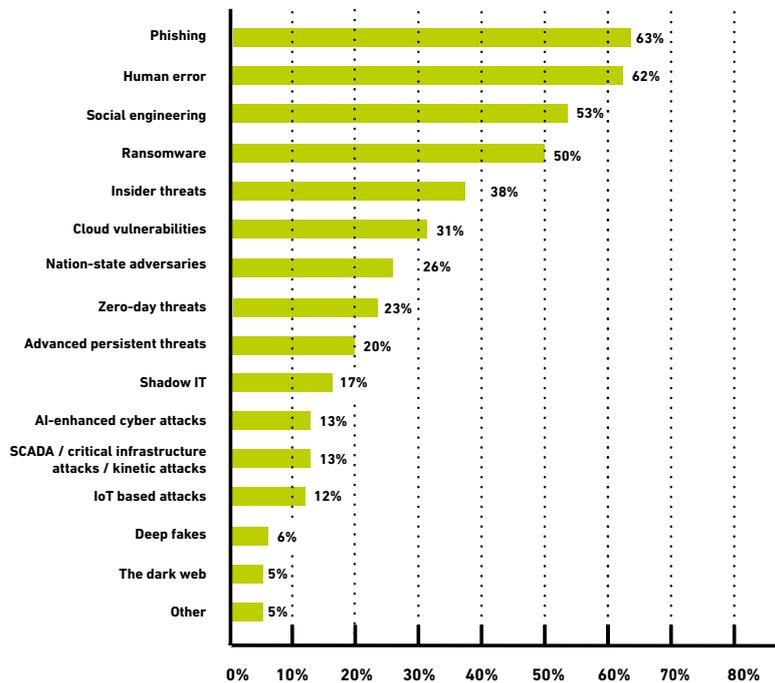
This exclusive extract from BCS' security research focuses on the skills landscape.

BCS' latest research asked members – both of BCS's security specialist groups and IT professionals in general – about their view on the state of IT security now. Nearly 700 members responded with some fascinating insights. This piece looks at the skills side of the survey.

The complexity of the cybersecurity landscape makes it a vital area of interest for all – whether in IT or not. In an industry where a breach can happen through well-intentioned mistake; or through highly organised criminal activity; or via a lone teenager hacker; or through a state actor; or from a disgruntled employee, the threat surfaces are huge.

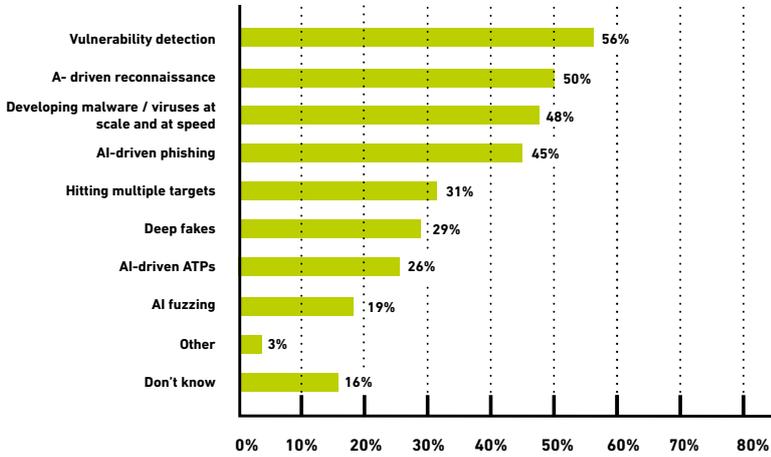
Add in legal compliance issues, the speed of change, user demand, the gap between business leadership and technical understanding and a multitude of other considerations and it is obvious why BCS has such a thriving security community.

Figure 13:
CURRENTLY, WHAT ARE THE BIGGEST CYBER THREATS?



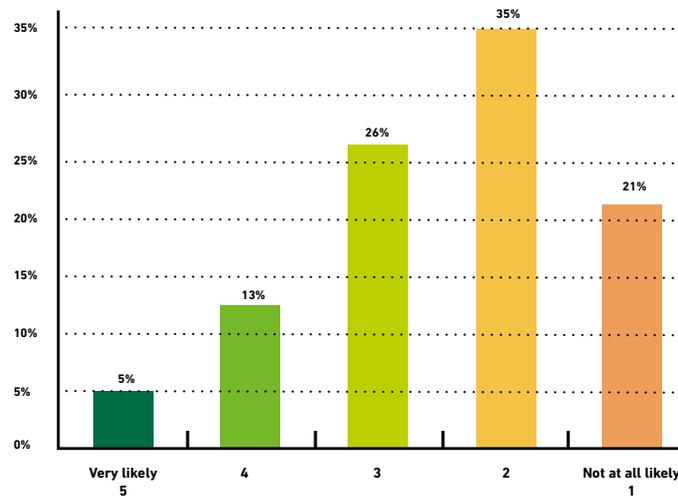
Source: BCS

Figure 14:
HOW DO YOU SEE CYBERCRIMINALS DEPLOYING AI IN ATTACKS?



Source: BCS

Figure 15:
HOW LIKELY DO YOU THINK IT IS THAT AI WILL LEAD TO REDUNDANCIES IN THE CYBERSECURITY PROFESSION?



Source: BCS

SKILLS OUTLOOK

As is to be expected there was a wide range of issues on the skills gaps – both from the technical perspective and in relation to security understanding in the wider business. The specific question we asked was around what skills are most difficult to recruit for. These ranged from hard security skills – an obvious essential – to softer skills and those surrounding integrating more effectively with the business.

Some of the harder skills listed included: red teaming skills; in-depth penetration testing, edge device protection and security postmortem deep forensics. Related deeper skills, or experience-related items, included finding *‘people who are real engineers and think solutions through properly,’* as described by one responder. Also mentioned were an awareness of governance and how it should fit in with the business; general policy knowledge, and those X factors: a conceptual understanding of risk and a security *‘spider-sense’*.

‘We need HR people who have a scoobie-doo what security is and that it is a profession based on the rule of law,’ wrote one member. And inevitably new staff cause an issue, being, as one commenter wrote: *‘unable to discern, phishing, scam, peering and social engineering and many other cyber security threats.’*

That leads to some of the softer skills mentioned, such as empathy and an understanding of user psychology. Of course, a lot of these things need to converge. As one member put it, we need *'pragmatic cybersecurity understanding in a business environment.'*

The inherent tension here was highlighted in this comment: *'the bigger issue is getting rounded people - it's easier to find people with either very technical mindsets or very human centric mindsets but harder to find both.'*

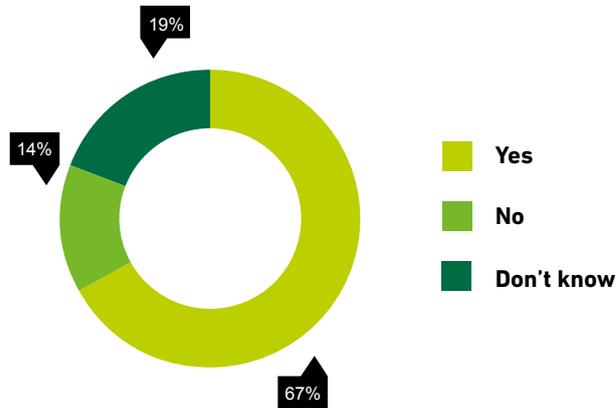
And, picking up a long-discussed hybrid issue, one commenter wrote that we need, *'people who can see end to end and can communicate both up and down the business both technically and nontechnically.'*

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Figure 16:

DO YOU BELIEVE AI WILL ULTIMATELY LEAD TO THE CREATION OF NEW JOBS IN THE CYBERSECURITY PROFESSION?



Source: BCS

DIGITAL SKILLS SUPPORTING 2021'S ECONOMIC ROAD AHEAD

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Coming in 2021

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* Also available internationally

For more information about these and our other qualifications, visit [**bcso.org/digitalskills**](https://www.bcs.org/digitalskills)



A SNAPSHOT OF THE UK'S DIGITAL SKILLS

A piece of survey work has been undertaken by BCS specifically for the Festival of Digital Skills. The idea is to give a sense of the breadth of the challenge. Its findings were sobering - it is still the case that many people are simply not confident using basic software.

The digital skills in the survey were defined as the ability to use computing software for word processing, spreadsheets, communication - such as video conferencing - and email. It also included navigating social media and web content effectively to communicate and share information online.

To take spreadsheets and storage first - a third of people lack the ability to use an Excel spreadsheet - and most have been offered no opportunity to improve their digital skills recently. An even larger number, 37% of UK adults, said they were not confident with (or didn't know about) simple storage and management of data using Microsoft Office.

The background here is the recent issue with the NHS track and trace system where people testing positive for Covid-19 were not recorded once an Excel spreadsheet reached its maximum capacity - work not undertaken by members of the public, of course.

Are people being helped? BCS found that 83% of people had not been offered any help to improve their digital skills over the last six months. Most said their opportunities for support came from employers (57%), over a quarter (28%) from family and friends and 13% from external organisations like government and training providers.

But this is not to say that the public don't see the importance of digital skills - in fact 89% agreed that digital skills would be important to the UK's long-term economic prosperity. Despite this, most of the adults surveyed (62%) said they were not concerned about their level of tech training affecting their career prospects.

Rebecca George OBE, President of BCS, The Chartered Institute for IT said: *'The digital divide is the modern measure of inequality. Over 9m people in the UK lack basic tech skills which are key to levelling up social inequality and to turbo-charging the workplace post-Covid.'*

'So the fact the vast majority of people don't appear to have been offered the opportunity to improve their abilities in using basic software like spreadsheets is concerning.'

'We want to help government and industry ensure that every adult and child has the right level of digital education or training for them to succeed.'

This survey is, of course, a snapshot, but certainly confirms that BCS' goal of making IT good for society is vital for the UK in the 21st century.

Methodology: all figures, unless otherwise stated, are from YouGov Plc. Total sample size was 2,072 adults. Fieldwork was undertaken between 2nd - 3rd November 2020. The survey was carried out online. The figures have been weighted and are representative of all GB adults (aged 18+).

83%

OF PEOPLE HAD NOT BEEN OFFERED ANY HELP TO IMPROVE THEIR DIGITAL SKILLS OVER THE LAST SIX MONTHS.

BCS MAKING A DIFFERENCE

The festival which this publication is accompanying has a focus on the digital skills needed to nurture future resilience across areas such as education, training, healthcare and social care. BCS, as the organiser and a member-driven organisation with a mandate to make IT good for society, takes a vital role in these issues. So, what is BCS doing to create a thriving, prosperous economy that helps all of us in every part of the UK? The policy work BCS does, as discussed here, showcases some of its influence and effectiveness.

The sale of chip giant ARM, based in Cambridge, to US-owned Nvidia is a global geo-political issue – so how was BCS to take a credible position let alone be heard on this topic?

As international debate around the sale of ARM (already owned by Japanese tech group SoftBank) became increasingly politicised, BCS asked members for their opinions.

The strong response to the survey last month provided BCS with a mandate to comment on the matter. As a result, we were able to offer the results as an exclusive story with the *Times* newspaper, which was later followed up by global news channel CNBC referencing our findings in their report.

The results made news because they were stark - 70% of IT professionals favoured government intervention in the deal, something that remains a live issue.

This was not for idealistic or nationalistic reasons, but because members felt that retaining assets like ARM and Imagination Technologies can help cushion Britain from geo-political turmoil, protect jobs and secure the intellectual property rights underpinning our future.

One argument is that ARM chips will power the internet of things; so NVIDIA could have its hand on a priceless social and economic lever in a world where all our devices can eventually talk to each other.

As our CEO Paul Fletcher summed up in the story: *"We recommend that strategic digital assets and significant technological intellectual property are considered more fully in the Government's Industrial Strategy. In a post Brexit and COVID world the UK should be a beacon of technological innovation and leadership."*

In the days following our story – coincidence or not - influencers such as Lord Mandelson and ARM co-founder Hermann Hauser were also reported in the press, stressing the importance of reviewing the decision.

As with our member surveys on early plans for the contact tracing app (where BCS came out against a centralised data storage model) or the banning of Huawei from the UK 5G network (where our professionals doubted the decision would move us to the 'digital slow lane') – the collective view of BCS members is vital to help BCS positioning.



Paul Fletcher

CEO, BCS, the Chartered Institute for IT

BCS EXPERTS' VIEWS BEING HEARD

Supporting our data-driven PR and engagement, BCS now offers timely comment to journalists who seek our input. Our ambition is to become the go-to organisation for commentary and insight on the vital issues affecting our industries.

So, in this, thanks go to Adam Leon Smith FBCS, who provided rapid analysis on the recent controversy around the role of Excel spreadsheets' in recording of COVID-19 contact tracing.

His comments provided to the PA national newswire were picked up across the UK's media including the *Independent*.

Adam, who chairs our Software Testing Specialist Group, wrote: *“It is very surprising to hear that an enterprise scale system, presumably developed by professional technologists, is expected to run on Excel. It is designed for end-users not complex systems, has well-known scalability limits, and will not handle unexpected situations in a way that interacting systems will be able to recognise.”*

Adam’s view on process failures which led to coding errors in the test and trace website, were also covered by *Schools Week*. We are finalising plans for a technical leaders group which creates sector-leading papers on areas including 5G and will share details with you over the coming weeks.

Another example of a BCS leader whose expertise is cutting through is Dr Alan Warr CITP MBCS, Chair of the Consultancy Specialist Group. Dr Warr told *IT Pro* magazine in a feature on tech investment choices that a plethora of new technologies have arrived at the same time, *“offering the prospect of a ‘golden decade’ in the 2020s for those businesses that invest well”*.

He added: *“These technologies include infrastructure technologies leveraging global connectivity including cloud services, security technologies, 5G for mobile connectivity, blockchain, IoT and quantum computing.”*

DIVERSITY AND INCLUSION

Elsewhere in our engagement work, BCS has renewed its focus on promoting diversity and inclusion both internally and throughout the sector, as part of its mission to Make IT Good for Society. In particular, we recognise there are key areas

of under-representation in the IT sector beginning in education and continuing to senior professional levels.

While the proportion of women applying to study computer science at degree level has risen slightly, in 2020, women still made up just 17% of the total university applicants (UCAS data). Women currently enjoy their largest ever employment share of the IT profession (20% according to ONS data), yet black women make up less than one percent of the total.

BCS’ Diversity and Inclusion 2020 survey showed that while being better qualified than their white counterparts, BAME IT professionals make up just 9% of directors. The research was covered by a range of media including a large feature in *Computer Weekly*, under the heading ‘Tech’s Diversity Gap - Slow Growth for Minority Groups’.

Our recent webinar ‘The Awkward Conversation’ focused on the experiences of BAME IT professionals and featured Dorothy Monekosso, Professor of Computer Science at Leeds Beckett University; Dr Ip-Shing Fan, Senior Lecturer in Enterprise Systems at Cranfield University and Chair of BCS Bedford; and Nzube Ufodike, an entrepreneur and Vice-Chair of BCS London Central.

The group found that diversity and inclusion remained a ‘box-ticking exercise’ for many organisations and called on senior managers to do much more to understand the diversity of experiences, backgrounds and perspectives in their organisations.

The event was covered exclusively by *The Voice*, the UK’s leading black newspaper, promoting our work and research to new audience. We are working closely with our members ahead of the imminent launch of BCS’ first Specialist Group (SG) dedicated to supporting and inspiring IT professionals from BAME backgrounds.

ALGORITHMS, PUBLIC TRUST, AND THE EXAMS CRISIS

In response to this summer’s exams crisis, we commissioned a YouGov poll to investigate the public’s trust in and understanding of organisation’s use of algorithms. We found the 53% of the 1,000 UK adults surveyed had no trust in any organisation, from government to social media, to use algorithms to make decisions about them.

The research was covered in an exclusive arrangement by the *i* newspaper and then later by *The Telegraph* and a range of other trade press.

The study also had demonstrable policy impact, with politicians including Conservative Peer and Good Careers Guide director, Lord Ralph Lucas, and Institute of Artificial Intelligence leader, Labour MP Darren Jones. The poll was supported by a detailed policy position paper entitled: *“The Exam Question: How to do we make algorithms do the right thing?”* which recommended the professionalisation of data science alongside independent, public impact assessments whenever algorithms are used to make high-stakes public policy decisions.

HUAWEI 5G BAN

Our survey of members' views on the banning Huawei from the UK's 5G infrastructure attracted almost 3,000 responses, a record for a poll of this kind at BCS.

The majority of IT professionals (53%) did not believe Huawei's claim that the UK's decision to ban the tech giant from 5G will 'move Britain into the digital slow lane, push up bills and deepen the digital divide'. However, over a quarter (28%) did agree with the Chinese telecoms firms' warning that the UK's tech development will stall without it, with 19% remaining neutral.

The full story was covered in a range of national and trade press including in *The Telegraph*, as well as being shared with key policy stakeholders within DCMS.

TECHNICAL INSIGHTS ON EU DATA LEGISLATION

Alongside achieving mainstream recognition for work of broad public interest, we are also focussed on harnessing members expertise in highly skilled and 'niche dominance' areas.

For example, the Law Specialist Group produced a well-received paper on the Schrems II European Court of Justice judgement which ruled that the Privacy Shield Framework cannot be used for transferring personal data between the EU and US. Our work urged 'prompt action' from UK organisations alongside information and guidance.

The judgement will have sustained, post-Brexit impact on any countries that are not considered by the EU to have adequate data protection.

53%

DID NOT BELIEVE HUAWEI'S CLAIM THAT THE UK'S DECISION TO BAN THE TECH GIANT FROM 5G WILL 'MOVE BRITAIN INTO THE DIGITAL SLOW LANE, PUSH UP BILLS AND DEEPEN THE DIGITAL DIVIDE'.

NATIONAL DATA STRATEGY LAUNCHED

The launch of the government's outline National Data Strategy in October is a vitally important step towards the UK being able to thrive outside the EU and post COVID-19. It contains several key commitments that are closely aligned with BCS' long term policy objectives that were in our response to the consultation on the strategy.

These include:

- recognition from the government of the work led by the Royal Statistical Society (and in which BCS is a key partner) to professionalise the field of data science

- the need for integration of data science into all technical qualifications
- the need to incorporate data skills across university courses, including arts and humanities subjects as well as STEM - a specific BCS recommendation
- and a focus throughout public services on ensuring ethical use of data and preventing online harms.

The government is also recruiting 500 new data scientists and BCS is determined to engage and offer value to this initiative, supported by our longer-term work.

The consultation will close in December and we will be submitting a full response, working with key areas of BCS membership.

These recent examples prove that member insight is what makes BCS unique and is what gives us the right to be part of important conversations on the socio-economic impact of technology.

A NEW WORLD OF TRAINING OPPORTUNITY

In mid-2020 a BCS webinar assessed COVID-19 and the UK government's job plan. Rebecca George OBE FBCS, President of BCS and Managing Partner at Deloitte, introduced the event to discuss the plan that came into force in August 2020.

PART ONE

THE PROBLEM

Laura Jane Rawlings, CEO Youth Employment UK, set the scene for the need for training and support for young people. She said: *'We are dealing with a generation of young people who have been completely displaced from everything they thought to be true. We are seeing that news come through thick and fast with A-level results and the anxiety and the challenges [that's] presenting.'*



Laura Jane Rawlings

CEO, Youth Employment UK

'We are seeing young people who are living in homes where they aren't able to access technology because of digital poverty and they have lost out on masses of education... We are also seeing children living in crisis. The number of calls to Childline and mental health charities have all doubled since young people have been in lockdown. This situation couldn't be more challenging for [16-24 year olds].'

While there has been a lot of protection for existing employees with the furlough scheme, there have been few opportunities for young people embarking on their career.

Rebecca Denham, Traineeships Policy Lead, Education and Skills Funding Agency, said: *'The last few months before COVID hit, we had already started doing a lot of work with employers, providers, job centres and careers advisers as well. It was really to understand how we could expand and reform the [apprenticeship] programme. This was propelled when COVID hit.'*

'It was right that the chancellor wanted to focus on traineeships as one of his priorities, to be able to start supporting people back into employment.'

There is a need to increase apprenticeship opportunities and the jobs plan incentivises companies to take on trainees of different sorts, but during this dark economic period, where companies are struggling, will they really be receptive to adding to the payroll? And new talent doesn't just fall between the ages of 16-24. Is there anything else that needs to be considered for workers who are not of the millennial generation, who desperately need to reskill?

THE LAST FEW MONTHS BEFORE COVID HIT, WE HAD ALREADY STARTED DOING A LOT OF WORK WITH EMPLOYERS, PROVIDERS, JOB CENTRES AND CAREERS ADVISERS AS WELL. IT WAS REALLY TO UNDERSTAND HOW WE COULD EXPAND AND REFORM THE [APPRENTICESHIP] PROGRAMME. THIS WAS PROPELLED WHEN COVID HIT.

Rebecca Denham, Traineeships Policy Lead, Education and Skills Funding Agency



HOW AND WHERE WILL WE LEARN?

We also need to consider how brilliant young people will join the workforce from their bedrooms. How do they learn to become professional? How do they learn from their peers, if they can't have that proximity?

Laura Jane Rawlings said: *'Working from a bedroom or working from a lounge with parents. Trying to move and avoid obstructing them is really difficult with mental health and wellbeing.'*

'There are digital and connectivity issues, too, because they don't necessarily have the right bandwidth... I worry about some of our businesses talking about never returning to the office, because it will rule out some really brilliant, talented young people who just aren't ready to work from home full time.'

'There is some training you just can't do digitally. It has to be face to face, in a welcoming and supportive environment for young people.'

Rebecca George agreed: *'In my experience, there is some work that is better done with other people in the same room. Many young people, or people in their early careers want to be in the same room as their more senior leaders, because that's how they learn.'*



Rebecca George
BCS President

POSITIVE CHANGE

Will there be changes in how we learn? Will there be blended placements, with time at work and time learning remotely? Although cautious, the panel remained largely optimistic that this period of unprecedented flux and uncertainty would bring positive change.

Jonathan Mitchell, Deputy Director, Standards Development, IfATE, said: *'There will be an enormous temptation over the coming months to roll back, to change reform, or to head off in a different direction. And sometimes it will feel like the right thing to do – it may even be the right thing to do.'*

'It's helpful for us to bear in mind that an enormous amount has been achieved in the last few years and it's not work that has been finished. We are on a trajectory here and there will be lots still to do.'

PART TWO

ATTRACTING NEW TALENT

How do we make job descriptions more dynamic and inspirational? What is an IS business analyst? Or what is the difference between a data analyst and a data scientist?

Bill Mitchell, BCS Director of Policy, said: *'Imagine what would happen if Manchester United released all the data they had, say from five years ago, on all of their footballers, their training and their performance. And they explained how they used data'*

analysis to choose the first team in the premier league. I think you would soon find a shed load of young boys desperate to become data analysts.'

While we need to encourage the young to see value in the new occupations, roles can seem a little nebulous. We need to show that this is a starting point and not a destination. We can move sideways and diagonally in our careers. This is an opportunity to gather transferrable skills.

How do you attract the cream of the crop to your company? Do you have to be a member of the Fortune 500? Be Google or Apple? Or is it more important to have a good culture that is open, honest, welcoming, and inclusive?

Jessica Holt, Director of Consultancy & Workforce Solutions, Consultancy, Tower part of Capita Resourcing, said: *'Talent attraction needs to be quite expansive. If you look at an orange and all the different segments that make it up, there are a number of different ways that individual groups will be attracted to an organisation. It could be around their culture or their social responsibility. It's understanding where those groups sit and how to engage them into taking a further look.'*

LOOKING AHEAD

Throughout the many questions, one thing is definite and that is that we have an uncertain few years ahead. However, looking beyond what we don't know, we can see a path to what we want.

Where traineeships work really well is where training providers, employers, local authorities and job centres work in collaboration and understand local demand and supply, job opportunities and the local skills need. Having a pipeline and building

from the bottom up, ESFA is looking at how they build on a collaborative and regional approach.

Post COVID-19, we will need to retrain. Train for new careers. Prepare for careers that have not yet begun. Our certification can't stay still, our ways to deliver examinations have and will continue to change.

The qualifications need to be fit for purpose: our qualification structure was created, literally, in the steam age. Training and the recognition of skills and certification are all areas that are ripe for change. Students are looking for real value for money.

Employers may need different skills but, ultimately, most are having the same experience and share similar goals. They will need guidance from bodies that welcome the sharing of ideas and can lobby government for change, like BCS.

TALENT ATTRACTION NEEDS TO BE QUITE EXPANSIVE. IF YOU LOOK AT AN ORANGE AND ALL THE DIFFERENT SEGMENTS THAT MAKE IT UP, THERE ARE A NUMBER OF DIFFERENT WAYS THAT INDIVIDUAL GROUPS WILL BE ATTRACTED TO AN ORGANISATION.

Jessica Holt, Director of Consultancy & Workforce Solutions, Consultancy, Tower part of Capita Resourcing



Jonathan Mitchell

Deputy Director, Standards Development, IfATE CEO. Youth Employment UK

Jonathan Mitchell said: *'Job roles should have purpose and feel they get you somewhere, creating pathways into careers ready for the future. Core competencies are rapidly evolving not just in apprenticeships, all the other routes, T-Levels, Higher Level Qualifications and traineeships are linked to occupational standards. We need organisations like BCS to come together to set the strategies, so we all move in the same direction.'*

'Most jobs contain digital skills, following COVID even more so. IfATE has done a fair bit of work building on the Essential Digital Skills Framework, putting together a bank of knowledge skills and behaviours to provide as a stimulus to trailblazer groups to ensure digital skills are built into occupational standards using the same language. Further information will be published soon making it easier for employers and providers to deliver transferable skills in T-levels, traineeships and apprenticeships.'

RAISING STANDARDS

We need to raise the standard. We need to acknowledge the public sector contribution to economic recovery. The government jobs plan offers an opportunity, but it's up to private and public sectors to work together to support young people into traineeships. We must build on a collaborative approach.

The new T-levels will offer young people training with industry placements. A modern day 'sandwich course' that their parents' generation will recognise. Apprenticeships will continue to offer learners paid employment at all levels while they train, often with a day release.

In terms of employee incentives, the new job plan is centred around getting the 1m+ people aged 16-24 into full time training or work. This isn't just a message to the employers. School leavers receiving their exam results now, can look at their options in terms of work and training. Yes, academic knowledge is good, but experience is essential.

Rebecca Denham said: *'We will be using our comms channels through amazing apprenticeships, looking at options around including vacancies in newsletters that go out for teachers and parents. And, we're working on social media plans as well during the [exam] results period... to get more social content pushed out to individuals through DfE and DfSE channels, including the National Careers Service. We do have the redundancy support service there also, to help redundant apprentices.'*

ACCESSIBILITY

There are bursaries available for those with disabilities and neurodiversity, which could be especially valuable to IT companies looking for particular talent.

Traineeships have been introduced, typically for young people who have additional needs or a lower starting point. It is a rewarding programme to support young people in the community to enjoy better employment opportunities to move into a sustainable job or even an apprenticeship, who might otherwise become not in education, employment, or training (NEET). Recognising this challenge, the ESFA have introduced new reforms to the programme to extend the programme to 12 months maximum rather than 6 months.

Rebecca George said: *'I have a special interest in people with neurodiverse ability, because it happens that people with those capabilities are extremely well-suited to the IT sector. So, I would be extremely pleased if we could see more traineeships directed at people with neurodiverse capability in the IT sector.'*

For an older population who want to get back to work, the kickstart programme can offer training and reskilling courses from six weeks to six months. There is also a renewed level of support for job seekers with job coaching, careers advice and funding to make a change. This is an opportunity to move forward into a new direction. All are welcome. There is no limit to age with apprenticeships.

The full version of this article is available at:

SMEs AND THE GOVERNMENT'S JOB PLAN

In July 2020, Chancellor Rishi Sunak announced a raft of measures to protect jobs and increase training opportunities, so the UK would emerge from lockdown with a better trained workforce and a vibrant, thriving economy.

A BCS panel answered top line questions and took questions from the audience. There was a discussion about the incentives for work and training and an exploration of whether enough is being done to support SMEs. Here are the top ten themes, with quotes from our panellists...

1. SIGNPOSTING FOR SMALL BUSINESSES...

Mark Temple, Digital Ministry and Digital Skills Partnership, said: *'I think signposting is the key here. There's an old training acronym of "keep it simple, stupid" and if we can keep the signposting as simple as possible for these very small SMEs, it will make their life a lot easier.'*

'So, businesses need to understand what they need. That sounds like an obvious statement, but still many don't necessarily understand what skills they need to achieve what they want to achieve. So they need support in identifying what those skills are that they need in place now. But also, let's find a route to support longer-term skills such as the apprenticeship piece that will give them a much more sustainable business moving forward.'

2. LIKE FURLOUGH, FEARS THE NEW SCHEMES DON'T LAST LONG ENOUGH...

Alison Galvin, Chief People Officer Invotra, said: *'With regards to the apprenticeship incentives, I think for any of the employers and SMEs who have not embraced the scheme, and have not had an apprentice, that's too short a timeframe to avail of those benefits. So I'd like to see that extended past January.'*

3. BUSINESSES ARE SHAPING GOVERNMENT POLICY

Tracey Theo, National Account Manager, ESFA, said: *'We're doing sector growth work, which is focusing on construction, engineering, manufacturing and digital. I know that we've had a conversation certainly with BCS about what does that look like?'*

'They are doing a number of round tables, which includes SMEs and other organisations to be able to keep passing the message. And when you say to us, that the length of time is not enough - before the end of January - it doesn't fall on deaf ears.'

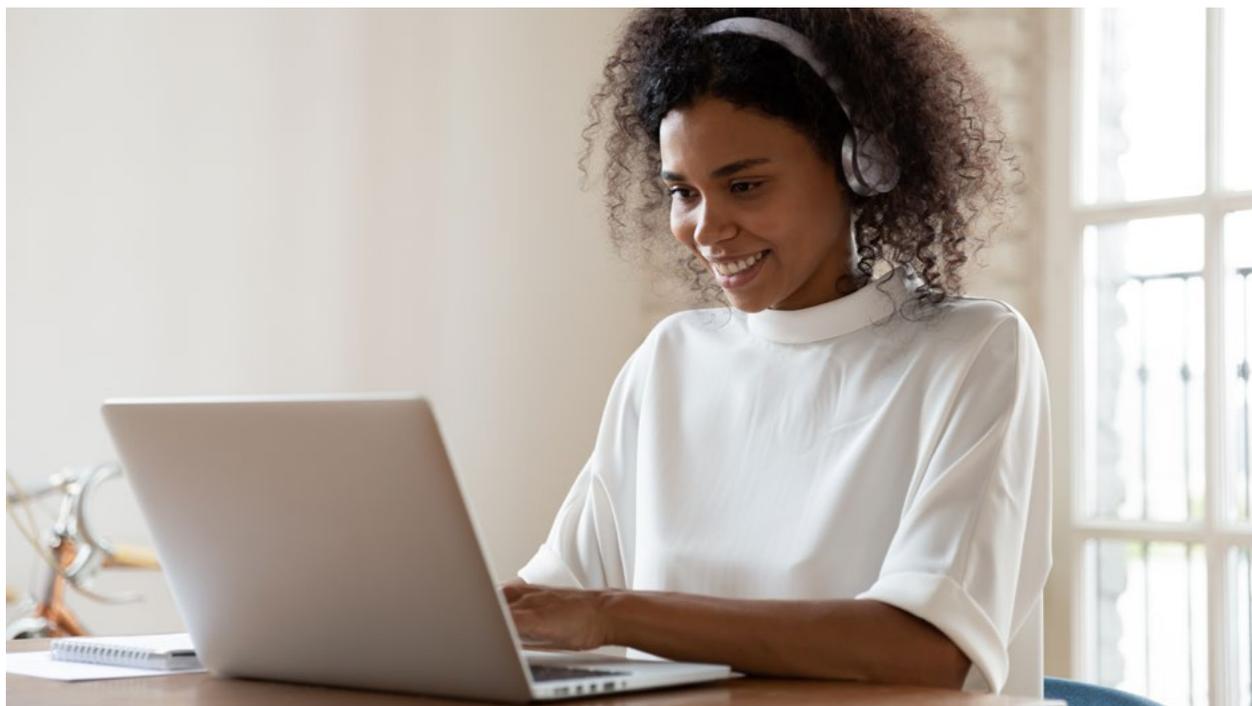


Rishi Sunak
Chancellor

'It does shape our policy and ultimately shape the programmes that we offer. It's probably the first time in my career that it has actually had such a major impact.'

4. KEEP INCENTIVES SIMPLE...

Anthony Impey, Chair of the Skills and Apprenticeship Board for the Federation of Small Business and CEO of Be the Business, said: *'That's the thing that employers really need. Small employers really need to have things joined together. I think you know in the past maybe the skill system has been a bit fragmented and there's been a lot of focus around individual programmes. Even in good times small businesses just care about skills.'*



'They don't care about whether it is T level or apprenticeships, they worry about having skills in their organisation. So I think it's really good to see everything come together in one place and starting to see different parts of government join together so Kickstart programs connecting with apprenticeships. It feels like a major step forward for programs in DWP to be working with programs and DFE. So I think that's a very important step forward.'

5. LOOKING FOR SCARCE SKILLS...

Alison Galvin continued: *'I think for us the roles that we found difficult to recruit for now, actually existed before Covid as well. Roles like DevOps - they're just little like trying to find hen's teeth.'*

'As an employer, it's brilliant seeing all these incentives coming through but I think making it easier. Bring it to a whole new level where it's actually easier for employers just to latch onto this. We're busy enough as it is, so actually how do we do this?'

6. MASS UNEMPLOYMENT, BUT ALSO A SKILLS SHORTAGE...

Anthony Impey continued: *'We've got massive skill shortages. So the skill shortages we had in digital before the crisis has actually got worse during the crisis because of the massive acceleration in the adoption of digital and the use of digital.'*

'I think Mackinsey wrote an article that said in the last 90 days, we've seen ten years' worth of digital transformation. The last three to six months have seen a massive rate of digital transformation. Like we've not seen before and so now that is a huge pressure on digital skills.'

7. FUTURE-GAZING STARTS WITH SCHOOLS...

Alison Galvin continued: *'A lot of focus is put on construction and leisure and that side of things, but actually, we should bring it all of the way back down to school. When kids are starting off, at a young age, there actually needs to be more focus on technology and actually building things from the very start.'*

'So you've got to choose a direction to go in - whether it's by 2028, we are going to be world leaders in AI or whatever - then embedding that actually in the school system from a very early age. I think is one of the areas that really hasn't been addressed properly.'

8. APPRENTICE TRAINING TOUGH IN WFH CULTURE...

Alison continued: *'We've got brand new apprentices that we've taken on during lockdown and we've had to work much much harder to keep them engaged, and to impart our culture and what we're about, instilling the professional skills as well, because they're apprentices, they've come straight out of school. So that's much more of a challenge for us.'*



Alison Galvin
Chief People Officer Invotra

9. DIGITAL ACCESS, NOT YET A UNIVERSAL CONCEPT...

Mark Temple continued: *'I think it's the whole apprenticeship piece, or that training upskilling piece that is hugely difficult in the current environment. You can absolutely set somebody up with Technical Training in inverted commas, but it's softer skills, which really make a difference to a business and the culture of the business as well which are difficult to impart in a virtual manner.'*

'A lot of businesses will not be fortunate in the way Alison's business is that they won't have cloud platforms, etc. So, they won't be able to benefit from the same technology, so it's a tough time to start these processes on a remote basis. So, I think we do need to be mindful of that.'

10. EMPLOYERS NEED HEADSPACE TO PLAN...

Anthony Impey concluded: *'Small business leaders just don't have headspace. And yet, having the headspace is vital in order to make those plans. The challenge is that businesses are fighting for their survival at the moment. It really is the toughest time of a generation and small business owners are taking the brunt of the challenges. So, survival is the order of business.'*

'There is a danger that we start saying, "oh, well, you need to start thinking about apprentices". The response can be, "actually I'm just worried about getting to the end of the week or the end of the month or maybe to the end of the year".'



Anthony Impey
Chair of the Skills and Apprenticeship Board for the Federation of Small Business and CEO of Be the Business

The full version of this content is available at:

“THERE IS A DANGER THAT WE START SAYING, “OH, WELL, YOU NEED TO START THINKING ABOUT APPRENTICES”. THE RESPONSE CAN BE, “ACTUALLY I’M JUST WORRIED ABOUT GETTING TO THE END OF THE WEEK OR THE END OF THE MONTH OR MAYBE TO THE END OF THE YEAR”.

Anthony Impey, Chair of the Skills and Apprenticeship Board for the Federation of Small Business and CEO of Be the Business

THE IMPACT OF APPRENTICESHIPS

With the overhaul of the apprenticeship scheme in recent years, how successful has it been? What have been the benefits to employers and apprentices – and where is the scheme headed next?

There has never been a time that digital apprenticeships have been so relevant. As we welcome in the new year, businesses will continue to embrace the challenges caused by the sudden onset of COVID-19 and the impact it has had on their organisations.

2020 has certainly tested our tenacity and resilience, but it has also demonstrated how we can continue operating through rapid digital transformation by utilising technology. As it is now often said, we have a 'new norm' and the way we work and interact with our customers are demanding a more digital savvy workforce, with the necessary skills, to respond to their needs.

In this article we will look at how apprenticeships have evolved and the opportunities they present to support the creation of robust digital strategies, helping to rebuild and reboot the economy.

EMPLOYER-LED APPRENTICESHIPS

In the last decade we saw the government roll out its most radical overhaul of apprenticeships

ever. Employers were put in the driving seat and groups, called Trailblazers, took responsibility to write new apprenticeship standards defining the knowledge, skills and behaviours necessary to be competent in an occupation. Trailblazers were also tasked with setting assessment methods to enable an independent validation of apprentices' competence against an apprenticeship standard.

In 2017, the government took another bold step to sustain the apprenticeship system, requiring all employers with a pay bill of over £3 million to pay 0.5% of it into an apprenticeship levy. Employers within this category could use their levy fund (plus a 10% top up from government) to train apprentices employed by their organisation, with any unspent levy being retained by HMRC and added to a general apprenticeship funding pot.

The key driver behind the overhaul of apprenticeships and their funding was to significantly boost workforce productivity. While this article does not attempt to review the impact of apprenticeships on national productivity, there is strong evidence of how they have delivered a serious return on investment for employers, and benefited the career development of thousands of apprentices.

DIGITAL APPRENTICESHIPS MAKING AN IMPACT

If we now fast forward the clock to 2020 there is much to celebrate.

Many employers, particularly those that have paid the apprenticeship levy, took a new approach to how apprenticeships are embedded within their organisation's talent strategies to recruit, train and retain skilled staff. As the content of the new apprenticeship standards are in employers' hands, they are on the whole proving in tune with their business needs.

In the case of digital apprenticeship standards employer Trailblazers have been busy. There are now apprenticeships covering most of the critically important tech areas of infrastructure, network, software, cyber, data and business analysis, digital marketing, and IT technical sales, and more recently DevOps, data technician and artificial intelligence.

Interestingly, the market for digital apprenticeships is becoming increasingly diverse. Digital skills are in demand from organisations in all sectors and of all sizes. In the period 2016/17 to 2018/19, ICT was reported to have the highest positive change in the number of individuals to start an apprenticeship compared to any other occupational area.



BCS alone, which is approved to assess digital apprenticeships, is seeing first-hand just how relevant digital apprenticeship are with over 21,000 registered apprentices and 10,000 end-point assessment over the three-year period. During this time, clear patterns can be seen in the occupational training employers are focused on. Infrastructure technician apprenticeships has proved to be the most popular employer choice, followed by digital marketer and software, however the significance of utilising data to all businesses is evidenced through a sharp increase in the number of data analyst apprenticeship in the past year.

WHAT'S THE FUTURE FOR DIGITAL APPRENTICESHIPS?

It's fair to say the future is looking very bright for employers who invest in digital apprenticeships. They have become a respected cornerstone to enter into and progress a digital career. In the coming months, as employers review and drive new tech strategies to embrace the impact of COVID-19 and changing norms, building digital capability through apprenticeships is a smart decision which can deliver a long-term return on investment.

For smaller businesses, the thought of hiring an apprentice at this time may seem like a step too far. It is worth exploring the opportunities and financial incentives set out by the government to support the COVID-19 economic recovery, included in its Plan for Jobs (see link below). While generally taking a different approach to large organisations, SMEs that have engaged with apprenticeships have experienced the benefits. Alison Galvin, Chief People Officer of SME Invotra explains that even during the pandemic, apprentices remained at the core of their business with four new apprentices starting just before lockdown. She explains, *'My advice is to totally buy into the programme. It takes investment, patience and lots of support to develop an apprentice but it pays dividends when they succeed.'*

Taking a wider perspective for small and large organisations, and to build a truly robust digital economy, there is an opportunity to be even more ambitious with how we embed digital skills across all apprenticeships, not only those that are primarily tech-related. This would be a positive move for the apprenticeship system as a whole, as would the retention of digital training and assessment methods that have come into play during the pandemic.

For individuals, digital apprenticeships can open the door to countless opportunities. At BCS, the saying is that when an apprentice reached their end-point assessment, that it only the beginning with the opportunity of being part of our community of 60,000 plus IT professional members, and automatic registration on RITTech, the register for technical professionals.

THE FIRST STEP

If you are new to digital apprenticeships or want to find out more here's your first step.

Information for employers to develop your people through apprenticeships.

Information for individuals to get qualified through apprenticeships.

Information on the government's Jobs Plan and financial incentives.

bc^s

The
Chartered
Institute
for IT

DIGITAL IT APPRENTICESHIPS FROM BCS

As more and more organisations of all sizes, across all sectors, turn to digital business solutions, **digital apprenticeships** have never been more relevant. That's why BCS is committed to raising standards through high quality, robust apprenticeships that will address skills gaps and give IT professionals the competencies to thrive in a fast paced digital economy.

BCS is the trusted end-point assessment organisation for the digital profession with over **21,000** registered apprentices and delivery of **10,000** end-point assessments. Our team, including full-time assessors who are experts in their field, focus on quality to ensure the apprenticeship experience is a positive one and can be relied on by both apprentices and employers.

When an apprentice completes their end-point assessment, to us that's actually the beginning of the journey – not the end! BCS supports apprentices' next steps in continuous professional development with direct entry onto RITTech (Register of IT Professionals) and Associate Membership of BCS.

Supporting the growth of the digital economy through quality apprenticeships.



Digital
apprentice



End-point
assessment



RITTech 

The professional
register for IT



Associate
membership



Trusted
professional



For more information, please go to
[bcs.org/digital-it-apprenticeships](https://www.bcs.org/digital-it-apprenticeships)

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