



Digital Skills in York & North Yorkshire: An Assessment of Supply and Demand

**Produced on behalf of York & North Yorkshire
Local Enterprise Partnership**

Report authors: Les Newby and Nicky Denison

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EXECUTIVE SUMMARY

Les Newby Associates and Nicky Denison/Wordfern Ltd completed this research on behalf of York & North Yorkshire Local Enterprise Partnership (Y&NY and “the LEP”) to advance understanding of digital skills supply and demand in the area, with focus on businesses and employers, but also relevance to community needs and access to employment and progression. The research explores what skills are required; the extent to which Further Education (FE) colleges and training providers serving the LEP area are delivering these; and what barriers and solutions exist to enhancing future delivery. We completed the research in March 2021, using qualitative engagement with 27 digital skills stakeholders, including businesses and representative organisations, FE colleges and other training providers, and wider stakeholders such as community organisations and local authorities.

The **overall conclusions and recommendations** from the research are:

Demand in digital sector businesses and for specialist digital skills

Conclusions

- Digital sector businesses and other large businesses with specialist digital needs seek a range of specific skills and expertise. These include cloud technologies and platforms; software development, coding and testing; web design and development; cyber security; data analytics and visualisation; technical architecture; user experience and interface design; AI; video conferencing; broadband and 5G; internet of things; robotics; and project management.
- Attracting talent is a challenge, if not always an insurmountable one, with skills shortages particularly in cloud computing, cyber security, software development/coding, and data analytics. Y&NY’s rurality and smaller digital sector compounds the challenge, with talent often migrating to large cities, both within the area and beyond. However, there are locally based opportunities to grow the sector and associated skills in Y&NY, especially post-Covid.
- However, digital businesses do not necessarily see qualifications as vital when recruiting. They instead look for a natural affinity and willingness to learn new technologies as vital ways that skills are developed in this sector. This links to the fast pace of technology advancements and a more skills based CV ethos showing how acquired skills have been applied in practice. Digital businesses also seek transferable skills such as teamwork, problem solving, communication and customer skills.
- The exception centres on the critical role that qualifications and certifications linked to major international information technology providers (commonly referred to as the ‘tech giants’ – see glossary) in supporting business competitiveness and in helping people to get a job and progress in it, with strong evidence of the positive impact that holding these qualifications can have on salaries.
- Most digital business recruit mainly from universities. There are mixed views on apprenticeships, although attitudes are warming, especially at Level 4+. There is little recruitment of students directly from FE, but more openness to engagement with independent training providers.

Recommendation 1: *Work with the sector, training providers and universities to identify specific measures and provision that would help to address skills shortages, notably in cloud computing, cyber security and data-based roles, and to widen the local talent pool for the future.*

Recommendation 2: Capitalise on opportunities to make Y&NY an attractive place for digital sector businesses, building on post-Covid desire for space and a shift from the cities, with scope to create local clusters of activity that help to grow the sector and attract and retain talent.

Digital skills demand and need in wider businesses and the workforce

Conclusions

- Digital skills needs have risen rapidly as a result of the Covid pandemic, and most businesses have faced new skills demands of which social media and digital marketing are foremost. Other areas of need include e-commerce, cyber security, web development and analytics.
- Most SMEs are too small to have digital specialists, and digital responsibilities are often bundled into existing roles. They hence seek general uplifts in digital competence and ability.
- Lack of digital expertise makes it hard for SMEs to know exactly what their digital skills needs are, how to address them, and what provision they need to solve practical business issues.
- Digital training in SMEs is often in-house or via external consultants for specific technical tasks. Any external training is preferably bite-sized or modular to fit financial and time constraints.

Recommendation 3: Provide or enhance a brokerage service that helps SMEs to understand their digital needs and skills needs related to them, makes them aware of the options to resolve these and supports them to move forward in taking action.

Recommendation 4: Work with training providers of all types to increase and communicate flexible, modular and bite-sized digital training options for businesses, and to engage with them to ensure that specific areas of need such as digital marketing are covered in evolving provision.

Digital skills for an inclusive economy and access to employment

Conclusions

- There is incomplete awareness of the Digital Skills Entitlement (see glossary) amongst training providers and wider stakeholders, and of the extent of entry and low-level digital skills needs in adults and the community. However, FE colleges do appear to be in the process of increasing the provision they offer that services this need.
- While the number of people with digital skills has grown during Covid, the digital divide between this group and those who lack basic digital skills has widened and is conflated with factors such as age, low incomes, health factors and rural isolation.
- There is a gap between digital skills *needs* in the community, and the extent to which these are translated into *demand* for learning. Lack of confidence, fear of the unknown, and “*not knowing what you don’t know*” contribute to this, and learning is likely to revolve around informal routes.

Recommendation 5: Ensure the Digital Skills Entitlement is fully communicated and understood amongst those who are expected to offer provision, and by the target group who can benefit from it.

Recommendation 6: More fully review the extent of digital skills gaps and barriers that prevent access to learning, and work with partners to develop solutions. This should include building on existing good practice and ensuring that provision is attractive and accessible to target audiences.

Current and future provision of digital skills

Conclusions

- There is a significant volume and range of provision across FE colleges. The bulk is at Level 3, with lower but still significant amounts at Levels 1, 2, and 4+. Six out of ten institutions offered digital apprenticeships, usually at Level 3 or above. Provision aimed at adults and businesses is more limited. The focus of the courses offered varies by Level. At Level 2, for example, creatively focused courses are the most common; at Level 3, general computing courses dominate; and at Level 4+, computing is prominent, but more evenly balanced with specialist courses including cyber security and games development. Digital Infrastructure is the main focus area for apprenticeships; digital marketing is also evident.
- It is vital to also embed digital and tech content into all courses. There are good examples of FE colleges that are already doing this.
- Nearly all providers are looking to expand and evolve their provision around digital technologies. Many are not yet clear about the specifics of what and when, but planned courses include higher level provision with a cyber security focus. Two colleges are set to offer Digital T Levels.
- It is difficult to be categorical about the extent of gaps in FE provision in relation to reported digital skills gaps without having a full picture of how far relevant skills are provided through other routes such as HE. However, there is evidence of a gap around cloud computing, as well as evidence of strong demand and/or potential gaps in areas such as cyber security, software development/coding and digital marketing.
- Independent Training Providers (ITPs) are often able to be more flexible, dynamic and specialised than FE colleges in meeting specific skills needs and play an important complementary role including in delivery of apprenticeships, specialist provision such as coding, and opportunities to deliver initiatives such as Digital Skills Bootcamps (see glossary).
- As noted earlier, the skills programmes of the major international information technology companies are also seen as critically important and their supply and linking people and business to it should be considered as a key route to developing digital skills.
- Other routes to development of digital skills include in-house and self-taught skills; public sector funded skills programmes; universities and connection to specialist consultancies.

Recommendation 7: *Engage with businesses and other skills and education partners to identify the extent of need for additional FE college provision in key areas such as cloud computing, cyber security, software development/coding and digital media, and provide help in addressing barriers to delivering or accessing such provision.*

Recommendation 8: *Promote further embedding and the integration of digital and tech skills into non-digitally focused courses, including examples of good practice and making links to existing EdTech Demonstrator schools and colleges (see glossary).*

Recommendation 9: *Ensure digital skills solutions on current and future needs are integrated and include collaboration across all types of providers and routes – including ITPs, higher education, awarding bodies, community based provision, and provision by major international information technology companies.*

Wider and interconnected issues, barriers and solutions for enhancing digital skills

Conclusions

- Young people's demand is higher for more general courses and in areas such as social media and gaming, but lower for more specialised courses and those that may appear less appealing and/or more niche in nature. This makes it harder to viably run courses in some key areas, for example cyber security.
- Digital careers Information Advice and Guidance provision (IAG) appears to be limited; and a low proportion of females studying and working in many parts of the digital sector further limits the supply of talent in the sector.
- Providers can sometimes be perceived by businesses to not adequately respond to their skills needs, and whilst there are examples of collaboration on course design, this was not reported as prevalent by interviewees. For non-digital sector businesses, the need is not necessarily for more provision, but helping SMEs to understand and articulate their digital skills needs and then to find solutions within existing provision.
- Apprenticeships are key to sustaining a pipeline of technical talent and can support diversity and social mobility in tech roles. However, there are barriers to overcome to grow the pool of businesses willing to host a digital apprentice, with opportunities to learn from businesses that are already doing this successfully.
- Funding and resources are a potential barrier to digital skills provision in FE, linked to the costs of equipment and facilities, specialist tutors, and constraints on what courses can be funded. Resources are also an issue for many businesses, especially in the current economic context.
- FE can struggle to adapt swiftly to new digital technologies and recruiting tutors with the right skills is a challenge. Continuous professional development; education-industry partnerships; and building in specialisms via modules and non-accredited units is key. ITPs can also play a vital complementary role; as can the courses, qualifications and certifications offered by major international information technology companies.
- Inability to afford IT equipment (specifically laptops and tablets) and broadband and/or poor connectivity in some areas, can limit how far individuals can operate online, access work, learning and services, and improve their digital skills in the process.

Recommendation 10: *Increase demand from young people to study and seek careers in digital specialisms demanded by businesses, including through improved IAG; promotion to diverse audiences and specifically to females; developing an engaging, practical and real-world curriculum from early school years upwards; and boosting take-up of digital apprenticeships.*

Recommendation 11: *Use vehicles such as the Yorkshire and Humber Institute of Technology (YHloT) and a possible Y&NY Digital Skills Partnership (DSP) to facilitate business-provider engagement across the spectrum that focuses on defining need, helping business understand where to access independent digital skills and advice, boosting tutor capacity via industry expertise, and co-designing a Y&NY digital skills roadmap.*

Recommendation 12: *Where possible, make targeted resources available to tackle cost, resource, and expertise barriers that prevent key areas of digital provision including via business-provider partnerships that boost teaching capacity and bring in specialisms linked to the latest technologies.*

Recommendation 13: Continue to enhance and accelerate improved digital connectivity and support the extension of existing Covid-related initiatives to provide free or affordable access to IT equipment (including laptops) and broadband connectivity for low-income households.

The Yorkshire & Humber Institute of Technology (YHloT) and a potential Y&NY Digital Skills Partnership (DSP)

Conclusions

- A range of digital courses are provided by member colleges, either directly or embedded in other subjects. Capital funding has supported delivery of new or improved industry-standard facilities and equipment to support high-quality provision.
- It is hard to assess the extent to which having an IoT in place has substantively strengthened high level future focused technical skills provision, or whether existing provision has been badged under the YHloT banner. A strategic plan for how curriculum can be developed to build in this focus and to fully leverage the impact of having an IoT based here would be beneficial.
- There is very low awareness of DSPs or proposals for one in Y&NY, but providers and stakeholders were very supportive of the idea in principle.

Recommendation 14: Establish a strategic plan for how digital curriculum and provision will evolve towards the IoT's higher level future focused technical skills remit, including in digital and non-digital subject areas, and amplify the YHloT's role in convening business to kick start this in partnership.

Recommendation 15: Engage with partners to set in train a process to plan and establish a DSP for the Y&NY area. Ensure it has a clear role, remit and priorities and is fully connected to existing structures and strategies, such as the LEP and the Y&NY Local Industrial Strategy (LIS¹).

¹ <https://www.businessinspiredgrowth.com/lis/>

1. Introduction, Methodology and Context

1.1 Research purpose and methodology

York and North Yorkshire Local Enterprise Partnership (Y&NY LEP) is keen to ensure that digital skills in its area match those demanded by business (now and in the future) and those needed by individuals to access work and learning and to progress and be productive in employment.

In early 2021, the LEP commissioned Les Newby Associates and Nicky Denison/Wordfern Ltd to complete this research, and specifically to increase its understanding of:

- what digital skills businesses and individuals require for a greener, fairer, stronger economy;
- how far further education (FE) colleges and other training providers are delivering these skills now;
- what barriers exist to enhancing future delivery and how these can be overcome; and,
- the role of existing and potential partnership vehicles, specifically the Yorkshire and Humber Institute of Technology and a potential Digital Skills Partnership.

Digital skills can be defined in different ways, and different audiences and types of business will put onus on particular types of digital skills. For this research, we considered three types of digital skills needs relevant to the local economy, employment and inclusion:

- i) Specific technical, high-level digital skills needed by digital sector businesses and specialists
- ii) Digital skills capabilities employers need in their workforce in order to be productive
- iii) Digital skills that individuals need to access work and learning, and to function in society

For brevity, in this report we describe these skill types as '*specialist digital skills*', '*workforce digital skills*' and '*digital skills for employment and inclusion*'.

We completed the research in March 2021, using interviews with businesses and their representative organisations, FE colleges and independent training providers (ITP), and wider stakeholders such as community organisations and local authorities. As shown in **Table 1**, we interviewed 27 organisations in total, with the bulk conducted via Teams/Zoom and the remainder by telephone. Interviews were semi-structured and typically involved between one and three people per organisation.

Table 1: Breakdown of stakeholder interviews and input

Type of Stakeholder	Number of organisations interviewed
Business representative body	3
Further Education College*	9
Independent training provider**	4
Business/employer	4
Local Authorities	4
Voluntary and community sector/other***	3
Total	27

* Includes Institute of Technology

** Further written input was passed on to us providing input from one additional independent training provider

*** Includes an interview with the Humber Digital Skills Partnership to gain insights from its operation

We completed the research in parallel with two other skills-based research studies commissioned by the Y&NY LEP focused on the capacity of the FE system to:

- deliver re-skilling and up-skilling (undertaken by Annabel Jelley and Nada Tokos); and
- engage and support 19-24 year old NEETs (undertaken by Aspire-Igen).

We co-ordinated with the leads for both of these studies to ensure an integrated and efficient approach that was as clear and streamlined as possible for the organisations we contacted, and used joint approaches and interviews on occasion, and exchange of information, where helpful, to achieve this.

This report draws out the main messages from the engagement, initially identifying the nature and level of digital skills demand by businesses and individuals; and then reflecting on the supply side perspective, both in terms of current and likely future provision. It goes on to outline a range of barriers that exist around this agenda and potential solutions to them, and a set of conclusions and recommendations for ways forward.

We would like to thank all the contributors for their support, time and insights. We have included quotes from interviews to reflect views without directly attributing them.

1.2 The context for digital skills

Digital transformation and the skills needed to support it has been thrust into sharp focus by the Covid-19 pandemic. A number of reports have recently been released that succinctly capture the picture on digital skills in the UK in a Covid context and assist in setting the broader context for this report. In late 2020, Microsoft, in partnership with Goldsmiths University of London, published findings of a study² assessing the nation's digital skills capabilities, that evidenced the existence of a clear and persistent skills gap:

- 69% of UK leaders surveyed believe their organisation has a digital skills gap; and 44% fear this lack of digital skills will impact on their success in the next year
- 63% of employees felt they lacked appropriate digital skills to fulfil new and emerging roles; 59% said developing digital skills will be key to post-Covid employability; and 70% feel access to digital skills is vital for economic, social and financial inclusion
- Cost (37%) and lack of skills strategy (28%) are the main barriers to digital skills investment
- Just 28% of UK leaders believe the education system offers adequate digital training for pupils; and only 24% are confident the UK government is doing enough to tackle the digital skills gap. 80% believe investment in digital skills will be important to UK economic recovery, and a similar number see having a large digital skills talent pool as essential to UK global competitiveness.

We see a similar story emerging from research by the CBI.³ It finds the UK's domestic pipeline for digital skills to be at a tipping point based on demand outstripping supply, with this impacting on business ability to adopt technology, innovate, and compete in a post-Covid economy. We are increasingly seeing the major international technology providers (commonly referred to as the 'tech giants' – see glossary) launching laudable ambitions in this space. In June 2020, Microsoft

² Unlocking the UK's Potential with Digital Skills (2020) Microsoft & Goldsmiths University of London https://info.microsoft.com/rs/157-GQE-382/images/Unlocking-the-UKs-potential-with-digital-skills_131120_v3.pdf accessed on 16/03/2021

³ Building a World-Class Innovation and Digital Economy: Recommendations for an innovation and technology-led recovery (2020) CBI; https://www.cbi.org.uk/media/4911/cbi_final_id-report.pdf accessed on 16/03/2021

launched its Global Skills Initiative;⁴ and in December 2020, Amazon Web Services (AWS) announced⁵ it would help 29 million people globally by 2025 to grow their technical skills with free cloud computing skills training.

Alongside this, in 2020 Lloyds Bank⁶ found that nearly 12 million people (22% of the UK population) lack basic digital skills – a stark reminder of the digital divide that exists, exacerbated by the pandemic. This skills deficit is concentrated amongst those who often face compounding disadvantages based on their age, religion, socioeconomic status or through having a disability. The Lloyds report also found that 9 million people (16%) could not undertake ‘foundational’ digital activities such as turning on a device, connecting to Wi-Fi or opening an app by themselves.

Digital exclusion has wide-reaching impacts. The Centre for Economics and Business Research⁷ identified five areas in which individuals with basic digital skills are gain benefits:

- increased earnings of between 3% and 10%
- improved chances of finding work for someone who is unemployed, and an increased likelihood that someone who is inactive will look for work
- shopping online being 13% cheaper on average than shopping in-store
- being able to connect and communicate with family, friends and community 14% more often
- time saved by accessing government services and banking online rather than in person, estimated to be about 30 minutes per transaction

Campaigns such as the Good Things Foundation Future Digital Inclusion programme that uses an Online Centres Network⁸ to engage some of the hardest to reach groups in society in digital help in this respect, but there remains a long way to go.

From a national policy perspective, in 2020, DCMS announced that it was pushing back the publication of a new Digital Strategy, noting they were instead “*working towards publishing in 2021.*” A set of Ten Tech Priorities was instead published in March 2021, demonstrating how government will deploy digital tech to build back better, safer and stronger from Covid, and shape a new “golden age” for tech in the UK. One of these priorities – building a tech-savvy nation – states that:

“We want every adult to have a base level of digital and cyber skills so no-one is left behind by the digital revolution. Our apprenticeships, Digital Bootcamps and the Digital Entitlement will help set people up for the highly-skilled, highly-paid roles of the future, and give them confidence to use the internet safely and securely, while our £520 million Help-to-Grow scheme will empower 100,000 businesses to adopt the latest tech.”

⁴ <https://blogs.microsoft.com/blog/2020/06/30/microsoft-launches-initiative-to-help-25-million-people-worldwide-acquire-the-digital-skills-needed-in-a-covid-19-economy/> accessed on 16/03/2021

⁵ <https://www.aboutamazon.com/news/workplace/amazon-to-help-29-million-people-around-the-world-grow-their-tech-skills-with-free-cloud-computing-skills-training-by-2025> accessed on 16/03/2021

⁶ Lloyds Bank UK Consumer Digital Index 2020 https://www.lloydsbank.com/assets/media/pdfs/banking_with_us/whats-happening/lb-consumer-digital-index-2020-report.pdf accessed on 16/03/2021

⁷ <https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04> accessed on 16/03/2021

⁸ <https://www.goodthingsfoundation.org/online-centres-network> accessed on 16/03/2021

2. Demand for Digital Skills

As outlined in the introduction, our research is segmented into three types of digital skills needs relevant to the local economy, employment and inclusion: ‘*specialist digital skills*’, ‘*workforce digital skills*’ and ‘*digital skills for employment and inclusion*’. Our analysis of business demand follows this pattern and is set out in the sections that follow.

2.1 Demand for specialist digital skills

We interviewed four businesses/employers, all with digital at the front and centre of their business models, and all home to a highly digitally skilled workforce of varying size. Specialisms included bespoke software development, cloud computing and a business-critical digital function within a major financial sector firm. We also engaged with three ITPs specialising in the digital sector, two of whom have a specific focus on technical digital skills, primarily as part of apprenticeship programmes. Others with a view on this included the Yorkshire and Humber Institute of Technology (YHIoT) and a selection of colleges and business representative organisations. The specialist digital skills noted as being in highest demand centred on cloud architecture, security, governance, operations and platforms (e.g. AWS); cyber security; software development, coding and testing; data analysis and visualisation; and web design and development. Others included:

- Technical architecture
- Digital marketing including user experience and user interface design
- Artificial Intelligence and Robotics
- Video conferencing
- Broadband, 5G and Internet of Things
- Product and project management including SCRUM and AGILE

We asked interviewees whether they were able to access these skills in the volumes required to meet their business needs. Whilst all currently had in place the skills needed, there was consensus that shortages exist in the wider labour market in all of these areas and that finding the right people is “*is an ongoing challenge*” that can be hard work and/or slow, with competition amongst digital technology employers looking to draw on the same limited talent pool. One technology business noted that this competition for skills is also increasingly with their own customer base (i.e. with those businesses who require technology services) who are now looking to develop their own internal skills and capacity in these technologies so that they can “*speak the language.*” We also learnt that this shortage is not unique to Y&NY, but is national and international in its scope, and everything we know about the accelerated pace of adoption of digital technologies points to these shortages being exacerbated. Two interviewees stressed the extent to which they look to differentiate themselves as good employers as a way to address this competition and attract the best staff.

“We are always looking for people with skills in cloud computing platforms – this is a global industry issue that will take time to address and must be focused on as cloud technologies are the future of so many businesses.” [Business]

Two other factors came to the fore linked to businesses being able to access the specialist digital skills they need.

Firstly, recruitment becomes harder still when looking for technical people who can also demonstrate wider customer facing or business development skills. This is especially the case for smaller digital technology firms of the type that are likely to be prominent in Y&NY with its

prevalence of SMEs. In common with other types of businesses, digital employers are looking for people with a rounded and transferable skill set. They require people with positive “*can-do*” attitudes, problem solving, teamwork and communication and customer skills. This points to a need to help businesses tap into the widest possible pool to find the talent that can add value to their business. In this context we learnt of the value of networks such as Women in Tech, helping expand access to skills whilst also helping to tackle gender disparities in the tech sector – only 19% of the tech workforce in 2018 was female.⁹

“Small businesses like mine don’t have a specific business development team – everyone needs to be able to do a bit of everything.” [Business]

Secondly, up until now, location has mattered when it comes to recruitment and businesses looking to build an in-house team, notwithstanding the fact that many roles in this sector are outsourced and even filled internationally. Interviewees talked about challenges in retaining digital skills in North Yorkshire, with a pattern of individuals securing their first role locally but then quite quickly moving on to places, usually cities, where there are more choices in roles and higher levels of pay can be achieved. This was presented by some as a rural disconnect, exacerbated by a lack of critical mass of digital businesses, incubation space for digital start-ups and issues around connectivity. Whether this remains the case post-Covid is yet to be seen but does point to the importance of considering the role that vibrant and diverse places across York and North Yorkshire can play in terms of how the sector locally is supported to grow.

“York is OK, but everywhere else leaches talent.” [ITP]

We asked interviewees where they go to recruit employees and to develop their skills. For this level of digital skill, the businesses we spoke to often identified higher education as their main source for recruitment, drawing on graduates with specific computer science or STEM based degrees. Employers specifically referred to the Universities of York and Leeds and Coventry’s base in Scarborough.

However, digital businesses also expressed the view that they do not necessarily see qualifications as vital when recruiting. They told us that their staff (as is typical in the sector) have a natural affinity with technology and an intrinsic desire and willingness to learn and embrace new technologies, often in their own time. It appears that this is a highly important factor in how skills are developed in this sector; alongside the importance placed on building a skills-based CV that shows how acquired skills have been applied in real practical projects. Much of this seems related to the pace at which technology is advancing. One business expressed its scepticism that *“a three year computer science degree is out of date before you have even finished it!”*, with businesses instead needing people to be constantly learning and developing skills and experience in a hands-on way.

“I want people with the right mindset and attitude, general technical acumen and a desire to work in digital – I can train them in the specifics.” [Business]

One business told us that self-directed online learning is very common, with people tapping into industry and peer-to-peer seminars, networks and conferences. Another told us of their in-house buddy system that helps to mentor and support people with digital skills training expertise brought in when necessary and, linked to this, the importance of structuring the team in accordance with agile methodologies. Of the largest two employers that we spoke to, 60-70% of their teams were built

⁹ Tech Nation (2018) <https://technation.io/insights/report-2018/> accessed on 16/03/2021

with internal candidates, with the remainder being recruited due to their specific digital technology experience, often outsourced or consultants, to plug gaps.

“People at this level and with this interest are always open to exploring new technologies, often in their own time – they are enthusiastic self-learners.” [Business]

“Digital businesses don’t really care if you have a computer science degree.” [ITP]

There was a mixed view on the role of apprenticeships at this technical level, with points made around them being *“a hard sell in digital businesses.”* Reasons for this reluctance included outdated perceptions of apprenticeships being *“not for our sector”*; that they are too rigid in a fast moving environment; and that they do not fit because they require supervision and this takes time away from work costed at hourly rates. In contrast, we were made aware of positive practice. This included prevalence of apprenticeships that are often level 4 upwards and that have been bespoke built based on business technology. This was often aligned to the skills required to use major technology provider platforms (see below). Furthermore, it appears that providers are also working to ensure that apprenticeships are flexibly delivered to meet business need.

Albeit a limited sample, none of our interviewees referred to further education institutions as a place they naturally look to for skills development at this technical level. The view was that FE did not have a sufficiently flexible or responsive curriculum to adapt to the pace of change in digital technology skills requirements, and that qualifications were too long and insufficiently flexible in design and content to meet employer need. A number of interviewees referred to ITPs as being more flexible and responsive way of accessing provision in this sector.

There is, however, an exception to this qualification argument, centred on the critical role that industry recognised major technology provider qualifications and certifications play. This is both in terms of helping people to get a job and to progress in it, and in supporting business competitiveness by aligning to advanced, future focused and business-critical technology. From apprentice level upwards, and across a wide range of skills areas such as cyber security, networking and cloud computing, Amazon Web Services and Microsoft Azure certifications were the most often noted, as well as those offered by Cisco and CompTIA. There is strong evidence of the positive impact that holding these qualifications has on salaries, and policy decisions should take this into account.

“Cloud is driving everything and it all ripples down from the tech giants.” [ITP]

Finally, although we did not speak to any such businesses directly, we did get positive input about land-based business adaptation to, and adoption of, technology. There is undoubtedly a significant way to go in making technology the norm, but there is evidence of growing demand for technical digital skills in this sector locally, both in terms of new recruits and in up-skilling the existing workforce, linked to technology suppliers. The fact that there is clear line of sight between use of technology and boosting farm productivity and animal welfare certainly helps in making the case, although keeping up with the pace of change (including from a curriculum and equipment perspective) remains a challenge.

2.2 Demand for digital skills in the general workforce

Everyone we spoke to agreed that demand for digital and associated skills has risen sharply up the business agenda on the back of the Covid-19 pandemic. This is creating new demand for skills across a spectrum of needs – as one employer representative organisation noted, businesses are:

“...getting to grips with online working; learning how to digitise business functions like their staffing, sales and customer relationships; and more technical areas such as cyber security, digital marketing and cloud systems.”

Our research found digital marketing and, within that, social media to be the most often cited workforce digital skills need, with businesses looking to build a professional presence online, often from scratch. We spoke to the Education Development Trust whose research in West Yorkshire showed that of the 15 most requested skills in online job adverts in the last 12 months, three of the top five focus on social media, digital marketing and e-commerce.¹⁰ These skills were being sourced for roles including web analytics, social media manager, digital marketer and e-commerce strategist. This triangulates with input received from stakeholders with a Y&NY perspective.

Developing digital skills in the current climate presents something of a conundrum for businesses where many acknowledge the need to improve digital skills, but are uncertain about exactly what their future business model will look like, and therefore how they should respond. This is especially difficult given that many are also in survival mode and hence have to target any investment carefully. A number of issues flow from this that result in businesses often not having the digital skills they need.

It was repeatedly highlighted that when it comes to digital, many businesses simply *“do not know what they do not know.”* Businesses are uncertain where to go to access digital skills and support, who they can trust to do a good job, and who will help them work out what they actually need. One provider noted that because non-digital sector SMEs do not usually have digital specialists, they have limited understanding of their needs and options and would benefit from help in undertaking accurate analysis of their real requirements.

“Businesses think they need one thing, but when you hear why they are asking for that, you find out that what they really need is something else.” [FE College]

“How do I know what I am being offered is what I need? Businesses can be sold a Jaguar when all they need is a Morris Minor.” [Business representative organisation]

The landscape on provision is also not always clear to business and interviewees reported that there is a tendency for it to be delivered in a way that can come across as too generalised for their specific needs. We were also made aware of negative employer feedback on the quality and cost of some types of provision, with *“SMEs very quickly turned off if they have a disappointing experience.”*

As for many smaller businesses, employing someone in a full time digital role is not an option, digital responsibilities are instead bolted on to an existing role: *“often something like social media is bundled into a business development or office manager role, or someone who once showed a bit of interest!”* Use of a specialist external consultant to buy-in skills around a specific need is common, e.g. setting up a website, coupled with some knowledge transfer or on the job upskilling to

¹⁰ Labour Insight, Burning Glass Technologies, January 2021

employees for day to day management and upkeep. Businesses then need to think about where the tipping point lies between the cost of buying in advice and that of training a member of staff.

“The IT department is missing in most small businesses.” [Business]

Despite the acceleration in business uptake of digital technology caused by the pandemic, we also heard that some businesses still need to be convinced about the tangible impact digital adoption can bring. Time is a precious commodity in SMEs and setting aside time for carrying out digital training and then implementing and maintaining that – such as setting up then managing social media accounts – can be seen as a resource cost if it does not bring an immediate return.

We asked what interviewees felt would help businesses to increase their take up of digital skills. This is discussed in more detail in Section 4. However, at a headline level, there was consensus that part of the solution lies in a more diagnostic, independent and holistic conversation with business to help in the first instance identify the issues that may be acting as obstacles to growth or day to day operations, then determining what can be unblocked via digital solutions, and what systems and skills need to be put in place as a result. A good example is helping hospitality businesses to set up QR codes for life post-Covid. This is a straightforward digital solution, but one that can be intimidating for a small business to learn and implement if they are starting from scratch. This idea is akin to the Y&NY LEP’s ERDF Digital Advantage programme¹¹ delivered by Coventry University to help SMEs in North Yorkshire (excluding York) to grow through the adoption of digital technology (see section 3.2 for more detail).

“You need someone who can sit down with you, talk about your business needs and point you to a solution.” [Business]

2.3 Digital skills for an inclusive economy and access to employment

We asked providers and stakeholders (with the exception of businesses) how far they found there to be demand for foundational and basic digital skills, and the nature of this if identified. This related to ensuring that individuals – and in this case mostly adults – have the basic digital skills needed to apply for, secure and maintain a job; to access learning; and to participate fully in society, thereby supporting inclusion goals.

Our first observation is that most stakeholders had a general (and sometimes quite sketchy) awareness on this issue rather than firm, confidently held views and hard data to back them up. Neither did views always agree – some stakeholders sensed more need and demand than others, which may reflect different perceptions as well as varying positions in different places. This means that conclusions reached here should be viewed as providing an indicative rather than comprehensive picture. In of itself, this lack of certainty suggests there is a need for fuller and stronger data about the extent of demand for the entry and low level digital skills needed for work and inclusion in Y&NY.

There was consensus that the general level of digital skills in the population has increased, with widespread use of online applications and platforms in the workplace, education and at home – meaning that more people have some digital skills, and that the average level of their skills has improved. However, views about the extent of adult digital skills gaps, for example related to those needed for employment, varied. One local authority reported low unemployment and did not

¹¹ <https://www.cuebusinesssolutions.com/portfolio-item/digital-advantage-2/> accessed 17/03/2021

perceive significant digital skills issues related to access to work. In contrast, a significant number of stakeholders (including VCS organisations and some local authorities and skills providers) suggested that there remains a significant minority of the population with no or low digital skills and that this is a barrier to them accessing employment and learning, and fully participating in society. One noted that while those in work had got used to video-conferencing, there remained “*big groups of people who have not been on this journey*” because they are out of work or furloughed.

Overall, most stakeholders who commented on this issue observed that although the number of people with no or very low digital skills is reducing, the gap between those with no or poor digital literacy levels and the majority of the population with better digital skills has widened. Covid and associated restrictions have catalysed a starker and more polarised digital divide. This is rooted in digital skills, but also connected to wider issues such as low incomes (and their impact on availability of IT equipment and broadband); poor IT connectivity (usually linked to remoteness); and to diversity, an ageing population and health outcomes. Digital divide issues have been further exacerbated by Covid because those with the lowest levels of digital know-how, confidence and equipment “*need to be shown in person as they lack the core skills to be shown online*”, but have been unable to access face-to-face provision given lockdown restrictions.

“Disadvantaged people have become more disadvantaged as they can’t access learning online or in a classroom.” [Local authority]

“Diversity in digital is really important, it’s critical that people are not left behind. There is a risk of a new type of discrimination based on competence in digital skills and technology” [Business representative organisation]

The overall picture elicited is that there is a significant and excluded group at the wrong end of a digital divide, with considerable entry/beginner level digital skills needs. However, while some stakeholders and providers picked up an element of demand for digital skills based on these needs, most saw this as quite small scale. One college observed that digital courses are very popular for 16-19, but “*not so popular*” with adults; another that “*very small numbers of adults come forward*,” despite outreach work. It appears there is a gap between adult digital skills *needs* and these translating into *demand* to enrol onto courses. A number of stakeholders made comments that support this analysis, especially in relation to fear of the unknown, lack of confidence, and lack of equipment preventing those with low or no digital skills from accessing provision that could help them. Others stressed the need for training to be inspiring and of high quality to be effective.

“Low adult take up probably reflects the fear of the unknown and a don’t know what you don’t know factor.” [FE college]

“Confidence and self-belief is crucial to learning generally – including digital.” [VCS organisation]

Finally, and as is the case with businesses attending an FE college or otherwise enrolling on a training course is not the only way that adults with poor digital skills may enhance them. Some stakeholders stressed the importance and role of friends, family and community-based organisations and settings (e.g. libraries and community centres) in helping to build basic digital skills and ability to use technology. This may reduce barriers to learning for those with a fear around digital skills and technology, or who may feel uncomfortable in a perceived classroom setting. One stakeholder noted the University of the Third Age as an example, which has a network of learning groups aimed at encouraging older people to share their knowledge, skills and interests in a supportive environment.

3. Supply and Provision of Digital Skills

3.1 Overview of supply through FE

We carried out high level mapping of the range of digital courses made available through FE colleges, through both identifying courses advertised on college websites, and confirming these and discussing any wider provision in our interviews. We used this twin-track approach with all nine colleges we interviewed, and additionally looked at the course listings for two other bodies we were unable to interview. In total, the review covered all FE colleges in Y&NY and three institutions outside it and serving catchment areas that include Y&NY (Darlington College, East Riding College and Calderdale College) – ten FE colleges in total (including Scarborough UTC). **Table 2** summarises provision of courses at Levels 2, 3 and 4+.

Table 2: Provision at Levels 2, 3 and 4+

Course Area	Level 2		Level 3		Level 4+	
	institutions	courses*	institutions	courses*	institutions	courses*
Total offering at this level*	8	16	9	22	7	9
Computing/Computer Science etc.	3	3	8	10	3	4
General IT focus (including IT user)	3	3	1	1	-	-
Hardware focus – Computer Systems & Networks etc.			2	2	-	-
Software focus – Software Development etc.	1	1	2	2	1	1
Creatively focus – Creative and Digital Tech, CAD etc.	5	6	2	2	-	-
Games development focus	2	2	4	4	2	2
Cyber-security focus	1	1	1	1	2	2

* Courses count is based on number of institution/course combinations, not the number of specific distinct courses (i.e. the same course delivered separately by two colleges counts as two courses not one)

Overall points that emerge for different types and levels of provision are set out in the subsections below.

Level 2

- Most institutions offer some Level 2 digital provision, ranging from between one and three courses.
- Provision focuses mainly on creatively orientated digital courses (e.g. Information and Creative Technology, Creative and Digital Technology); as well as some games-focused creative courses.
- General computing and IT courses are the second most common area of provision.
- There is little provision in software or more specialist areas such as cyber security.

Level 3

- Digital provision in colleges is most abundant at Level 3 – there are 22 courses in total and all but one college offers courses at this level. Most offer two or three courses.
- Computing/Computer Science is by some margin the most common area in which courses are focused – accounting for nearly a half of all courses and offered by eight colleges.
- There are also a significant number of games development focused courses (four courses).

Higher level courses (Level 4 or above)

- Excluding degree apprenticeships (covered below), seven institutions offer a digital based course at Level 4 or above; three of these offer two courses, the others a single course.
- As with Level 3, the main area of focus is on computing/applied computing.
- There is also some, but small-scale, provision of courses focused on cyber security, games development and software solutions.

Apprenticeships and T Levels

- Six out of ten institutions offer at least one digitally focused apprenticeship. Four of these offer three or four apprenticeship options, the others offer one or two.
- Eight different apprenticeships are offered in total. The most common is Infrastructure Technician (four colleges). The only other apprenticeship offered by more than a single provider is Digital Marketing.
- Other apprenticeships offered by a single college include Digital and Technical Solutions (degree apprenticeship), Software Developer, Software Development Technician, Digital Support Technician, Network Engineer, Cyber Security and IT Solutions Technician.
- Overall, most of the apprenticeships focus on fairly broad hardware focused roles, with fewer focused on software or specialist areas such as digital marketing and cyber security.
- Two institutions will offer one or more Digital T Level from September 2021.

Entry level, Level 1 and adult provision

- We identified 16 courses offered at Level 1 or below, spread across six colleges, plus a number of application-specific courses for adults (e.g. Microsoft applications) offered by one other college.
- Two of the 16 courses are ECDL, and three are Essential Digital Skills; all others are only offered by one college and range from broad areas such as computing to specific ones such as cyber security and software development.
- Seven of these courses, plus a number of application specific ones, were part-time and short courses explicitly open to adults. A small number higher level options also exist.
- The most common courses aimed at adults are ECDL and Essential Digital Skills. Other courses include 'Introduction to using a computer' and 'Computing for the terrified'.

Business focused provision

- Five colleges were offering digital provision to businesses (sometimes through discrete business support/engagement units within or associated with the college) or were otherwise working with business on digital skills at the time of the review – although provision is variable over time rather than being constant.
- The scale of provision is modest, and usually focused on specific short courses.

- Examples of provision include courses in specific applications and specialist areas such as CAD, social media for business, search engine optimisation, and cyber security for business.

Overall, there is a significant volume of wide-ranging courses available, with a large majority of FE colleges offering significant provision. However, the strongest provision is at Level 3, with a lower but still significant volume at Level 2, Level 1, Level 4+ and through apprenticeships. Other provision aimed at adults and businesses is quite limited – although as discussed in section 2, this may reflect lower-level demand from these groups

Based on interviews, we found that awareness of the government’s Digital Skills Entitlement¹² supporting adults aged over 19 with no or low basic digital skills to gain a qualification (up to and including Level 1) was not high. A significant proportion of those interviewed did not appear fully versed in exactly what the entitlement was or what they needed to provide in response. In some cases, this may reflect responsibilities in the college for such provision being delegated to lead people not included in an interview. Likewise, even if some uncertainty exists (as it also did with wider stakeholders who were asked about the entitlement) it was also clear that provision at this level is increasing. A number of colleges specifically referenced new courses at Level 1 or below that had, or was just about to, come on stream, even if in at least one case the college doubted how far these courses would be taken up given a high base skills level in the local area.

While colleges offer a significant volume at all levels, in terms of uptake, some colleges specifically noted Level 3 as attracting the largest number of enrolments. Numbers on apprenticeships are often quite low, in part reflecting difficulty for businesses to find appropriate supervisors (see also section 2).

The focus of the digital courses offered varies by Level:

- At Level 1, and below, more functionally oriented courses are to the fore
- At Level 2, creatively focused courses are the most common
- At Level 3, general computing courses dominate
- At Level 4+, computing is still prominent, but more evenly balanced with specialist courses including cyber security and games development
- In Apprenticeships, digital infrastructure¹³ is the most frequent focus, with digital marketing also evident

Finally, four, stressed that building digital skills is not just about digital courses, but about integration across many other courses too. These include agriculture and engineering, but also potentially all other areas of study. One college noted that around 6% of its students take digital courses, which is seen as a significant number, but also that it is crucial to build the digital skills of the other 94% given the growing importance of digital skills across the workforce:

“Digital skills should be an embedded part of everything you do.” [FE college]

An example of this in practice can be seen at Darlington College – one of 50 ‘EdTech Demonstrator Colleges’ in England which are DfE funded to assist other schools and colleges on digital provision

¹² A new legal entitlement to fully funded specified digital qualifications, at Entry Level and Level 1, for adults with no or low digital skills. <https://www.gov.uk/government/publications/digital-qualifications-evaluation-progress#:~:text=The%20Department%20for%20Education%20is,be%20available%20from%20August%202020.>

¹³ E.g. Infrastructure Technician roles that involve setting people up on systems and providing support when they need it

(none of these 50 are in Y&NY). As part of this status, they embed digital and technology into other courses to help build digital skills amongst those not doing digital courses, and roll this out across the college. Examples include using 3D technology and virtual reality in courses as diverse as childcare and construction, and technology links in courses such as engineering and design.

3.2 Independent training provision and wider supply and support

There are a range of routes beyond FE colleges through which businesses, other employers and individuals gain digital skills. We do not have comparative data on the scale of provision by each route, but anecdotally some of these may be as or more important for the development of digital skills than provision through FE colleges for some groups.

Independent training providers (ITPs)

It was beyond the scope of this research to catalogue the scale and nature of digital training provision by ITPs in Y&NY. However, we interviewed one ITP network lead and three ITPs to help inform our findings. The process for doing this was itself instructive as it was difficult to find any digital specialist ITPs that are based within Y&NY - those we interviewed were wholly or strongly digitally focused and based outside of Y&NY but serving clients within it. Two were focused on technical digital apprenticeships, and the other on coding and software. We cannot extrapolate from this limited base to give a comprehensive picture of provision, but together with wider input from other stakeholders/providers, some key messages about provision via ITPs emerged:

- ITPs have a significant role in digital apprenticeship provision, including at Levels 3 and 4.
- Most ITPs have some form of general workforce Level 2 digital provision, while more specialist ones reach into specific areas such as software development and coding, cyber security, digital marketing, data analysis, user experience and interface, and network engineering.
- ITPs can be involved in delivering Digital Skills Bootcamps¹⁴
- Some are offering pre-apprenticeship provision and adult education, for example short courses at Level 2.
- There is a perception that ITPs are often able to respond to business needs more swiftly and flexibly than colleges, in part because they are not constrained by achieving enrolment thresholds to make the provision viable.

Major technology providers

A number of interviewees noted that 'vendor' training via major international information technology companies is a key route through which businesses gain digital skills relevant to the systems they use, and which can provide individuals with internationally recognised certification to support them in seeking employment (and in so doing position themselves to secure higher paid roles, notably in specialised areas of networking, cloud, cyber security and project management). This includes provision through companies such as Amazon Web Services (AWS), Microsoft Azure, Cisco, Google Cloud and CompTIA – which all have their own academies and provide online learning and course material that providers can embed in modules. Likewise, there are apprenticeships specifically linked to the operating systems of these companies.

¹⁴ Short courses in IT subjects such as cloud services, digital for advanced manufacturing and cyber security with links to job interviews to help people aged 19 and over gain employment in the digital sector.

These major technology providers are also stepping into pre-employment. For example, the AWS re/Start programme¹⁵ (run in collaboration with the Prince's Trust and linked to Generation¹⁶) is a free, full-time, classroom-based skills programme for unemployed or underemployed people. With no need for a technology background, it prepares them with the skills and recognised qualification they need for an entry-level cloud role, then connects them to potential employers including help with CVs and interview skills. One of the ITPs we spoke to is actively engaging on this in partnership with AWS and delivering it in Leeds.

In-house and self-taught

Both specialist digital businesses and others in all sectors of the economy will often develop digital skills amongst their employees more informally and often in-house. At a basic – but widespread – level, SMEs will often use their most digitally adept staff members to train up or informally help out others in the company to improve their day-to-day digital skills, such as using software packages. In larger companies, in-house IT staff may play a similar role in a more formal way.

“A lot of digital training is in-house and peer to peer...they muddle along.” [Local authority]

Sometimes in-house skills development is linked to work brought in by specialist digital consultancies, i.e. a major, more technical one-off task such as building a website where expertise on how to subsequently use and update it is passed on to internal staff.

Within digital sector businesses, there is often an emphasis on self-learning, with an expectation that employees will have the motivation and ability to keep on top of and learn new developments and technology through online and peer sources. Another example we identified in a major digitally focused employer was subscription to a major digital learning platform, which all staff have access to. Other internal routes include internal peer to peer learning through communities of practice within individual businesses/organisations. There is also a significant amount of unaccredited learning and learning by doing in the sector.

Universities

Review of university provision was outside the scope of this research, and we did not interview universities as part of our methodology. However, it is important to note that both universities in York have computing/digital provision. The Department of Computer Science at the University of York is particularly important given it has around 750 undergraduate students, nearly 250 post graduate students and approx. 170 research students.¹⁷ Its Computer Science course can be self-standing or combined with a year in industry or a specialism such as cyber security or AI.

University digital skills provision is particularly important for specialist digital sector businesses or roles, where recruitment will often focus on graduates or be directly from universities. For example, one of the large digitally focused employers we interviewed said that it goes directly to relevant universities for maths and computing graduates, including to those in York and Leeds. Another said it had linked with the University of York to help design a postgraduate cyber security course.

¹⁵ <https://uk.generation.org/leeds/get-into-technology/> accessed on 16/03/2021

¹⁶ Generation is an independent non-profit organisation founded in 2014 by McKinsey & Company to help connect the 75 million young people who are unemployed worldwide to employers who need people with the right skills for entry level jobs.

¹⁷ <https://www.cs.york.ac.uk/about-us/> accessed on 16/03/2021

Public sector funded programmes

A number of public sector funded support programmes are in place to help businesses with digital technology and skills, some of which are operated locally through the Y&NY LEP.

The main programme referred to by interviewees was the **Digital Advantage** programme¹⁸ – which is funded through the ERDF and Coventry University and helps SMEs in North Yorkshire (excluding York) to grow through the adoption of digital technology. It offers support ranging from workshops to grants (up to £5,000 and covering 40% of project costs), much of it geared towards making websites work harder for businesses. Workshops (2-3 hours) have covered topics such as web sites and search engine optimisation, social media, e-commerce, cyber security, managing relationships with customers online, e-marketing and smarter working. These were described positively by a number of business organisations and stakeholders in this research, with one noting that their small group sizes, interactive and practical nature, and pitch towards those with a low level of digital skills was helpful.

Other examples of programmes that could support digital skills that were referred to include **Digital Bootcamps**, which have been operating in West Yorkshire and other pilot areas, and will be rolled out nationally from April 2021. Provided by ITPs and colleges, they offer intensive training to those aged 19+ in subjects such as cloud services, software development and cyber security, and broker links to job interviews to help people gain employment in the digital sector. Two Leeds City Region programmes were also mentioned. The **Ad:venture** programme¹⁹ offers business support to start-ups and early years businesses, while the **[re]boot** programme²⁰ offers short courses to individuals, including digitally focused ones, and is provided through FE colleges including Harrogate.

Further issues, barriers and potential solutions around provision of digital skills are discussed in Section 6.

3.3 Likely future provision

We asked FE colleges and ITPs about whether they had plans to expand their digital provision in the future. Overall, nearly all providers were looking to expand and evolve their provision of digital based courses or to integrate digital skills into other non-digital courses. However, many were not yet clear about the specifics of what would be provided and when, and often this would depend on factors such as resources, whether they won relevant contracts, the level of demand (which some tested with new course offers), and the details of new apprenticeship standards which are yet to be confirmed.

Further points that emerged about new provision are:

- A minority of FE colleges could point to some **specific new courses**. Of three specific courses, two were at higher level, and either focused on cyber security or on computing with a cyber security pathway. The other course offer was a Level 2/3 on Esports games development.
- Much of the thinking around new provision is about embedding and applying digital technology and alignments and **interfaces between digital and other courses**. Examples include making use of new technologies such as AI, VR and mixed reality, and looking at areas such as drone

¹⁸ <https://www.cuebusinesssolutions.com/portfolio-item/digital-advantage-2/> accessed 17/03/2021

¹⁹ <https://ad-venture.org.uk/>

²⁰ <https://www.westyorkshirecolleges.co.uk/contracted-projects/reboot>

flying. Alignment includes application and integration of digital skills in courses including business (for example around social media) and agriculture; creative digital media skills that fit between computing and art and design; and alignment between engineering and digital.

- One FE college said it would be significantly expanding **adult and inclusion provision** (a number of others had just done so or were in the process of so doing).
- There is some interest in running digital Bootcamps. One FE college and two ITPs said they were looking at doing so.
- Two FE colleges will be providing Digital T Levels from 2021 or 2022, including in Digital Production, Design and Development at York College from 2021. However, a number of colleges noted barriers to T Level provision, in particular in finding businesses that would be willing and able to successfully host students for a day a week.

4. Issues, Barriers and Solutions to Improved Digital Skills

4.1 Demand to study digital courses

We asked training providers about student demand across their range of courses, and most were able to give a general sense of what type of courses were most popular or otherwise.

Overall, providers tended to describe demand amongst young people for digital courses in terms such as “*healthy*” or “*steady*” and suggested that demand was reasonably strong but also that more would be welcome. However, many noted that demand varies notably for different types of course. Across FE colleges, the consensus was that demand was greatest for “*straightforward*” or “*more general*” computing courses, and those that offered them also highlighted social media and games development based courses as popular. In contrast, colleges said that demand tended to be lower for specialist courses, and one noted that this may be because people are not thinking about specialising at a younger age. Likewise, a number indicated that perceptions and descriptions of courses are important as demand is lower for courses that may be perceived as boring or dull.

“Course titles can put students off when they seem dull or dated, for example Information Technology.” [FE college]

“The way computer science is taught in school is outdated and off-putting and does not reflect reality.” [Business]

Demand also varies by age and demography. One ITP noted that those that are interested in higher level digital skills tend to go to university to gain them, and one provider made clear that the gender balance can be skewed towards males, with females only accounting for between 10 and 15% of enrolments on their computer courses. A number of colleges also suggested that demand from adults was not high, especially for evening courses because fees are off-putting. This mirrors messages in section 2.3.

“General digital courses are very popular for 16-19, but not so popular for adults.” [FE college]

A small number of FE colleges noted that there can be difficulties in making courses available for both adults and young people. Specifically, how to mix adults into a predominantly 16-18 year old setting can be problematic, in part for safeguarding reasons. The ideal situation was described as being able to fill a full adult class of 15 people but achieving that in practice is difficult.

There were mixed messages on apprenticeships, with some FE colleges and ITPs noting reasonable and increasing demand (including from those aged 19+), but others that it was difficult to recruit to apprenticeships such as IT Infrastructure.

One potential solution to increase demand for courses is stronger careers advice and guidance around the digital sector and with respect to the diversity of roles, skills options, progression routes and the salaries that can be commanded. There is also scope to encourage people to think widely about tech and how it cuts across all sectors – “*everything is going digital – even working as a doctor!*” This can be done (possibly linked to any future DSP or the YHIoT) as part of building a diverse tech talent pipeline from school onwards, linked to ambitions for more people having higher skilled and paid jobs in the future and inclusive growth goals. Promotion of tech roles to women and people from BAME backgrounds plays a part here, as does changing the way that computer science is taught in schools to demonstrate that this can be an exciting path to follow.

4.2 Awareness and understanding

Some of those interviewed expressed a perception that providers do not always respond adequately to digital skills needs articulated by businesses, and this creates a vicious circle, which hampers future engagement. As discussed in 2.2, it is very often the case that businesses “*don’t know what they don’t know*”, while at the same time “*providers can’t just put on courses speculatively hoping it will hit the mark.*” We also heard that when it comes to digital, businesses want to:

- take on aspects of digital that will support them directly in tackling a business issue or need;
- see tangible results quickly so as to gain bottom line value from their investment of time, resource and effort; and
- take on new skills and technologies in manageable chunks so that they can implement change a bit at a time, test what works, and then go back to top up their knowledge.

There are some good examples of FE collaborating with local business, such as Scarborough TEC linking to GCHQ in Scarborough on cyber security, and Craven College linking to Skipton Building Society. However, collaborative working at this level was not the norm, and we found limited evidence of FE engagement with business in shaping provision. Stakeholders agree that there needs to be far more of this, with high hopes for the FE White Paper in pushing forward a far stronger requirement for FE to engage with business.

Potential solutions lie in a number of areas. Firstly, as already noted in section 2.2, a mechanism that helps businesses to diagnose digital need and opportunity based on actual business blockages or scenarios and then to devise a plan for gaining the skills needed is critical. Alongside this, demonstrating the value of digital skills remains important. In many areas, the issue may not be the level of provision itself, but awareness of it and how it can meet specific needs. Voluntary sector and careers advice based organisations found this to be an issues as well as businesses.

“It would be like having a business model analysis and digital skills solution designed hand in hand based on an actual business need – that type of help would be invaluable.” [Business organisation]

“There is confusion about what courses and resources are available...we sometimes come across things accidentally rather than by design.” [VCS stakeholder]

Secondly, bite-sized modules and short courses are supported as a key way of enhancing the digital offer in colleges. This is particularly true when a business is not looking for an IT specialist, but rather for an all-rounder who is a level above using standard IT packages and can meet everyday business needs in areas such as social media, setting up payment systems (e.g. Paypal) and dealing with GDPR requirements - “*these businesses want the next level of digital skills beyond the basics, not an apprenticeship in a narrow topic.*” This is also important in terms of businesses being able to “*pick and mix according to their needs*”, and to implement what they have learnt and then return to top up their knowledge with the next logical step. Flexibility from providers, including offering non-accredited units, is key to this.

Other potential solutions include:

- Making it clear where and how businesses can access independent digital skills and advice.
- Providing a guide as to what digital skills and operations questions businesses should be asking.
- Facilitating greater engagement with businesses around their digital needs.

4.3 Apprenticeships and T Levels

Apprenticeships are an important part of the solution to establishing a long-term tech talent pipeline from school years onwards, and act as a route to promoting diversity and social mobility in tech roles.

We heard a lot of positive stories about the impact that digital apprentices are having in the sector, offering a viable alternative to traditional learning paths. This includes evidence that specialist digital apprenticeships can attract a starting salary of £15,000-18,000, with realistic opportunities to access roles at £30,000 within 12-18 months as *“employers know what tech talent costs.”*

However, there are barriers to overcome in increasing digital apprenticeships linked not least to the need to grow the pool of businesses that are willing to host an apprentice. At one level, this relates to continuing efforts to shift perceptions about what an apprenticeship is in a modern workplace and in a technical setting. Close working with business is needed to design apprenticeships that are flexible and fit for purpose in a fast-moving environment (including alignment to tech providers); are bespoke to business need; and which suit an often project/client focused digital business model where providing supervision can detract from costed work. Working with the full range of providers is critical and there is scope to learn from specialists that are doing this successfully.

For wider businesses outside the digital sector, especially SMEs, a key barrier to more apprenticeships is the lack of anybody in the business who can provide the necessary supervisory role. Without an existing digital specialist, it is hard for businesses to properly train, manage and transfer on-the-job knowledge to a digital apprentice as they do not already have the skills in-house to do this. Hosting an apprentice can therefore be a challenge for SMEs looking to expand their digital capabilities. Further promotion of apprenticeships should take this into account and look for ways to support both the business and the learner on their journeys. Similar concerns were raised by some FE colleges in relation to offering digital T levels in the future, based on their extensive work experience requirements. They feared it would be difficult to find sufficient businesses who would be willing and able to offer viable placement options, especially for more specialist options.

4.4 Funding and resources

Nearly all FE colleges said that funding was an issue in one way or other, and a range of business, local authority and voluntary sector stakeholders also highlighted barriers to better digital skills that involved cost or funding support, sometimes interwoven with other factors. Four financial related issues were identified by FE colleges:

- Funding constraints which limit the purchase or renewal of equipment and facilities for colleges themselves, or for equipment such as laptops needed by students. Examples were noted of instances where funding via the LEP (e.g. for a Digital Skills Academy at Askham Bryan College) or through the IoT had helped to address this, but other needs remained.
- The inflexibility of funding regimes can limit the courses they are able to provide. Examples include inability to offer the higher level courses required to meet local demand, and the need for funding for entry level and foundational provision that is necessary to help those with no/low digital skills and employability challenges to move on to provision at Level 1 or 2 or above.
- Difficulty in being able to afford the wages of specialists needed to teach some digital subjects where there is high demand in industry (e.g. cloud computing and cyber security).

- The financial viability of putting on courses where learner demand is limited and numbers of students or apprentices would be low. This can affect some of the more specialist areas that are important to businesses but currently less popular with students.

Most business representative organisations also noted financial barriers to digital skills, typically to do with business reluctance to invest in skills in the current economic climate where resources are under severe pressure and survival is the paramount concern for many. Related factors include the observation that sometimes the issue is perception of cost (which is assumed to be higher than it may be), or to do with a short term outlook whereby some businesses see digital as another thing to do, but then “put it aside if benefits do not emerge quickly”:

“They often try it for a week but ditch it if it doesn’t bring an immediate return. To them, it just appears as a cost.” [Business]

It is also likely that propensity to invest in digital skills in businesses is diminished by the fact that many SMEs outside of the digital sector are uncertain about what digital skills they need, where to get them, and what the benefits will be – as discussed in sections 2.3 and 4.2. Finally, making bite-sized and modular digital training available to businesses (see 4.2) allows targeting at what is most needed, and reduces the time and financial commitment required at a single point in time.

4.5 Expertise, capacity and flexibility

Providers and stakeholders raised the difficulties FE colleges face in being sufficiently flexible and able to adapt swiftly in terms of curriculum, expertise and (often costly) equipment to new technologies, and so able to keep up with the fast pace of change in the digital sector and especially in specialist areas such as cloud computing and cyber security. This reflects to a large extent the nature of FE colleges as big institutions that need to plan a long way ahead, and there may also be cost factors at play. There is a role here for providers working in partnership with business; and the IoT model of sharing equipment and expertise across multiple providers will also be beneficial.

Interviewees also regularly raised the issue of providers finding it difficult to recruit tutors with the right expertise, notably as they cannot pay salaries commensurate with those attainable in business, especially in advanced skills and subjects. This is compounded when colleges may be looking to start a new area of provision, with initially lower demand - meaning that only a part-time tutor role is required, which is less attractive for many and harder still to recruit to. Finding a way to attract and retain tutors is essential, but very challenging. It requires continuous professional development and demands well facilitated and flexible partnership working between education and industry so that tutors can play a more general role and be supported by industry experts to provide specific subject focus that is abreast with the latest technologies and their applications.

Building in specialisms via modules and non-accredited units is seen as one way for providers to be more responsive. This allows the existing offer to be enhanced; reduces (at least in the short term) the time consuming process of shifting curriculum and designing new courses that can risk being out of date by the time they are ready; and aligns with business desire for more bite-sized learning. Again, business input is vital. Partly, this is to build better understanding of local demand. But, additionally, stakeholders are keen to explore how to gain value from working with tech providers as part of the way forward, partnering with organisations such as AWS to design content based on real world technologies, to draw on the course materials they make available and to complement their established academies. This is also true in terms of the role awarding bodies can play; and from a Y&NY perspective, the YHIoT and any potential DSP can be the facilitators of this.

The ITP sector was also seen as playing a very important role, especially in terms of being able to “pivot provision overnight” and to “respond swiftly and flexibly if there is sufficient demand – they don’t need the same numbers of guaranteed learners as colleges do.” However, this provision can be stifled by the sector not having sufficient visibility of business demand, with one person linked to the sector noting: “there does have to be visibility – it is costly to put on provision without it, as too few learners or local employers mean a return on investment is not generated.” This point is expanded in 4.7.

4.6 Connectivity and IT equipment

Many providers and stakeholders identified barriers to both the learning and application of digital skills linked to poor or inadequate equipment and infrastructure. They said that some learners (or employees) did not often have the laptops or tablets they needed to access educational resources and learning or to work from home, and/or lacked sufficient broadband/wifi and data capacity. This has two impacts. First, some learners are unable access opportunities to study digital courses and access material that would enable them to improve their digital skills. Secondly, less or no use of digital devices at home, including for social and practical purposes, means there is less opportunity to learn and embed digital skills organically.

The root causes of this issue concern two separate but sometimes interconnected issues – poor IT connectivity in more rural areas, and poverty/digital exclusion. Some households cannot afford the digital equipment, data allowances and broadband they need; others simply do not have sufficient broadband to make full use of equipment even if they do have it. Both contribute to the increasingly polarised digital divide described in section 2.3.

Besides the widely expressed view about a general lack of equipment being an issue, some interviewees also raised a specific point about the inadequacies of smart phones for digital learning purposes. They made clear that while some people (including students) feel that using a smart phone meets their connectivity needs, in practice they do not provide everything that is required either in education (e.g. to submit work), or to apply for jobs.

“Many learners are working on their phones, which is fine for listening to lectures but means they can’t submit work.” [FE college]

“People assume that because you have a smart phone, you know how to use a digital platform, but that isn’t always the case. There is misconception that all young people have good IT skills.” [Local authority]

Issues to do with lack of connectivity have been heightened by the Covid pandemic, but reflect problems that already exist, and which are likely to continue into the future, especially given a move towards blended models of learning and employment which involve an element of working/learning from home. Likewise, many of the solutions to these deep-seated issues will not be new. Hence, work to address inequalities and to accelerate and enhance roll out of broadband and wider IT connectivity is even more vital than previously. Other potential solutions are also likely to build on those employed during the pandemic, such as helping those who cannot afford adequate IT equipment and broadband to access it; or providing routes to access in community settings and libraries, with support on how to use it. There are also opportunities linked to the circular economy, for example by re-using IT equipment that is becoming redundant in organisations and making it available to those in need. There are already companies within Y&NY that specialise in upgrade and re-use of equipment in this way.

Besides lack of equipment and connectivity, one local authority stakeholder also stressed the difficulties presented by there not being an FE college anywhere close to it. This made it physically hard for learners to access digital courses and training, as well as wider skills.

4.7 Defining the issue and articulating demand

Lack of visibility of demand for higher level digital skills can hamper provision across FE and ITPs who are unable to make the sizeable financial commitment involved in putting on provision at risk. Similarly, bundling essential and technical digital skills into one agenda can block progress – these are very different and recognising them as such is vital in terms of convening the right people so that everyone knows where on the spectrum they can contribute and can take responsibility for action.

Stakeholders challenged whether more could be done in Y&NY to articulate demand, linked to labour market intelligence and aligned to policy on a greener, fairer, stronger recovery. One suggestion is that a roadmap be developed for the next three to five years, coordinated with providers across the spectrum, to put in place a strategic and forward-looking response. People pointed to the role of a potential DSP in this.

5. Yorkshire and Humber Institute of Technology and Digital Skills

The Yorkshire & Humber Institute of Technology (YHloT) is one of twelve first wave Institutes established across England as part of government policy to increase access to higher level technical skills required by employers, with a focus on STEM subjects and at Level 4 and above in qualification areas such as HNCs, HNDs, Apprenticeships and Foundation Degrees. It is based on a collaborative partnership²¹ between seven FE colleges, two universities, four businesses, and the industry-led partnership, CATCH.

From a digital skills perspective, a range of courses provided by member colleges sit within the YHloT. Some of those that are directly digital in nature, such as computing, cyber security, software development, computer games development and digital marketing, notably via Craven, Scarborough TEC and York Colleges. Other courses are less immediately digital in nature but have strong embedded elements of digital as an enabler by virtue of the equipment and technologies they use. These include, for example, the precision agriculture technologies in both Askham Bryan and Bishop Burton Colleges, and advanced engineering technologies at Selby college.

These courses and the colleges involved have benefited from the YHloT securing £10m of capital investment to support delivery of new or improved industry-standard facilities and equipment leading to high-quality provision. Examples include a new digital centre at Craven college and a new Gaming, Digital Arts and Cyber IT Lab at Scarborough TEC.

Part of the brief for this research was to assess the capacity of the skills sector to effectively support the work of the YHloT. We did this by speaking to five of the seven college partners, the head of the YHloT and a number of businesses linked to it; as well as asking other stakeholders for views from an outside perspective. It is in many ways too early in the life of the YHloT to take a fully formed view, however, from our discussions we have been able to draw the observations that follow.

At a headline level, there is a broad range of subject areas and courses within them that are in place to support the STEM and digital missions of the YHloT, and these encompass a spread of qualification levels and types. However, from high-level discussions and desk research, it is hard to assess at this point the extent to which having an IoT in place has substantively strengthened the nature of provision towards the higher level future focused technical skills that can lead individuals to higher paid employment opportunities, and businesses to improved competitiveness and productivity.

A number of stakeholders expressed the view that provision as it currently stands is centred on existing courses badged under the YHloT banner; rather being based on a strategic and prioritised plan for how curriculum can be developed to build in a future tech focus – which is required to fully leverage the impact of having an IoT based here. Whilst the difficulties in changing curriculum are recognised, at the same time there is a need to think creatively about how this shift can be achieved. Potential solutions could include delivering specialisms via modular learning, and stronger business engagement to understand needs and help develop training materials and resources.

²¹ The FE Colleges of York, Selby, Askham Bryan, Bishop Burton, Craven, East Riding, Scarborough TEC; the Universities of Hull and York St John; Skipton Building Society; Visr; CATCH; Engie Fabricom and GB Recruitment

There is no doubt that the investment in state-of-the art capital equipment and facilities secured as a result of the YHloT partnership has been a good thing, not least because injections of cash in this way are rare and will help to deliver high quality provision that can meet industry needs and learner demands. It appears that much of the focus to date by colleges has been around getting these facilities established, with delivery in the main yet to start. This has not been helped by the complicated circumstances colleges have faced as a result of Covid-19, and the understandable need to re-focus on core business. In a linked point, one college noted that “*access to revenue funds, not just capital, is key.*” They felt that they had contributed more to the YHloT than they had gained from it because of this limitation and focus on capital spend.

Although it is too early to say how this will work in practice, the colleges we spoke to support the notion of working in partnership to share expertise and equipment, especially given the financial climate FE colleges have been operating in for some time. There is good scope to bring in business input linked to the central YHloT role and remit and aligned to new proposals in the 2021 FE Skills White Paper²² pledging to give employers a central role in designing technical courses by 2030 to ensure that post-16 level 4 and 5 qualifications are linked to employer-led standards and skills needed for work. Some asked whether the YHloT can play a bigger role in convening business – especially in a way that mirrors Y&NY’s SME business base – and the spectrum of digital technology skills provision to kick start this and to form a robust picture of need and who can do what to deliver.

More broadly, there are also clear links to be made between the YHloT and any future Y&NY Digital Skills Partnership, and one stakeholder explicitly said that the loT should have a role in relation to an emerging DSP. Although we understand the window is not currently open for further FE colleges to joining the YHloT, one college in Y&NY specifically expressed an interest in doing so if the opportunity arose. Another college outside of Y&NY but with a significant role in serving its residents on digital skills was keen to link to the YHloT and receive communication from it, and was surprised that had not happened to date.

²² Skills for Jobs: Lifelong Learning for Opportunity and Growth (2021) DfE; https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957856/Skills_for_jobs_lifelong_learning_for_opportunity_and_growth_web_version.pdf accessed on 16/3/21

6. Views on a Potential Digital Skills Partnership

We asked most interviewees what they thought about the possibility of establishing a Digital Skills Partnership (DSP) in Y&NY - with the exception of individual businesses/employers who would not be expected to know about a DSP.

Overall, there was low awareness of what a Digital Skills Partnership is, or of the idea of establishing one in Y&NY. Only a handful of interviewees knew about a DSP, and even well-informed individuals in relevant positions in local authorities and FE colleges were often unaware. One stakeholder was familiar with the Humber DSP and thought that it was working well; another was aware of the West Yorkshire DSP but did not think it had delivered benefits yet; and a few others were aware of DSPs more widely but not of specific examples or proposals.

However, whether an individual already knew about a DSP or we had to explain the model to them, both providers and wider stakeholders viewed the idea positively. Nobody at all was opposed to the idea, and the remainder either did not express a view or welcomed the establishment of one on the basis that it would “*get the system talking together*” and strengthen partnership and collaboration. One stakeholder noted that:

“So many parties are working to individual targets, we need collective aims. Anything to raise awareness, get people working together, and put it on the agenda.” [VCS organisation].

Interviewees fed in a range of views and comments about the detail of a DSP and its potential role, membership and operation. These comments are listed below (with the number of times a comment was suggested in brackets for any points made by more than one organisation).

Table 3: Comments about a potential Y&NY Digital Skills Partnership

Comment	Number of interviewees
Get partners / the system talking together and co-ordinating	5
Align and integrate with other strategies and structures in Y&NY	3
Communicate existing courses and promote new ones	2
Include horizon scanning to identify/respond to future skills needs	2
Make sure the purpose is clear	1
Broad remit - cover community, workplace and specialist digital skills	1
Focus on a few initial priorities and keep it dynamic	1
Use it to scale up good practice	1
Connect it to or manage through the YHIoT	1
Include revenue as well as capital funding	1

Different stakeholders suggested specific organisations or sectors to be represented or indicated that they would be happy to be involved. The consensus was that the membership should be broad enough to enable co-ordination between the main bodies or sectors with a significant role to play in building digital skills (e.g. colleges, independent training providers, schools) or in representing constituencies who need to strengthen or utilise digital skills, such as employers/businesses (including SMEs), the VCS sector (who may need financial support to participate), and local

government. One stakeholder specifically suggested that the LEP should play a facilitating role in establishing and supporting a DSP.

We also interviewed a representative from the Humber DSP to gain insights from their experience. The Humber DSP was established in March 2020, drawing on models set by seven other DSP pilots across England. It aims to bring together knowledge, expertise and employer engagement from across the area to consider current and future digital skills needs, and brings together public, private and third sector organisations to increase the digital capability of individuals, businesses and other organisations. We were told that nationally, the Department for Digital, Culture, Media and Sport (DCMS) regard the Humber DSP as a best practice example, even though it is important to note that it is not one of DCMS' officially funded DSPs on the basis that the Humber is not a combined authority area. Instead, it was granted permission by DCMS to set up as an 'independent' DSP, has been supported by the Humber LEP, and is paid for locally rather than through seed money provided by DCMS.

The overall aims of the Humber DSP are to raise the digital skills level, identify and understand demand for workplace digital training, and to establish an inclusive Digital Skills Hub offering support services to businesses of all sizes. Its three current priorities reflect these aims and are:

- Developing a 'heat map' of provision, learner needs and employer perspectives
- Building an online assessment tool for SMEs to diagnose their digital adoption and needs
- Developing a set of case studies of best practice on local digital adoption journeys

Interestingly, the proposed diagnostic tool for SMEs around digital adoption and needs would appear a local response to a similar need identified through this research, i.e. to help SMEs to understand what digital skills they need and to access relevant provision.

7. Conclusions and Recommendations

We set out below the main conclusions from our research, including barriers to progress and solutions to overcoming these, and recommendations for action where appropriate.

Demand in digital sector businesses and for specialist digital skills

Conclusions

- Digital sector businesses and other large businesses with specialist digital needs seek a range of specific skills and expertise, often linked to major international technology company platforms (see glossary). These include cloud technologies and platforms; software development, coding and testing; web design and development; cyber security; data analytics and visualisation; technical architecture; user experience and interface design; AI; video conferencing; broadband and 5G; internet of things; robotics; and project management.
- Attracting talent in the sector and the specialist roles required is a challenge for many businesses, if not always an insurmountable one. However, competition and skills shortages are particularly acute for roles in cloud computing, cyber security, software development/coding, and data analytics.
- The rurality of Y&NY and its smaller scale digital sector adds to recruitment challenges, with talent often migrating to big cities. However, there opportunities to grow the sector and associated skills in Y&NY, especially given changing post-Covid locational preferences. Opportunities include building on existing sector presence in York and Harrogate; and those in Scarborough linked to GCHQ and cyber security; in Northallerton, given its new digital campus development; and in Skipton given financial sector presence and good links to Leeds.
- However, digital businesses do not necessarily see qualifications as vital when recruiting. They instead look for a natural affinity and willingness to learn new technologies as vital factor in how skills are developed in this sector. This links to the fast pace of technology advancements and a more skills based CV ethos showing how acquired skills have been applied in practice. Digital businesses also seek transferable skills such as teamwork, problem solving, communication and customer skills.
- The exception centres on the critical role that qualifications and certifications linked to major international information technology providers (see glossary) in supporting business competitiveness and in helping people to get a job and progress in it, with strong evidence of the positive impact that holding these qualifications can have on salaries.
- Most business in the sector currently recruit mainly from universities, including in York and Leeds. There are mixed views and some scepticism towards apprenticeships, although attitudes appear to be warming, especially towards those at Level 4 upwards. There is little recruitment of students coming directly from FE, but more openness to engagement with independent training providers.

Recommendation 1: *Work with the sector, training providers and universities to identify specific measures and provision that would help to address skills shortages notably in cloud computing, cyber security and data based roles, and to widen the local talent pool for the future.*

Recommendation 2: Capitalise on opportunities to make Y&NY an attractive place for digital sector businesses, building on post-Covid desire for space and escape from the cities, with scope to create local clusters of activity that help to grow the sector and attract and retain talent.

Digital skills demand and need in wider businesses and the workforce

Conclusions

- Digital skills needs have risen rapidly as a result of the Covid pandemic, and most businesses have faced new skills demands linked to online sales, operation and working. Social media and digital marketing are foremost amongst the digital skill sets businesses are looking for. Other areas of need include e-commerce, cyber security, web development and analytics.
- Most SMEs are too small to have digital specialists, and digital skills and responsibilities are often bundled into existing roles. They are hence seeking a raised level of competence and ability on digital in existing staff (although a trend toward recruitment of social media/digital marketing posts was observed).
- Lack of existing digital expertise makes it difficult for SMEs to know exactly what their digital skills needs are, how to address them, and what provision exists to help them do so. For these businesses, it may well be that the key need is not additional supply from training providers, but to better understand existing provision and how it can best help their business.
- Digital training in SMEs is often in-house and peer to peer or linked to use of external consultants for specific technical tasks and knowledge transfer from them to allow day to day digital management. When SMEs do seek external training for their staff, they often prefer bite-sized and modular options which are manageable within tight financial and time constraints.

Recommendation 3: Provide or enhance a brokerage service that helps SMEs to understand their digital needs and skills needs related to them, makes them aware of the options to resolve these and supports them to move forward in taking action.

Recommendation 4: Work with training providers of all types to increase and communicate flexible, modular and bite-sized digital training options for businesses, and to engage with them to ensure that specific areas of need such as digital marketing are covered in evolving provision.

Digital skills for an inclusive economy and access to employment

Conclusions

- There seems to be patchy and incomplete awareness of the Digital Skills Entitlement and of the extent of entry and low-level digital skills needs in adults and the community. However, FE colleges do appear to be in the process of increasing the provision they offer.
- While the number of people with digital skills has grown during Covid pandemic, there appears still to be a significant volume of people who lack basic digital skills but need them to access and be effective in work, and function in society. The digital divide between this group and those who have improved their skills has widened and is likely to be conflated with factors such as age, low incomes, health factors and rural isolation.

- There appears to be a gap between digital skills *needs* in the community, and the extent to which these are translated into *demand* for learning, certainly in educational settings such as colleges. Lack of confidence, fear of the unknown, and “*not knowing what you don’t know*” are likely to contribute to this, and much learning (or potential avenues for it) is likely to revolve around informal learning through friends and family and community-based groups and settings.

Recommendation 5: *Ensure the Digital Skills Entitlement is fully communicated and understood amongst those who are expected to offer provision that responds to it, and by the target group who can benefit from it.*

Recommendation 6: *More fully review the extent of digital skills gaps and barriers that prevent access to learning and work with the right partners to develop solutions, or build on existing practice, to address these – including attractive and inspirational community and college provision.*

Current and future provision of digital skills

Conclusions

- There is a significant volume of provision, including a reasonably wide range of courses and across the majority of FE colleges. The bulk of provision is at Level 3, with a lower but still significant amount offered at Level 2, Level 1, Level 4+. Six out of ten institutions offered digital apprenticeships, usually at Level 3 or above. Other provision aimed at adults and businesses is more limited.
- The focus of the digital courses offered varies by Level:
 - At Level 1 and below, more functionally oriented courses are to the fore
 - At Level 2, creatively focused courses are the most common
 - At Level 3, general computing courses dominate
 - At Level 4+, computing is prominent, but more evenly balanced with specialist courses including cyber security and games development
 - Infrastructure is the main focus area for apprenticeships; digital marketing is also evident
- As only a fraction of learners study digital courses, but a large majority will need to use digital skills in work, it is vital to also embed digital and tech content into all courses. There are good examples of FE colleges that are already doing this within and close to Y&NY.
- Nearly all providers are looking to expand and evolve their provision of digital courses and application of digital technologies within other courses. Many were not yet clear about the specifics of what would be provided and when, but specific new FE colleges courses are expected to include higher level provision with a cyber security focus. Two colleges are set to offer Digital T Levels and others are working to further embed digital skills into non-digital courses.
- It is difficult to be categorical about how far there are gaps in FE college digital provision in relation to business and wider demand, without having a full picture of how far relevant skills are provided through other routes such as HE. However, there appears to be a gap around cloud computing, and additional provision in other high demand areas such as cyber security and digital marketing may also be valuable.
- It is difficult to be categorical about the extent of gaps in FE provision in relation to reported digital skills gaps without having a full picture of how far relevant skills are provided through other

routes such as HE. However, there is strong evidence of a gap around cloud computing, as well as evidence of strong demand and/or potential gaps in areas such as cyber security, software development/coding and digital marketing.

- Independent training providers are often able to be more flexible, dynamic and specialised than FE colleges in meeting specific skills needs in businesses and the community. Their provision plays an important complementary role to that available through other routes, including around apprenticeships, specialist areas such as coding skills, and opportunities to deliver new initiatives such as Digital Bootcamps.
- As noted earlier in these conclusions, the skills programmes of the major international information technology companies are also seen as critically important in supporting business competitiveness and in helping people to get a job and progress in it, with strong evidence of the positive impact that holding these qualifications can have on salaries.
- Other routes to development of digital skills include in-house and self-taught skills; universities; connection to specialist consultancies; and public sector funded skills programmes. Examples of the latter include the well-received Digital Advantage programme run by the University of Coventry at its Scarborough campus in North Yorkshire, and the University of York's Department of Computer Science.

Recommendation 7: *Engage with businesses and other skills and education partners to identify how far there is need for additional FE college provision in key areas such as cloud computing, cyber security, software development/coding and digital media, and provide help in addressing barriers to delivering or accessing such provision.*

Recommendation 8: *Promote the further embedding and the integration of digital and tech skills into non-digitally focused courses, including examples of good practice and making links to existing EdTech Demonstrator schools and colleges.*

Recommendation 9: *Ensure digital skills solutions on current and future needs are integrated and include collaboration across all types of providers and routes – including ITPs, higher education, awarding bodies, community based provision, and provision by major international information technology companies.*

Wider and interconnected issues, barriers and solutions for enhancing digital skills

Conclusions

- Young people's demand is higher for more general courses and those that fit with interest areas such as social media and gaming, but lower for more specialised courses and ones that may appear dull or intense. This makes it harder to viably run courses for businesses in some key areas that are seen as more emerging and niche in nature, such as cyber security.
- The extent to which careers information, advice and guidance makes young people aware of growing and evolving digital career options – and the good job prospects and salaries available – appears to be limited. The proportion of females studying computing courses and working in many parts of the digital sector is also low, which further limits the supply of talent in the sector.
- Business can struggle to know and articulate their digital skills needs, and providers can sometimes be seen to not adequately respond, but themselves lack the visibility needed to

confidently put on new provision. There are examples of providers collaborating with business in course design, but this was not reported as prevalent by interviewees. As well as helping business identify need (see recommendations 3 and 4), there is a need to boost awareness of existing provision, articulate how it can meet business needs, and ensure that it is strategically aligned.

- Apprenticeships are an important part of a long-term tech talent pipeline and can help to support diversity and social mobility in tech roles. However, there are barriers to overcome to grow the pool of businesses that are willing or able to host a digital apprentice, not least a lack of digital specialists in non-digital sector SMEs who could supervise a digital apprentice. Other needs include shifting perceptions of what an apprenticeship is; collaboration to design flexible and bespoke apprenticeships; and pastoral support to back up business mentoring and supervision. There is scope to learn from specialists that are doing this successfully.
- Funding and resources are a potential barrier to digital skills provision in many FE colleges, linked to the costs of equipment and facilities, tutors with specialist expertise, and constraints on what courses can be funded. Resources are also an issue for many businesses, where investment in skill is difficult given tight finances and the challenging economic context.
- Linked to the above, FE can struggle to be sufficiently flexible to adapt swiftly to new digital technologies, and recruiting tutors with the right skills is a challenge. Solutions are based on continuous professional development; education-industry partnerships to bring specific focus on the latest technologies and their applications; and building in specialisms via modules and non-accredited units. ITPs can play a vital complementary role as they are often able to pivot more swiftly; and can make connections to tech provider courses, qualifications and certifications.
- Inability to afford IT equipment (specifically laptops and tablets) and broadband, and/or poor broadband connectivity in some areas, can limit how far individuals can operate online, access work, learning and services, and improve digital skills in the process. This is especially the case for those on low incomes and living in more remote areas, and contributes to the digital divide.

Recommendation 10: *Increase demand from young people to study and seek careers in digital specialisms demanded by businesses, including through improved IAG; promotion to diverse audiences and specifically to females; developing an engaging, practical and real-world curriculum from early school years upwards; and boosting take-up of digital apprenticeships.*

Recommendation 11: *Use vehicles such as the YHIoT and a possible DSP to facilitate business-provider engagement across the spectrum that focuses on defining need, helping business understand where to access independent digital skills and advice, boosting tutor capacity via industry expertise, and co-designing a Y&NY digital skills roadmap.*

Recommendation 12: *Where possible, make targeted resources available to tackle cost, resource, and expertise based barriers that prevent key areas of digital provision including through innovative use of business-provider partnerships that boost teaching capacity and bring in specialisms linked to the latest technologies and their applications.*

Recommendation 13: *Continue to enhance and accelerate improved digital connectivity and support the extension of existing Covid-related initiatives to provide free or affordable access to IT equipment (including laptops) and broadband connectivity for low-income households.*

The Yorkshire and Humber Institute of Technology and a potential Digital Skills Partnership

Conclusions

- A range of digital courses are provided by member colleges, either directly (e.g. computing, cyber security, software development, games development and digital marketing); or embedded in other subjects (e.g. precision agriculture and advanced engineering technologies). Capital funding has supported new or improved industry-standard facilities and equipment that enables high-quality provision; however, revenue funding based options would also be welcomed.
- It is hard to assess at this point the extent to which having an IoT in place has substantively strengthened provision of higher level, future focused technical skills, or whether existing provision has been badged under the YHIoT banner. Either way, prioritising a strategic plan for how curriculum can be developed to build in this focus and to fully leverage the impact of the IoT would be beneficial. This includes planning creative solutions for delivering specialisms via modular learning and stronger business engagement to understand needs and help develop training materials and resources.
- There is very low awareness of DSPs or proposals for one in Y&NY, but providers and stakeholders are very supportive of the idea in principle as a vehicle for stronger collaboration across a broad range of partners that pushes forward digital transformation in Y&NY.

Recommendation 14: *Establish a strategic plan for how digital curriculum and provision will evolve towards the IoT's higher level future focused technical skills remit, including how it is embedded across digital and non-digital subject areas, and amplify the YHIoT's role in convening business to kick start this in partnership (and linked to any potential DSP).*

Recommendation 15: *Engage with partners to set in train a process to plan and establish a DSP for the Y&NY area. Ensure it has a clear role, remit and priorities and is fully connected to existing structures and strategies, such as the LEP and the LIS.*

Glossary

AI – Artificial Intelligence
AWS – Amazon Web Services
DCMS – Department for Digital, Culture, Media and Sport
DSP – Digital Skills Partnership
ERDF – European Regional Development Fund
FE – Further Education
HE – Higher Education
IAG – Information, Advice and Guidance
IoT – Institute of Technology
ITP – Independent Training Providers
LEP – Local Enterprise Partnership
LIS – Local Industrial Strategy
LMI – Labour Market Intelligence
SEO – Search Engine Optimisation
SME – Small and Medium Enterprise(s)
STEM – Science, Technology, Engineering and Maths
VCS – Voluntary and Community Sector
VR – Virtual Reality
YHIoT – Yorkshire and Humber Institute of Technology
Y&NY – York and North Yorkshire

‘Providers’ is used throughout as a collective term to refer to all bodies who provide training and courses – including colleges, universities and independent training providers.

Digital Skills Entitlement - A new legal entitlement to fully funded specified digital qualifications, at Entry Level and Level 1, for adults with no or low digital skills.

Digital Skills Bootcamps – are short courses in IT subjects such as cloud services, digital for advanced manufacturing and cyber security with links to job interviews to help people aged 19 and over gain employment in the digital sector. Skills minister Gillian Keegan has emphasised the employability purpose of the bootcamps: “It’s 12 to 16 weeks, so it’s quite intensive training, and is really trying to get people to get some quite valuable skills, which will lead them to employment in the digital sector and digital-based roles in particular.”²³

EdTech Demonstrator schools and colleges – a network of 50 ‘EdTech Demonstrator Colleges’ in England are DfE funded to assist other schools and colleges on digital provision.

Major international information technology companies/providers – a phrasing used in this report to describe the companies commonly known as the ‘tech giants’, including Google, Microsoft, Amazon, Apple and Facebook.

²³ <https://feweeek.co.uk/2020/10/16/digital-skills-bootcamps-what-are-they-and-how-will-they-work/>