

THIS IS FOR
EVERYONE:
CONNECTING
YOUNG PEOPLE
AND THE TECH CITY
CLUSTER

*Sam Sims
Brell Wilson
Jess Tyrrell*

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Sam Sims, Brell Wilson, Jess Tyrrell

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FOREWORD

Digital skills are essential to the growth of the tech sector, and by extension the growth of London. There are more people working in the technology and information sector in London and the surrounding regions than in all of California.¹ The sector is an economic engine for London, and to fuel its continued growth Londoners, beginning with primary school students, must be equipped with the digital skills needed to be a part of this success.

It is well documented that London is facing a serious skills gap, with more tech jobs available than skilled workers to fill them. And it is not only tech jobs which require digital learning competency; digital skills are a requirement in all industries to stay competitive in the 21st century economy.

Creating pathways for people to become a part of the vibrant tech ecosystem in London is essential to ensuring London's place as a leading digital city. New York City Mayor Michael R. Bloomberg and London Mayor Boris Johnson discussed this candidly at last year's Bloomberg Technology Summit and it has been a focus of my work in London over the last nine months via Bloomberg Associates, a non-profit consultancy founded by Mayor Bloomberg to help city governments improve the quality of life of their citizens.

As the Commissioner for the NYC Mayor's Office of Media and Entertainment under Mayor Bloomberg, I saw first-hand the need to better connect academic offerings with the requirements of a quickly changing industry to produce a nimble, skilled workforce ready to benefit from the opportunities available in the digital sector. Now, at Bloomberg Associates, I see this trend playing out around the world as we advise cities on how best to promote economic growth in the media and technology sectors.

Mayors know that job creation and retention are essential to the well-being of their city, and with the expanded tech and information sector accounting for 30% of total London job gains since 2009, it's no secret that tech is where the jobs are.² London's technology and information sector – which includes traditional tech companies as well as related media and information companies – employs 382,000 workers, an increase of 11% since 2009.³

The tech sector offers real economic impact and opportunity for a city and the effort of projects like this one to map out the ecosystem is an important part of the process of developing this sector. It will help us better identify how to create viable pathways to 21st century careers.

The data in this report will help all key stakeholders – from government to academia and industry – make more informed and strategic investments in the digital learning ecosystem. Building public-private partnerships where stakeholders can contribute their expertise and thought leadership to creating a sustainable and robust set of offerings to Londoners will position the city for success, and that’s why I am so pleased to see this report come to fruition.

Katherine L. Oliver *Principal, Bloomberg Associates*

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EXECUTIVE SUMMARY

Britain's digital economy has grown dramatically over the last decade. But it is being held back from reaching its full potential by a shortage of workers with digital skills.

At the same time this economy has taken an urban turn. The first wave of digital companies grew up on university campuses, science parks and sprawling suburbs. But over recent years the digital sector has moved to cities and in particular to poor, run down neighbourhoods, which offer cheap rent and an urban vibe that young digital entrepreneurs and workers like. One result of these two developments – a growing digital skills shortage and the urbanisation of the digital economy – is that digital companies find themselves located in areas with high youth unemployment while struggling to find workers with the skills they need.

The East London Cluster

East London is a case in point. As a number of surveys and reports have demonstrated, a cluster of digital companies has developed in the wards around Old Street and Shoreditch and extending outwards to neighboring districts in Islington, Hackney, Tower Hamlets and Newham. This 'Tech City' cluster has grown rapidly and is now one of the largest concentrations of digital companies in Europe. In its early days, Tech City was made up almost entirely of small and medium sized companies. More recently larger companies have begun to set up offices in the area, hoping to get closer to digital innovation and attract and retained skilled digital workers. But despite the outward success of Tech City, entrepreneurs and employers are finding it increasingly difficult to secure workers with the skills they need. Yet the cluster has developed in one of the poorest and most diverse areas of London.

The Connecting Tech City Initiative

Over the last year Centre for London has been working with a large array of partners on an initiative – 'Connecting Tech City' – that aims radically to scale up the number of East London's young people gaining digital skills and securing a future in the local digital economy, both as means to improving life chances for local young people and helping tackle the digital skills gap.

More particularly, Connecting Tech City has three interconnected strands. It sets out to:

- support emerging networks of companies, schools, colleges, and local authorities committed to creating a more inclusive tech cluster, and promote collaboration between them;

- create a digital platform with information on all the digital workshops, courses, apprenticeships and other opportunities available in East London for young people;
- undertake research on the question: what more can be done to develop and engage local digital talent?

While Connecting Tech City is firmly focused on East London, we hope that it will have wider application – that lessons learned from it would be useful to digital clusters elsewhere in the UK and beyond.

Connecting Tech City has made fast progress. We have built an extensive network of East London schools and colleges, social enterprises and companies committed to helping young people develop digital skills. We are launching a new online platform – *wereadotdotdot* – following this report. This report represents the culmination of the third strand of our work. It is based on a literature review and over 60 interviews with young people, and focus groups with digital learning programmes and digital companies.

Research Findings

The East London Context

Our research confirmed that Tech City companies are struggling to recruit enough people with the skills its digital companies need and that this is holding the growth of the cluster back.

Our research also found a widespread desire, among local digital entrepreneurs and employers, to see more done to support the development of local talent. Many of the companies we spoke to stressed that their ability to make major commitments, in terms of time or money, was limited. This was especially true among startups and smaller firms. But we found a strong sense of identity and community among many of the companies and workers in the local area and a commitment to helping it grow and prosper. Local companies recognised, in particular, both the moral and the economic case for helping local young people develop digital skills and find work in the cluster.

Our interviews with young people revealed a complex picture. On the one hand, the gap between the young people and the cluster is wide. Most of the young people we interviewed had a very limited awareness of the opportunities available for them in the local digital economy, and were not considering a future in it. ‘Tech City’ might loom large in the imaginations of those responsible for London’s economic development, and for those working in it, but few young people know about it. On the

other hand, when invited to consider a future in the digital economy, the young people we interviewed did see it as a sector that would be open to them. There was a strong sense, among both boys and girls, young men and women, and across ethnic groups, that as long as they worked hard and had the right skills, background and identity would not hinder them.

Digital Learning Programmes

So what can be done to help young people growing up around the digital cluster benefit from it?

Clearly there is no one magic bullet that can solve the skills shortage faced by digital companies. We need to ensure that schools and colleges are helping young people acquire digital skills. And we need national initiatives, like the BBC's Make It Digital, that will use BBC channels to get the public excited about coding and digital creativity.

This report, however, focuses on a more local solution. Early on in our research we identified a fast growing community of what we have called 'Digital Learning Programmes' – largely young, local programmes and initiatives that work alongside or outside the formal education system to interest young people in digital making, and help them develop digital skills and secure work in the digital economy. We have identified at least 60 of these programmes, working in East London, and most of those who responded to our survey were less than three years old. This report is the first in-depth investigation of them.

Our analysis of Tech City's Digital Learning Programmes shows that they come in a wide variety of shapes and sizes. Some aim primarily to give children a taste of digital creativity, while some are aimed at helping improve the life chances of young adults, and a third group work to help digital companies by increasing digital skills. Some are delivered in schools, some in the community and some in the work-place. Some provide one-off taster courses, some provide regular training sessions and some intense, full time 'boot camp' style programmes. Some are very structured but many of them are highly informal and collaborative, in keeping with Tech City culture. Some charge and some don't.

Taken together the Digital Learning Programmes make a very broad offer. It's possible for a motivated and curious young person to find their way from Code Club, which teaches the basic of coding to primary-aged children, to Young Rewired State hack days as a teenager, to drop-ins at City Unrulyversity when they have left school, to an apprenticeship scheme like {CODEZONERS}, or a boot-camp programme like Makers Academy as a young adult.

For all their differences Tech City Learning Programmes are alike in important respects. Many have grown up with the East London cluster

and have a sense of being part of it and of the local area. They tend to have a strong social purpose and an entrepreneurial can-do, ethos. Many rely on connections with the local tech community and volunteers from it. While we didn't set out to evaluate the Digital Learning Programmes individually, we believe that together they are already making a big contribution and could be making an even bigger one.

We identify three features of the Digital Learning Programmes in particular, which put them in a particularly good position to help young people develop digital skills and find work in the East London digital economy.

First, digital technologies and the type of digital skills that companies require change almost from month to month. Digital Learning Programmes have a good understanding of the latest developments and of employers needs.

Second, we found that one of the major factors explaining why few local young people look for opportunities in the digital economy is that neither their teachers nor their parents are familiar with it or point them to it. The Digital Learning Programmes are well positioned to help young people understand digital careers, and provide links to digital companies and the people who work in them.

Third, we found that most of the companies we interviewed tended to recruit from one or two tried and tested routes – most recruited from prestigious universities or through their personal networks and those of their employees. While they are open, in principle, to recruiting from a larger pool and were particularly interested in recruiting local young people, they were worried about possible risks involved. Digital Learning Programmes, especially those working with young adults, like the apprenticeship schemes, can act as a trusted recruitment source – a growing cohort of young people have been through programmes schemes and are now successfully employed.

We don't want to over claim what the Digital Learning Programmes can achieve. There is only so much extra-curricular programmes can teach. Nevertheless we believe that they have an important contribution to make and that they deserve greater support.

This report ends with a series of recommendations, addressed at government, schools, companies and the programmes themselves.

Recommendations

We suggest:

- 1— The East London cluster should come together to develop a Digital Skills Charter setting out the range of ways digital

companies can contribute and what it means for them to be good digital citizens. We also recommend that every company that signs the Charter agrees to make an annual contribution to supporting Digital Learning Programmes, appropriate to their size and circumstance. Contributions can range from simply volunteering hours, to hosting events, to funding support and taking on trainees or apprentices. The digital cluster should gather together once a year to celebrate the best examples of digital companies working to the standards the Charter sets out.

2—The Department of Business, Innovation and Skills, National Apprenticeship Service, and the GLA (Greater London Authority) should continue to work with Small and Medium Sized Enterprises (SMEs) to develop more flexible, fit-for-purpose apprenticeship schemes for smaller companies in the digital sector and closely follow the work of the Innovation Lab Project.

3—Digital SMEs should actively engage with the Trailblazers programme to develop training schemes and funding models that work better for them.

4—The GLA should increase the target number of digital apprenticeships in London, with more support from the LEP on strategies to achieve those targets.

5—Sector bodies should use their influence to support Digital Learning Programme growth and help companies understand how they can best support these Programmes.

6—More Digital Learning Programmes should be included in professional networks like Tech London Advocates. These should promote Digital Learning Programmes as a means to addressing the skills gap.

7—Companies and Digital Learning Programmes to foster more open innovation as part of working together, through ‘hack-day’ type events where young learners engage with real world commercial problems and develop solutions.

8—Specialist digital careers advisors should be created. Based in Tech City they would deliver advice in the surrounding boroughs about Digital Learning Programmes and careers.

9—Where appropriate Digital Learning Programmes develop and award ‘badges’ to recognise and accredit young people’s digital skills and achievements. Professional networks like LinkedIn should make space for badges on profile pages. When recruiting, digital companies should take into account badges alongside formal qualifications.

10—The annual OpenCo event, which opens up the doors to startups and digital companies across the UK one day a year, develops OpenCo Junior into a significant annual event.

11—The GLA and London Councils leads efforts to make it easier for schools to make sense of the variety of Digital Learning Programmes and ensure that schools are getting the best from them.

12—The GLA and London Councils lead the coordination and consolidation of London Digital Careers events creating a clearer offer for employers, Digital Learning Programmes, schools and young people.

13—All Digital Learning Programmes should continue to monitor and demonstrate their impact, through methods appropriate to their scale.

INTRODUCTION

Digital technology is transforming our lives but also our economy. Indeed what has become known as the digital economy – the part of the economy focused on developing and maintaining digital technology and digital content – is one of the fastest growing economic sectors in advanced economies in general and in the UK in particular. A report by the Department of Business, Innovation and Skills in 2012 put ‘digital, creative and information services’ at contributing 4.5% of national GVA, only 0.3% behind retail.⁴

But this new economy is being held back by a shortage of workers with the right skills. Indeed it is widely argued that this skills shortage is now the most important factor holding the digital economy back. The search is on to find ways of helping young people in particular develop digital know-how and guide them to digital careers.

But might the skills gap also be an opportunity? Over the last decade the digital economy has taken a city turn. In its early, pioneering days, the computer industry was not a particularly urban phenomenon. The first firms grew up on university campuses and moved to science parks and sprawling suburbs – most notably Silicon Valley.⁵ But that has changed, in part because the digital economy is fusing with other more urban economic sectors, including design, fashion, film, advertising, business services and finance. Moreover, digital companies often choose to locate in poorer areas, with cheaper rents and a hip urban vibe that appeals to their young, creative workforce. These areas often have high youth unemployment.

City governments have tended to welcome and try and promote the digital sector where it develops in their cities. Digital companies pay their high skilled workers well, and their presence can help boost a city’s economy, bolster its tax base and improve its employment rates. But the development of a digital cluster in a poor neighbourhood can be a mixed blessing. As well as bringing jobs and money it can push up property prices, so squeezing local residents out or marginalising them. Gentrification has become a very live issue in some cities, most notably San Francisco, where the tech economy has been blamed for rocketing property prices. Buses transporting Google workers from fast gentrifying city neighbourhoods to Google’s headquarters in Silicon Valley have had to run the gauntlet of protesters chanting ‘GET OUT’, where GET stands for ‘Google, Evictions, Technology’.

But could young people from the poorer communities around emerging digital clusters provide employers with the talent they are looking for? Could we create a win-win future, where the urbanisation of the digital economy does not only drive up property prices and promote gentrification, but provides new opportunities for local

communities? Certainly there is growing interest, among city governments and from within the digital economy, in findings ways of opening up work opportunities and helping less privileged young people secure a future in it. As Tim Berners Lee said of the worldwide web in his live tweet at the opening ceremony of the 2012 Olympic Games in East London, ‘this is for everyone’.

The London Story

London provides a good case study of the trends, challenges and opportunities described above. While the digital sector does not loom as large in London’s economy as it does, say, in San Francisco’s, it has grown rapidly in the last decade. Between 2009 and 2013, the digital sector in London created three times as many jobs as it did in the period 2005–2009 (39,000 compared to 11,000).⁶ In areas like FinTech, the capital has become a global leader. London has an estimated 44,000 workers in FinTech, ahead of the 43,000 in New York and 11,000 in San Francisco and the Silicon Valley.⁷ And as with other cities, the development of London’s digital economy is being held back by an acute shortage of digital skills.

Here too the digital economy has tended to take off in old and run-down areas of the city. Indeed it has mainly centred around inner East London – an area close the City of London that has long attracted poor migrants.

While the rise of the East London cluster – ‘Tech City’ to give it its official title – has not provoked high profile public protest, there is a widespread concern around the resurgence and gentrification of the area. Recent proposals for new residential and commercial developments in the heart of Shoreditch have met with intense local resistance, with Hackney council itself launching a ‘Save Shoreditch’ campaign. These concerns are not just limited to Tech City outsiders; many within it are also committed to the creation of a more inclusive cluster.

Connecting Tech City

It is against this background that Centre for London and a large group of partners have spent the last year developing the Connecting Tech City initiative. The aim of the initiative is radically to increase the number of young East Londoners developing digital skills and securing a future in the local digital economy.

More particularly, the initiative has three interconnected strands:

Firstly, it aims to support and grow networks of organisations, including companies, schools, colleges, charities, social enterprises and

local authorities committed to creating a more inclusive tech cluster, and promote collaboration between them.

Secondly, it aims to create and maintain a digital platform that will serve as a directory of local learning and digital job opportunities in the Tech City area. With information on all the many digital workshops, courses, and apprentices and professional training options available in East London, the platform is aimed first and foremost at local East London young people.

Thirdly, it set out to undertake research on the question: what more can be done to develop and engage local digital talent and help local young people find work in Tech City?

While the Connecting Tech City initiative has focused firmly on East London, we hoped that it would have wider application – that lessons learned from it would be useful to digital clusters elsewhere in the UK and beyond, and even perhaps to other economic sectors facing similar challenges.

As of writing in March 2015, Connecting Tech City has made good progress on all fronts:

Much of the funding for the project was raised through an online crowdfunding drive to which over 150 individuals and organisations donated. Contributors included local schools and colleges, charities, and small and large companies with a stake in the area. Other partners came on board after the end of the online drive, many making substantial monetary or in-kind contributions. 1,200 people now receive the Connecting Tech City newsletter, including 287 local schools.

A new digital platform – wearedotdotdot – is being launched following this report. At launch it will feature at least 60 Digital Learning Programmes, though we expect that number to grow as new programmes are set up or existing ones join the network.

This has included the establishment of the Tech City Fellowship – an initiative from leading companies in the sector to help young Londoners access the highest quality Digital Learning Programmes.

This report represents the culmination of the third strand. It is based on an extensive literature review, over 60 interviews with young people, and focus groups with Digital Learning Programmes and digital companies.

Report Focus – Digital Learning Programmes

So what can be done to help young people growing up around the digital cluster benefit from it?

Clearly curricular learning has an important role to play, but our research does not focus on this. The government has recently introduced a major overhaul of the ICT curriculum, which has been warmly welcomed by the digital sector; there is understandably little appetite for further curricular reform before current reforms have had time to bed down. Our research also suggests that formal teaching can only play a limited role in meeting the digital skills gap; the world of digital technology and the digital economy is both new and very fast moving, and it is very hard for teachers, most of whom are necessarily somewhat removed from the tech world, to keep up with the latest needs of the digital sector and to help young people into it.

But if the formal education system cannot alone bridge the skills gap, how else might this be done? Early on in our investigations we became interested in the contribution that what we call ‘Digital Learning Programmes’ could make to addressing East London’s digital skills gap. These programmes have developed hand in hand with the East London cluster and there is now a large number – we have identified more than 60 of them. The more we looked at the East London Digital Learning Programmes, the more we came to believe that they had an important contribution to make. In fact, we can see examples of the mainstream education system beginning to absorb the practices of these programmes, much as mainstream theatre absorbs innovations from the fringe. This report focuses on the transformative role that those Digital Learning Programmes can play.

Digital Learning Programmes are education or training programmes that aim to expand digital skills (such as programming or digital marketing), and are delivered by non-traditional providers (such as digital companies, or specialised digital charities). While some of these programmes are delivered *in* schools and universities, they are not delivered *by* them. Digital Learning Programmes come in various shapes and sizes: some are motivated primarily by a desire to address youth unemployment and promote social mobility, while some are aimed mainly at helping tech companies secure digital talent; some work with younger children, some with young adults; some are delivered free, and some charge fees. But despite the difference between them, they share important features in common: most of them are young and relatively small; they have come out of the Tech City cluster, have been shaped by it and remain part of it (and as such they tend to be entrepreneurial and innovative in nature, and focused on making

a practical difference); they understand how Tech City companies, entrepreneurs and employers like to work and they are good at drawing in their support, in the form of funding and volunteers; and they have a much better understanding than most schools and colleges of the fast changing digital landscape, the needs of digital companies and career pathways into them.

This report provides the first in-depth analysis of the development of the East London Digital Learning Programmes. While we have restricted our focus to East London, we have worked with quite a broad understanding of East London – we have surveyed programmes based in the core boroughs of Islington, Hackney, Tower Hamlets and Newham, and programmes that work in these boroughs which may be based outside. Because we wanted to understand the nature and potential of locally-focused skills programmes, we have also excluded online-only programmes from our study although there are many valuable ones, a selection of which appear on the *wearidotdotdot* platform, including Tech City UK’s recently launched Digital Business Academy.

This report asks three questions in particular:

- How many Digital Learning Programmes are already operating in the area, and what is the nature of their offer?
- What are the barriers to young people’s involvement in Digital Learning Programmes?
- What are the barriers to their expansion?

Methods

Our research for this project had three components: interviews in schools and FE colleges; a survey and focus groups with Digital Learning Programmes; and focus groups with digital sector companies.

Schools and FE colleges

We conducted interviews with 60 young people across eight secondary schools, two FE colleges, and one digital careers event.⁸ Interviews were semi-structured, and lasted between 8 and 25 minutes depending on participants’ age and depth of knowledge and experience around digital technology. Most interviews were one-on-one, but we also carried out three group interviews. Interviews were audio-recorded for analysis, except in one school where circumstances did not allow this. We also interviewed teachers in eight secondary schools, including at least one

computing teacher in each. In six schools we also spoke to a careers advisor and/or staff member responsible for external relations.

Digital Learning Programmes

Our research with Digital Learning Programmes had two stages. Firstly, we developed a list of programmes working in the area. This involved an extensive snowballing exercise – identifying new programmes, and then using their networks to identify further programmes. We then invited the programmes to complete a written survey. Twenty three responded. Secondly, we ran two focus groups to explore the findings of this survey in more detail. We ran one with programmes delivering locally in East London, and one with programmes operating on a national scale. Representatives from eight programmes attended.

Digital companies

The final component of our research involved focus groups with companies working in the digital sector. We ran three focus groups: one with tech SMEs (broadly focused on hardware); one with digital SMEs (broadly focused on software or content); and one with larger digital companies, or ‘corporates’. We also conducted several one-to-one interviews with non-digital corporates employing large numbers of digital staff. Most of these companies had a presence in East London, although we also included two based elsewhere in the capital.

Structure of the report

The first chapter of this report addresses **the cluster and the skills gap it faces**. We discuss in detail the nature of the cluster, the extent of the skills shortage and its impacts, and the cluster’s social context. We conclude with a brief overview of the efforts already in place to address the digital skills gap.

Chapter two **describes and categorises the Digital Learning Programmes** currently operating in the area: their origins, aims, format and how they are delivered. Through this chapter we aim to provide a rich picture of the network of provision that has developed in East London and expose the work being done by Digital Learning Programmes to a new audience.

Chapter three outlines **three key characteristics of Digital Learning Programmes that make them well positioned to contribute to solving the digital skills gap**, and highlights the important role they can play.

Chapter four then reflects on **how the growth of Digital Learning Programmes can be supported** – focusing on their relationships with industry, young people, and schools.

As we set out, we believe that the programmes we have studied are already making an important contribution to the dual objectives of helping local young people develop digital skills and helping East London meet its skills challenge. But we also believe that with the right support they could do much more. So this report ends with a series of **recommendations** for national and London government, schools, digital companies and Digital Learning Programmes themselves.

Throughout we have focused very deliberately on the East London cluster, but it should be clear that our research findings and recommendations have wide application. There are already many other digital clusters throughout the UK and beyond constrained by a lack of workers with the right skills. Yet there will be no shortage of children and young people in the areas where these clusters have developed who could benefit from gaining digital skills and who could, in turn, help the growth of the these clusters. Local versions of East London's Digital Learning Programmes could help build connections between digital companies and local young people.

We are very pleased that Tech City UK and other organisations with a national remit have supported the Connecting Tech City initiative, and hope to work with them in applying its lessons and insights more widely.

1

EAST LONDON'S DIGITAL ECONOMY: COMPANIES, SKILLS AND LOCAL CONTEXT

We discuss in detail the nature of the cluster, the extent of the skills shortage and its impacts, and the cluster's social context.

Defining East London's digital economy

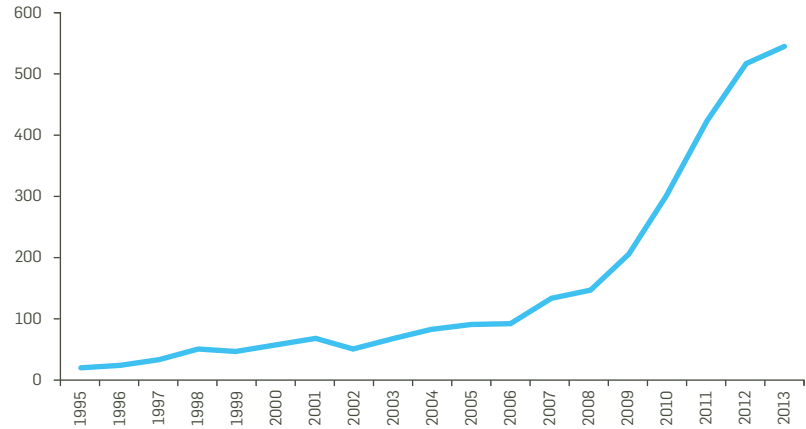
This report uses a broad definition of the digital economy. We understand it to include the 2010 BIS/DCMS definition encompassing information and communications technology (ICT) (systems, hardware, software, and related services such as maintenance) and 'digital content', including publishing, design, music and advertising.⁹ But we also include companies operating in well-established sectors that have gone or are going digital, such as banking and retail. We will use the terms 'digital economy' and 'digital sector' interchangeably in line with this broad definition.

Our 2012 report, *A Tale of Tech City*, mapped the digital economy in Greater London and identified a core cluster based on nine wards spanning Islington (Bunhill, Clerkenwell, St Peter's), Hackney (Haggerston, Hoxton), the City of London (Bishopsgate, Cripplegate, Portsoken), and Tower Hamlets (Spitalfields, Whitechapel). However, business clusters are not static and a number of factors, such as rent increases, can lead to changes in business location over time. In London, we see the cluster widening westwards towards Kings Cross and to the QE Olympic Park in the east. The boundaries of a cluster are also porous – ideas, goods and services and people are continually crossing them, and interacting with the broader digital economy. In light of this we focus here on the broader East London digital economy, including boroughs that neighbour the core cluster. From hereon, we refer to this as 'the cluster'.

Companies in the cluster

Recent research by Tech City UK found that inner East London is home to 3,280 digital companies, 7% of those in the UK,¹⁰ employing over 250,000.¹¹ According to the same research, the largest proportion of companies – around one in five – focus on software development, while web design and eCommerce also have a significant presence.¹² Indeed the cluster owes much to the strength of London's creative industries; some of its best-known successes – Moshi Monsters, Made.com, Unruly Media – have emerged as hybrids bridging digital and creative industries. The great majority of companies in the cluster are small or medium in size and most are young. Although the number of new digital companies starting in the area has been growing since the mid-1990s, there was a particularly marked increase in the pace of this growth between 2008 and 2011, when the number grew by over 40% year on year (see Figure 1).

Figure 1: Number of new companies formed in Inner East London



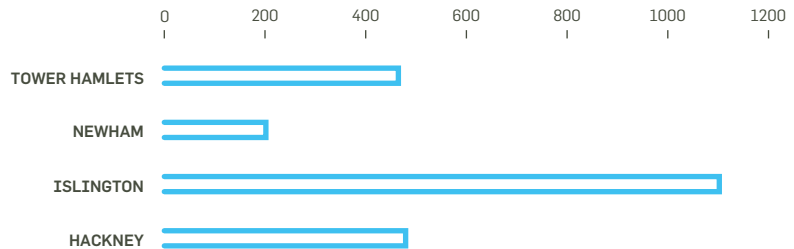
Source: DueDil – Tech National: Inner London – East: Timeline. Retrieved from www.duedil.com/technation/2015/regions/ukds-nuts3-uki12/inner-london-east#business-keywords 17/02/15.

Note: 'new companies' includes mergers and acquisitions.

While much of the cluster's growth has been driven by startups, it has been further boosted by established corporates moving some of their operations there. Larger established companies value being part of the cluster – close to the talent and innovation associated with it. By way of example, Aviva, Microsoft, and Barclays have all established a presence in East London, and Amazon are opening a 15-storey office building near Liverpool Street in 2017.

Digital companies are spread unevenly across the four core 'Tech City' boroughs. The first wave of startups centred around Old Street, on the borders of Islington and Hackney. More recently the cluster has spread to Tower Hamlets and Newham, including to the area around the new QE Olympic Park.

Figure 2: Number of digital companies in East London boroughs



Source: DueDil – Tech National: Inner London – East: Timeline. Retrieved from www.duedil.com/technation/2015/regions/ukds-nuts3-uki12/inner-london-east#business-keywords 17/02/15.

The skills gap

There is a growing concern across UK industry about a shortage of people with the skills that our fast changing economy requires. Sherry Coutu's 2014 *Scale-up Report* identified the skills gap as the *number one* barrier preventing high-growth companies from scaling, and this is particularly pronounced in the digital economy.¹³ Not all digital companies are high-growth scale-ups, but the problem around lack of skills persists across the digital sector – in 2011 digital as a whole had the worst shortage of any sector, with one in every twenty vacancies unfilled.¹⁴ Of hard-to-fill vacancies in the sector, nine out of ten were skills shortage vacancies – vacancies that result from lack appropriately qualified people, rather than from churn.¹⁵ These shortages do not just affect digital companies. Across industries, 21% of skill-shortage vacancies were unfilled due to applicants lacking advanced IT or software skills.¹⁶ In terms of particular skills, research suggests that the highest demand for digital skills the East London cluster is for coders and developers. Web design and user experience (UX) skills are also in short supply.¹⁷ Across the sector as a whole, cyber security is also increasingly difficult to recruit for, despite its obvious necessity across digital.¹⁸ While marketing professionals are not difficult to find, people with a good understanding of, and experience with, *digital* marketing are also hard to recruit.¹⁹

These findings were corroborated by the companies we interviewed. However another issue emerged from our interviews. Many companies said they were looking not only for people with digital skills, but with broader entrepreneurial attitudes and business skills, especially at senior levels. Companies increasingly want creative, autonomous and flexible, 'multi-layered Renaissance people' – polymaths whose skills stretch beyond the purely technical.

"We want specialists, but we're focusing too much on coding and not around the skills you need to make companies work – a jack of all trades."

Digital corporate

"Tech used to be insular but now you need a really diverse skill set and extensive knowledge of what colleagues are doing as you're collaborating on a solution."

Digital corporate

The hiring problems faced by companies are inhibiting growth in the sector. Research by GfK found that 77% of companies in Tech City said that they would be able to grow faster if they had access to people

with better skills,²⁰ and across the UK 68% of digital sector companies reported that hiring difficulties were impeding the development of new products and services.²¹ This is significantly higher than the economy as a whole (41%).²² With the digital economy expected to expand rapidly over the next decade²³ this skills gap is likely to become even wider, causing more damage to the sector's growth. A report by O2 estimates that between 2013 and 2017 the UK will need an additional 745,000 workers with digital expertise.²⁴ On current trends, this is set to leave between 13,000 and 21,000 unfilled vacancies by the end of the period, costing the UK around £2 billion a year in lost GVA.²⁵ Between 2015 and 2020, the European Commission estimates that the UK will have the largest digital skills shortfall in the EU.²⁶

In London, forecasts suggest that the digital sector could expand by 46,000 jobs by 2024.²⁷ The capital has a lot to gain from the digital economy: technology, media and telecoms companies are most likely, among UK businesses, to say that they have plans for increasing their London headcount.²⁸

Efforts to close the skills gap

A wide array of reforms and initiatives have been or are being introduced to try and close the digital skills gap. National government has recently introduced the computing curriculum into primary and secondary schools. This reform has been widely welcomed by the digital sector. However, results will be slow. Schools need time to learn to deliver the curriculum well, and many teachers are not yet confident in their abilities to teach it. In the 2014 CAS survey 47% of pupils said their teachers needed more training on computing²⁹ and research by CAS and Microsoft found that 41% of students admitted to helping their teachers on technology issues.³⁰ It will be nearly seven years before the first cohort who have studied the curriculum throughout their secondary education reach the workforce. Changes to formal education are being supplemented by other moves; the BBC Make It Digital initiative, for example, is working across the BBC channels to encourage more people to get creative with coding, programming and digital technology.³¹

There are also several pieces of relevant research which are being conducted on a city-wide and national level examining the skills gap. In the summer of 2014 the Digital Skills Task Force, led by Maggie Philbin, reported on a country-wide consultation with teachers, young people and digital companies throughout the UK. One of the recommendations in this beta report was further support for the 'tech third sector' through local level digital education/business partnerships co-ordinated through online platforms. The Digital Skills

Task Force will report in full after the 2015 General Election with more recommendations on how businesses can support digital learning in schools.

Ongoing government reform to the apprenticeship programme opens up new opportunities. The new Employer Ownership of Skills Programme will allow employers to work together to pull down funding and design training schemes tailored to their needs and the needs of their apprentices. Plans are underway to set up an Innovation Lab with leading employers to rapidly test and prototype ideas for developing apprenticeship models in the digital sector. There are already a number of proven apprenticeship schemes in East London successfully placing young people into Tech City jobs, but the number of placements so far has been small. Despite digital employment shares in London being around 15%,³² only 4% of apprenticeship starts in London in 2014 were categorised as being in the ICT sector.³³ The Employer Ownership of Skills programme could be a major boost to tech apprenticeships.

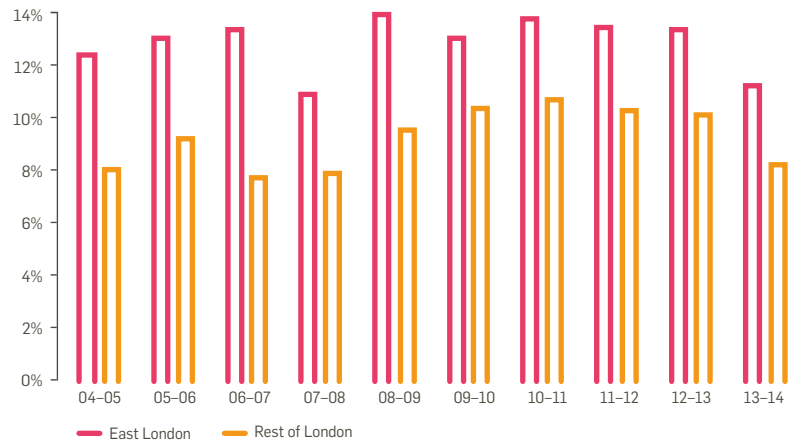
London government is also engaged in efforts to address the city's shortage of workers with digital skills. The London Enterprise Panel (LEP), chaired by the Mayor, has identified London's science and tech community as an important driver of innovation, jobs and growth.³⁴ One of the main aims within their *Jobs and Growth Plan* is to ensure that Londoners have the STEM (science, technology, engineering and maths) skills that companies need. In order to achieve this, the Mayor plans to double the number of science and tech apprenticeships by 2016.³⁵ The LEP is also looking at how to invest up to £120 million in FE for innovative projects aimed at meeting the capital's skills needs.³⁶ It has just allocated £5 million to The Digital Skills Programme, to support East London secondary schools improve their delivery of digital skills and engage with the tech sector.

The 'Olympic Growth Boroughs' – Barking and Dagenham, Greenwich, Hackney, Newham, Tower Hamlets and Waltham Forest – have been putting together a joint economic development strategy aimed at securing a legacy for residents. Their principal objective is to achieve 'convergence' with the rest of London, moving skills and employment levels towards the average for the city. There are some major developments, like Here East, a new commercial venture in the QE Olympic Park, which is expected to create 7,500 jobs by 2018, mostly around digital, tech, IT, design, media and TV production.³⁷ However, the degree to which local communities will actually benefit remains to be seen. The growth boroughs have a long history of disadvantage to reverse.

The Social Challenge

As already mentioned, the East London cluster has developed in one of the most deprived areas of London. Inner East London has historically had a high proportion of newly arrived, poor immigrant communities, with a labour market characterised by low-skilled, low-paid work. While the nature of local employment has changed significantly since the closing of the area's docks and factories in the 1970s, poverty and low skills have persisted. As Figures 3 and 4 show, the area has higher levels of unemployment and low pay than the rest of the capital, and as a result higher levels of premature mortality (see Fig. 5). The development of the cluster could clearly help tackle this longstanding deprivation and exclusion, by securing a future for local people, especially local young people, in the digital economy, but this is by no means the only or even the most likely scenario. After all, the poor communities of Inner East London have long rubbed shoulders with the City of London, and more recently Canary Wharf, but have found only limited employment opportunities.

Fig. 3 Graph of unemployment rates in the east boroughs vs average across the capital



Source: Data taken from London's Poverty Profile (2013). Retrieved from www.londonspovertyprofile.org.uk

Fig. 4 Graph of working family tax credits – east boroughs vs capital average



*The family element is a universal base level. Families receiving more than the family element are those who need tax credits to lift them out of poverty.

Source: Data taken from London's Poverty Profile (2013). Retrieved from www.londonspovertyprofile.org.uk

Fig. 5 Graph of premature mortality rate



Source: Data taken from London's Poverty Profile (2013). Retrieved from www.londonspovertyprofile.org.uk

California's Bay Area provides a warning of what can occur when divisions between the digital community and local groups are allowed to grow. The protests around Google buses, which take employees from their homes in San Francisco to their jobs 40 miles away in Silicon Valley,³⁸ and a video which went viral in 2013 of tech employees kicking local kids off a football pitch in a rapidly gentrifying neighbourhood,³⁹ exemplify the social schisms which are forming in the city as high-value clusters fail to engage with communities.

Our interviews with young people revealed a complex picture. On the one hand most young people were hardly aware of the cluster's development or local opportunities in the digital economy. On the other hand, most of the young people saw the digital economy more widely as one that would be open to them. There was a strong sense, among both boys and girls, and across ethnic groups, that hard work and skills would be what mattered, and background would not hold them back.

2

MAPPING THE DIGITAL LEARNING PROGRAMMES

As the last chapter set out, the East London digital cluster has developed in an area characterised by high unemployment and low pay. At the same time the cluster faces a major skills shortage.

Early on in our research, we identified a number of new initiatives and programmes growing from within the cluster itself, which aimed to help young people develop digital skills and secure a future in the digital economy. We have identified at least 60 of these programmes. The rest of this report analyses these ‘Digital Learning Programmes’ and explores the contribution they could make to helping East London meet the double challenge of high levels of social exclusion and the digital skills shortage.

The East London Digital Learning Programmes are relatively informal programmes that work outside of the school curriculum to teach digital skills. These Programmes tend to share certain traits in common. Almost all of them have grown up within the East London cluster and have a sense of being part of it and of the local area. They have been founded by enthusiasts who understand digital technology and want to share its possibilities. They are both entrepreneurial and social in character – reflecting digital startup culture, they tend to be fast on their feet, innovative and focused on making a practical difference. Many rely on volunteers from the local digital sector. Most of the Digital Learning Programmes are new or very young: of the 23 who responded to our survey, three quarters were less than three years old.

But while the programmes have a strong family resemblance, they also differ in some respects. Indeed this is part of their strength – the programmes work in different ways and cater to different groups, and in this way make a very broad offer – it does not matter what age you are, your level of attainment or your work situation, if you live in East London, the Digital Learning Providers will have something that will work for you.

The rest of this chapter analyses these Programmes in greater detail. We suggest they can be classified along five key axes:

- aims;
- target group;
- format;
- content;
- delivery.

Examples and case studies are used throughout to illustrate the different types of Digital Learning Programmes.

Aims

Our research identified three broad motivations among the learning programmes: firstly, supporting schools in delivering creative teaching around digital skills; secondly, advancing social mobility and creating a more inclusive society by helping local young people secure a future in the digital economy; and thirdly by helping the digital economy by increasing the supply of people with the skills it requires. While many Digital Learning Programmes aim to realise all of these objectives, most began with a focus on a particular goal.

The Tech City Stars apprenticeship scheme is an example of a Digital Learning Programme motivated primarily by the aim of promoting social equity (see Box 2). The scheme aims to provide a route into the digital economy for young people without the social and professional networks that are important in breaking into the tight-knit local digital cluster. Another example is Freeformers, which was set up explicitly to engage a much wider group of young people in digital skills. Their interesting one-to-one model uses fees from corporates to receive training from digitally savvy young people to go on and train other young people.

Box 1: ELATT

Aims: Social equity.

Approach: Qualifications and experience.

Format: Mixture of free for participants and earn and learn opportunities. Full time apprenticeships, traineeships, and classroom courses.

Content taught: CMS; Photoshop; Flash; ecommerce; UX principles; search engine optimization; app design; software testing; CISCO Essentials.

Delivery: Stand alone.

ELATT is one of the oldest Digital Learning Programmes in East London. Founded in 1984 by a group of teachers, it worked to connect local disadvantaged communities with the technology revolution. This mission has remained at the core of ELATT's work through basic digital literacy classes to help ensure that disadvantaged communities are equipped to operate in a world where things like job searching and government services are increasingly online.

ELATT also offers more advanced vocational training aimed at giving people the skills and experience necessary to move into the tech sector, in hardware support, web development and a web design appen-

ticeship delivered with Morgan Stanley. This partnership was originally facilitated through the East London Business Alliance, and has been very successful. The scheme is now on its fifth iteration, and one former apprentice has now reached Associate level, and is supervising the two current apprentices.

In addition to training young people, much of ELATT's work focuses on supporting companies who want to take trainees but are often not trained in integrating people who lack previous work experience. A clear understanding of responsibilities and support makes for valuable placements for all parties. ELATT is firmly embedded within the more traditional infrastructure around education and employment – some students come from referrals from Hackney Council's Education Advice Service and Job Centre Plus – but ELATT is also engaging with emerging infrastructures, sending participants on to other non-traditional programmes.

“We want to continue offering young people the most up-to-date opportunities, and we see the Digital Learning Programmes as key to this. We've had several participants move on to Tech City Stars, and these links really expand on and further the scope of our offer.”

Box 2: Tech City Stars

Aims: Social equity.

Approach: Experience.

Format: Earn and learn. Full time apprenticeship.

Content taught: Core business skills; web and software development; ICT systems and networking; digital marketing operations.

Delivery: Stand alone.

Tech City Stars offers apprenticeship schemes in web and software development, IT systems and networking, and digital marketing. It was founded in 2012 by a partnership between local tech entrepreneurs, a Shoreditch social enterprise and an established provider of apprenticeships. Its founders were responding to an “opportunity divide” where local young people had no way of breaking into the tight-knit community of businesses based around personal and academic networks. Tech City Stars looks for young people who are excited about tech, the kind of people who spend their time building programmes and contributing to open source software, but who lack the networks and information to find ‘ways in’ to the sector. To do this, they run an extensive community-based recruitment programme – going into schools, colleges, churches,

and mosques to connect with young people. Having run recruitment programmes over several years, including online marketing campaigns, Tech City Stars has strengthened its profile and firmly established itself with key institutions for young people. However, a challenge remains in engaging key stakeholders – schools, colleges, and companies – and persuading them of the value of tech apprenticeships.

An example of a programme aimed primarily at closing the skills gap is provided by General Assembly, which delivers very targeted professional training courses, responding to employers' requirements (See also Makers Academy Box 4 and City Unrulyversity Box 5). {CODEZONERS}, a full-time course at Ravensbourne, is another example. Students are in class two days a week and spend three days on industry work placements, a hybrid of traditional education and the tech industry.

A programme established to help schools deliver creative teaching around digital skills is Code Club – a nationwide network of after-school clubs (see Box 3). Code Club was founded in response to a perceived deficiency in what schools were able to teach. Run by a mixture of teachers and volunteers, they teach coding through challenge-based learning. While programmes supporting schools pre-dated the introduction of the computing curriculum in schools, many have now updated what they deliver to fit in with schools' new teaching objectives (see Technology Will Save Us, Box 6).

Target group

Digital Learning Programmes can be classified according to the age group of the young people that they aim to serve. Some, like Code Club, work with younger age groups and focus mostly on developing an interest in the digital world and introducing young people to the culture of digital making (see Code Club, Box 3). Other programmes focus mainly on older age groups and focus on providing young people with digital work experience and 'work ready' digital skills. Examples include programmes which provide apprenticeships and work placements, and those that help young people acquire specific qualifications and credentials to equip them for jobs in the digital sector. Some programmes deliver a mix of these latter two – AppsCluster, for example, runs a 12-month apprenticeship scheme as well as shorter part-time accredited units around iOS and Android development.

Box 3: Code Club

Aims: Closing the skills gap, supporting schools.

Approach: Socializing young people into digital creating.

Format: Free for participants. Regular weekly sessions.

Content taught: Programming; computational thinking; problem solving; collaboration and sharing; design.

Delivery: After school clubs.

Code Club is a nation-wide network of volunteer-led after-school clubs delivering across the country for three years. A startup born in East London's tech cluster, Code Club now delivers 2,273 clubs in primary schools, including 300 in London. It aims to give children access to learning coding, to kick-start an interest in digital technology that they'll build on. Schools are a crucial delivery avenue for Code Club, who wanted to slot into the existing infrastructure and model of after-school clubs which is widely accessible to children and convenient and familiar to parents. Clubs are run by teachers with Code Club staff and volunteers from the tech sector, and use challenge-based learning to teach computer science concepts and have students apply them throughout the weekly course. Volunteers bring industry knowledge, role-modelling and, crucially, enthusiasm to Code Clubs, and are engaged by the fun, sense of giving back, and broader perspective it gives them on their own jobs. In addition to this small army of volunteers, Code Club relies on public sector grants and corporate support, currently supporting the development of its regional infrastructure which will enable a huge expansion of provision, aiming to cover 25% of primary schools by the end of 2016.

There are also programmes which address real-work situations for participants through 'hack days' or open innovation events – these straddle the space between early years engagement and introduction to working environments and challenges.

There is a particularly strong cohort of programmes offering training and networking specifically for girls and women. Tech Future Girls is an after-school club designed specifically with girls in mind. Code Bar is a free weekly workshop run by female developers who want to share their knowledge. Stemettes is a targeted schools programme to engage young women across STEM subjects. Girls in Tech London run open monthly events to raise the visibility of women in tech.

Format

The learning programmes are delivered through events and courses which vary in intensity. Some are delivered through one-off events, like ‘hack-days’, workshops or annual festivals like Young Rewired State’s *Festival of Code* or *MozFest*. Others deliver more regular meet-ups and drop-ins where content is incremental but where learners can pick and choose from what is on offer. Coderdojo, which runs drop-in sessions for people between 7 and 17 years old, is an example of this. Volunteers teach programming and web/games development, while participants are given the chance to experience the creativity and sociability of the ‘maker’ world. Diverse Digital and Geek Girl meet-ups are also more like clubs for hobbyists and networks rather than structured courses. Digital Learning Programmes that do run courses offer both part-time and full-time. The Mobile Academy, for example, provides professional training two evenings a week during the length of their course. Full-time courses range from apprenticeship schemes to intensive bootcamps run by companies like Makers Academy (see Box 4).

Box 4: Makers Academy

Aims: Closing the skills gap.

Approach: Qualifications/work experience.

Format: Participant fees. 12 week course.

Content taught: Software development, including coding, communication skills and team-working skills.

Delivery: Stand alone.

Makers Academy is an intensive 12 week software development course founded by a Chief Technology Officer (CTO) who couldn’t recruit junior developers with the skills he needed, and an aspiring entrepreneur who found university too expensive and theoretical, and teaching himself too inefficient. They both saw the traditional avenues into the sector failing. The course at Makers Academy responds rapidly to industry needs, updating content every six weeks, for example by shifting emphasis between programming languages so that students enter the job market with the skills most in demand. A place on the course costs £8,000, with a discount for women to promote diversity. The business model relies on an ability to deliver the junior developers required by industry, as companies who recruit through them also pay a hiring fee. While there was an initial challenge in persuading companies that they could deliver a quality junior developer after only 12 weeks, the growing list who do hire through them –

including Deloitte Digital, Marks & Spencer and JustGiving – is now an impressive one.

“Since we started Makers Academy, there hasn’t been better time to start a career as a developer. Companies are rushing through our doors looking to hire our graduates. Our biggest problem to date is still to make the course more accessible, opening the opportunity to those who can’t afford it. We’re hoping that the Tech City Fellowship will help address this issue, or hopefully, that the government soon realises our successes and provides our students with the standard University Student Loans.”

Costs also vary. The majority of programmes we surveyed were free for participants, but some charge either participants and/or employers. These tend to be the professional training courses. Some offer students the ability to earn while they learn. These include apprenticeship schemes and programmes like Aha Studios who mentor freelancers through real world commercial projects.

In the table below, we have plotted the twenty three that responded to our survey according their format.

Table 1. Format of programmes surveyed [JP1]

	PARTICIPANT FEES	FREE	EARN AND LEARN
ONE-OFF	2	5	0
REGULAR SESSIONS	0	8	0
PART TIME	0	2	4
FULL TIME	1	1	5

Source: Centre for London survey (Base: 23 respondents, some programmes offering multiple courses with different time frames/costs)

Content

There is a great deal of variation in what is taught by different programmes. Most of those we surveyed focused on technical skills, primarily coding and programming. Other skills taught include user experience, data visualisation and design, digital marketing and social media, and app and web design. Unsurprisingly, given the industry-led nature of the Digital Learning Programmes, these areas reflect the current shape of the developing markets and the areas of shortage that tech companies are facing. Programmes like Fluency, for example, are responding directly to sector shortages

in digital marketing by training young people specifically in SEO, Content Marketing and Social Media. Other programmes aim to develop workplace skills such as communication, project management, teamwork and client relationships.

A third category of programmes provide higher level skills. One example of this is City Unrulyversity (see Box 5), a pop-up university which runs courses on business skills for digital entrepreneurs. Unrulyversity is open to anyone, but its target audience is startups and entrepreneurs, many of whom will be graduates.

Box 5: City Unrulyversity

Aims: Closing the skills gap.

Approach: Experience.

Format: Free for participants. Regular sessions.

Content taught: Marketing; entrepreneurship; innovation; startup finance.

Delivery: Through a partnership between City University London and Unruly Media.

City Unrulyversity is a free pop-up university run by City University and tech company Unruly. Unruly is one of the fastest growing startups in Tech City – one of Tech City UK’s Future Fifty – and wanted to give something back to the startup community. City University were also keen to support the Tech City community their students would likely move into. Weekly sessions are built into short series on topics such as marketing, new platforms and coding languages and business development. Teaching is led by university staff paired with experts working in the industry whenever possible, producing a synthesis of academic teaching and industry insights rarely found in Tech City. City Unrulyversity is open to anyone, in keeping with the collaborative culture of Tech City and the value of free education.

“Universities have a lot of knowledge and resources to offer and play an important part in supporting the Tech City ecosystem. But we need to think outside the box in order to effectively interact with this start-up community, and be prepared to do things a bit differently – City Unrulyversity is a good example of that.”

Delivery

The final dimension on which we compare the programmes is how and where they are delivered. A significant proportion of the Digital Learning Programmes are delivered in schools, some delivering parts of the curriculum and others, such as Teen Tech, which do not teach the curriculum but take place during school time. A second category of programmes, such as Code Club, run sessions which are advertised and delivered through the school but are delivered in after-schools clubs and are extra-curricular in nature. A third category are those which teach through educational kits such as Kano, Sam Labs – a family of technology kits that teach innovation, programming and electronic skills – and Technology Will Save Us (see Box 6) which develop materials to aid digital learning at home or at school. A fourth, and very significant, category of programmes are delivered completely detached from education institutions. Some of these take place in community settings, like Barclays Code Playground, which takes place in bank branches. Others are delivered in professional training settings, such as Freeformers, who invite businesses into their training space to be taught digital skills by young people, who themselves have been trained up through the Freeformers scheme. Other programmes respond to very local business need; Newham College Social Media apprenticeship, for example, has responded to the very specific digital needs of the local fashion industry.

Box 6: Technology Will Save Us

Aims: Closing the skills gap, supporting schools.

Approach: Socialisation and qualifications.

Format: Free for participants. Ed-tech kits delivered in class.

Content taught: Designing; coding; making; inventing.

Delivery: Stand alone and through schools.

Technology Will Save Us was founded by Bethany and Daniel, who had both worked as educators but also had backgrounds in branding and social impact and physical computing, respectively. They aimed to give people new opportunities to learn and create using technology. They began by building DIY Gadget Kits as a consumer product, encouraging people to make, play, code and invent with technology. Design is at the core of TWSU kits, building products that are desirable to all users – “*We avoid making things pink and fluffy,*” they say, “*That’s not going to engage girls. We try and engage all users through everyday*”

themes, like gardening or music or games, and those interests aren't gendered." User testing has always been used to gauge and develop the educational impact of kits, and TWSU are now also developing an ecosystem around the kit experience to support learning and help monitor progress. TWSU initially used their kits to facilitate workshops encouraging creative engagement with the making side of tech, but as educators started independently teaching a range of courses with the kits, they started developing teaching resources to support that. With the introduction of the computing curriculum, in keeping with the place of learning in their central mission, TWSU have mapped their kits onto the curriculum and developed lesson plans, tutorials and games to accompany kits that support teachers in delivering classes. Students have responded really positively to the kits, which allow them to engage with concepts they usually encounter on-screen in a totally new way. Development to meet schools' needs and learn from them is crucial – TWSU also has ambassador schools across the country using kits in their programmes and lessons and developing their own resources which are fed back into those TWSU provides. TWSU is also working in close partnership with the Ed-tech (education technology) sector in an alliance group that meets regularly, ensuring that their programmes are complementary and adding value to each other.

*"The most common feedback we get from students is "this s*** is sick."*

Collaboration

While this chapter has mostly focused on describing the differences between Digital Learning Programmes, it is also important to describe the growing links between them. Some are beginning to develop shared resources – for example pedagogical tools, teaching software, and hardware – often in the form of make it yourself 'kits', like those developed by Technology Will Save Us (see Box 6). Several programmes have recently begun pointing their graduates to more advanced programmes. For example ELATT (see Box 1) have now guided graduates from their programmes into the Tech City Stars apprenticeship. Fifteen of the programmes who responded to our survey had working links like this. This sort of referral is also happening at earlier stages, with programmes delivered in schools increasingly signposting interested pupils to things they can pursue outside of school. There is also now a consortium of eight national learning programmes (Apps for Good, TeenTech, Young Rewired State, Code Club,

CoderDojo, Code Academy, Freeformers and Technology Will Save Us) who are developing a memorandum of understanding intended to allow them to grow the market for their services and compete collaboratively. This alliance is also working to develop a shared methodology for assessing their programmes' impact.

3

**DIGITAL LEARNING
PROGRAMMES
AND THE DIGITAL
SKILLS GAP**

This chapter explores the contribution that Digital Learning Programmes can make to addressing East London's digital skills shortage.

We argue that there are number of reasons why Digital Learning Programmes are well placed to help.

Most fundamentally, these Programmes are born from the digital cluster and tend to remain part of it. Ties between the Digital Learning Programmes and the broader cluster remain strong, reinforced by a shared culture. Of the respondents to our survey, a third received financial support from businesses, and half received either financial or in-kind support. Many programmes are also supported by volunteers working in the sector.

Digital Learning Programmes offer clear benefits to companies who support them, and do so in keeping with the culture that both parties work within, enabling them to harness a shared good will within the sector. In particular, companies highlighted the benefits of strengthening their recruitment/retention and the potential of open-source innovation.

Companies we interviewed spoke about the positive effect that involvement with Digital Learning Programmes had had on staff recruitment and retention. Many spoke about workers increasingly expecting work to provide opportunities to 'do good things', particularly supporting and engaging with the community around their work.

"It's increasingly key to talent retention. All those broad things – need for community, relationships with the area you work in – are increasing, especially as millennials are entering the organisation. It's going to get close to becoming a hygiene factor going forward."

Digital Corporate

"We know if we can deliver on that [wider satisfaction], if someone can offer an extra £10k somewhere else, it's not enough to move. It's a sense of 'I work in an environment that allows me to contribute' – it's not CSR for us, that's retention."

Tech SME

Digital Learning Programmes are well-positioned to capitalise on this good will on the part of workers who can volunteer for programmes. The way the programmes teach – engaging a passion for digital, a hands-on approach, and emphasis on collaboration and problem solving – speaks to the skillset and culture of digital workers, and the desire for face-to-face ways of contribution that companies saw their staff craving.

As well as strengthening their ability to retain and recruit staff, companies also gain opportunities for innovation through working with Digital Learning Programmes. Open-source culture values collaborative innovation and creative thinking and approaches. Many companies are therefore willing to look outside their offices for solutions to problems. Some programmes had harnessed this openness to engage companies' support. For example, Apps Cluster – an apprenticeship scheme teaching young people how to develop native apps – augments its income and strengthens its relationships with hiring companies by using the scheme to develop apps for them. Students learn by responding to real world briefs from those companies, and everyone benefits through a more open exchange of ideas than you would typically find elsewhere. The results of this kind of open-source innovation are clear. One digital SME we spoke to told us about 'hack-days' it had sponsored, which generated ideas that were then developed and applied to both internal and customer-facing problems.

The rest of this chapter focuses on three further features of the Digital Learning Programmes which, we suggest, put them in a particularly good position to respond to the peculiar challenges of the digital labour market.

Closer to a fast changing sector

The digital sector is a particularly fast-changing one, constantly responding to and driving new developments in technology. LinkedIn recently analysed the ten most popular job titles among their users that did not exist five years ago. Eight out of the ten new roles were digital in nature. (The other two, 'Zumba Instructor' and 'Beachbody Coach', no doubt also tell us something interesting about our changing world.)

Table 2: Growth in new job roles 2008–2013

JOB TITLE	2008	2013	GROWTH
IOS DEVELOPER	89	12,634	142X
ANDROID DEVELOPER	53	10,554	199X
ZUMBA INSTRUCTOR	16	6,331	396X
SOCIAL MEDIA INTERN	25	4,350	174X

DATA SCIENTIST	142	4,326	30X
UI/UX DESIGNER	159	3,509	22X
BIG DATA ARCHITECT	0	3,440	–
BEACHBODY COACH	0	3,340	–
CLOUD SERVICES SPECIALIST	195	3,314	17X
DIGITAL MARKETING SPECIALIST	166	2,886	17X

Source: LinkedIn Infographic. Available at: <http://talent.linkedin.com/blog/index.php/2014/01/top-10-job-titles-that-didnt-exist-5-years-ago-infographic>

The fast-changing nature of digital technology poses a major challenge for the education system, and for the computing curriculum in particular. While the new compulsory computing curriculum is a very positive development, even the best curriculum in the world is going to struggle to keep up with the pace at which skills needs evolve. Teachers were very aware that they were trying to teach students skills for jobs that did not yet exist:

“I was telling my Y9 students about the fact that by 2020 there’s going to be a big shortage, and I was telling them that you’ll be preparing for jobs that don’t exist at the moment. So it’s difficult for them to understand.”

Teacher, Head of IT

Young people that we interviewed also reflected an awareness of this. Many expected that, to some degree, life-long learning would be needed if they were going to keep abreast of the new and changing technologies and skills relevant to this increasingly important labour market. This was particularly the case for those at the older end of our ‘young people’ spectrum (aged between 19 and 25), who had some first-hand experience of the world of work and how it has been impacted by technology. At this age, many were aware that they had left education on the cusp of the emergence of new technologies which would totally change their field. One marketing graduate spoke at length about digital marketing,

which she was interested in, but which was too new for her university degree to properly address:

“I studied a bit of digital marketing in my course. But because it is something that is relatively new... it wasn’t really discussed as well as I wanted it to be at uni.”

Marketing graduate, 21 years old

Digital Learning Programmes are better positioned than curriculum teaching in this regard: rather than being part of the school system, the Digital Learning Programmes are part of the tech city cluster; like the digital sector as a whole, they thrive on innovation and change; they are generally on top of the latest developments; and, being small, they can change and update their course content accordingly. As an example, Makers Academy revises its course content every 6 weeks in response to what employers are telling them they need and to changes in technology.

Better awareness of careers in digital

As already described, the local young people we interviewed did not tend to perceive large cultural and social barriers which might prevent them from finding work or developing a career in the local cluster. That said, they had very little awareness of the local cluster or opportunities within it. Of the sixty plus young people we interviewed across Hackney, Newham, Tower Hamlets and Islington, only a very small number were aware that a lot of digital companies had opened in their neighbourhood.

“Most people know the big ones, like Microsoft, Apple, Google, rather than those who work in the background.”

Year 10 Student

Those who did express an interest in working in the digital sector generally showed very little understanding of the different career options within it. Many wanted to be games developers, but most only had a shallow understanding of what is involved in becoming one. Some of the young people we interviewed expressed an interest in coding, but none mentioned data analysis, UX, or other areas identified by digital companies as shortage areas. As one teacher put it:

“They’re only exposed to the very obvious – like the programmers – the ones that stand out in the media.”

Teacher, Head of IT

Even where young people have a clear idea about which sort of job they would like in digital, they were generally unclear how to go about securing it. The most motivated young people we interviewed reported using internet forums, job advertising sites and YouTube channels to try and find out more, but they reflected that it was hard to make sense of what they found. Most of the Year 9 and 10 students we spoke to had an idea of the best established, more formal post-16 options – FE college, sixth form, and university – but only a handful were aware of alternative work-focused routes, such as apprenticeships.

What explains this lack of awareness? We argue that the sources of information that young people traditionally go to for information about careers – parents and schools – are particularly ill-equipped to offer advice around careers in digital. A range of research suggests that parents are the most important source of information for young people in relation to careers.⁴⁰ Most of our interviewees also reported speaking to their parents about career choices. But the digital sector is relatively new and most parents are unfamiliar with it.

“My parents say you become a doctor, mathematician or a teacher. That’s what they tell us the options are... but it’s up to me. They really don’t know about other options – they’re not really educated in that.”

Year 10 Student

Schools are the other important source of careers advice for young people.⁴¹ The degree of influence that schools have on the information and opportunities which students access was exemplified by one apprenticeship scheme which had a large proportion of applicants from a single school. This was driven by one particularly active and enthusiastic teacher. However, despite some examples of good practice, teachers and career advisors were generally ill-equipped to advise on opportunities in the digital economy. In general, as already said, schools struggle to keep pace with the changing face of the industry, and don’t have the kind of insider information that can be really valuable to students. Young people studying digital courses at FE colleges reported this as a problem they had encountered while at school, and many teachers were also frank about the difficulties they faced.

“For me to try and explain what a data analyst or a webmaster does, it’s all quite confusing. I don’t necessarily have all the knowledge and they don’t necessarily understand that world. And some jobs didn’t exist five years ago. They’re still new and it’s

hard to say exactly what skills they need and what exactly happens in those jobs.”

Careers advisor

“Really bright kids who know what they want to do will find us, but anyone who’s going to advisors won’t find us.”

Apprenticeship scheme

Digital Learning Programmes can be valuable in helping raise awareness of digital careers in three important ways:

Firstly, they can play an important role in putting digital careers ‘on the radar’ of young people who otherwise might not have considered them as a career path. Programmes like Wyrd are developing online employability kits for young people, for example. O2 Thing Big offer a digital platform which gives young people attractively designed careers advice alongside interviews with leaders in industry and job opportunities. Programmes delivered as extra-curricular activities around the school day – Founders for Schools, for example – have the benefit of reaching large numbers of young people. Founders for Schools connect schools with entrepreneurs in their area to give talks on their career journey. Many of them come from digital startups.

Secondly, by introducing young people to the types of skills that would actually be used in the sector, and to aspects of ‘maker culture’, Digital Learning Programmes provide a realistic insight into what working in digital is really like. This provides an important complement to the Computing curriculum, which will teach more formal and academic content. The Ideas Foundation, for example, connects young people to employers in the advertising sector and teaches across the creative disciplines, not only technical skills. Likewise, {CODEZONERS}, an apprenticeship scheme run out of Ravensbourne teaches coding alongside design skills and links young people to brand agencies and digital marketing specialists. East London Radio teach presenting skills, alongside digital music and sound production.

Thirdly, Digital Learning Programmes delivered with the help of volunteers allow young people to gather up-to-date information from those working in the sector, which is otherwise hard to come by. Discussions with people who actually work in the industry allow young people to *explore* the idea of careers in the digital sector and prompt them to ask questions they wouldn’t have otherwise considered. Most importantly, they allow them to get credible insider advice on what they can do to secure jobs in the sector.

An alternative source of new recruits

A third feature of Digital Learning Programmes that can make them well placed to help with the skills gap is that they can prove instrumental in supplying the growing sector with a far deeper and richer recruitment pool than has traditionally been the case.

Most of the employers we spoke to reported that they did the majority of their recruitment through a small number of well-trodden routes:

“When we try to branch out with alternative routes, we struggle. We don’t know where to find good concentrations of potential candidates.”

Tech SME

Companies look to two routes in particular: they like to recruit recent graduates from top universities, and they also hired through personal networks. Many companies in the cluster offer substantial ‘internal bounties’ for staff who recruited new employees.

“It’s very much a who-knows-who industry, closely knit, and no way of getting in without knowing someone or having a fancy degree. There’s a massive community of young people who don’t have a way of breaking into companies – they’re not linked into that world.”

Digital Learning Programme provider

“Everyone does internal recruitment and bounties – you get the best results and it is cheaper than a recruiter.”

Digital corporate

The employers in our focus groups recognised the case for hiring from as wide a pool of talent as possible. They appreciated that a diverse workforce could help them understand and provide for a range of different client groups,⁴² and foster creativity and diverse approaches to problem solving.⁴³

“We’re looking at how we help managers create diverse networks in their communities so when they’re thinking about succession plans they’ve got a rich pool of people.”

Digital corporate

When asked why they tended to rely on these hiring routes, companies explained that they needed to have confidence that new recruits would be able to ‘hit the ground running’. This was especially

the case for startups and SMEs who said they didn't have the time or resource to train somebody up, or wait for them to teach themselves.

“We’re facing huge uncertainty, lots to worry about, we need secure recruitment.”

Tech SME

“Graduates is a lazy option, but time and resources are limited so we have to be lazy.”

Tech SME

Larger corporates reported being more willing to experiment with less conventional and somewhat ‘riskier’ approaches to recruitment, but said they still struggled to identify alternative routes through which they could reliably find people who fit their job specifications.

But here too Digital Learning Programmes can be of assistance. Companies are recognising that they need to go beyond traditional routes to diversify their work force and solve their own skills needs, and the Programmes are well positioned to assist with both. Several companies told us that they were beginning to build strong relationships with some of the more established professional skills programmes, and our mapping shows a number of emerging apprenticeship schemes achieving significant results. For example, of the first cohort of 20 young people graduating from Tech City Stars, 17 moved into jobs in the digital sector on graduation, while two have gone on to study computer science at university, and 1 into employment in another sector. Tech City Apprenticeships have established long-term relationships with employers such as Mother, Poke, and Moo.

Professional training programmes like Makers Academy and General Assembly report having no shortage of employers interested in their graduates, and also assert a need to expand their own recruitment base in order to draw a wider group of young people into their schemes.

Indeed, our research suggests that Digital Learning Programmes are already providing new routes into the digital economy and providing employers with work-ready young people. The challenge now is to expand these programmes, evaluate results and strengthen their relationships with employers.

4

**REFLECTIONS
ON HOW THE
GROWTH OF
DIGITAL LEARNING
PROGRAMMES CAN
BE SUPPORTED**

We have argued that Digital Learning Programmes can make an important contribution to helping local young people secure a future in the East London digital economy and at the same time address the skills gap which is currently holding back the scale-up potential of the East London cluster. As we have argued, Digital Learning Programmes share the cluster's culture and are therefore able to provide opportunities which appeal to digital companies. Furthermore, their position within the sector allows programmes to address the particular problems of the digital labour market. They are agile and able to respond to changes in new technology and skills needs, they can provide young people and parents up-to-date and face-to-face information which are both badly needed, and they can provide companies with new trusted sources of recruits,

However, most of the Digital Learning Programmes are new and many are still in the early stages of their development.

In this chapter we set out a series of ideas and recommendations intended to help them grow.

Strengthening links between Digital Learning Programmes and digital companies

Digital Learning Programmes rely on digital companies for funding, volunteers and the provision of work placements. Of the respondents to our survey, a third received financial support from companies and half received either financial or in-kind support. These close connections with the digital sector are a big part of what make Digital Learning Programmes valuable, but the East London programmes can't expand their offer without more support from Tech City companies. Tech City Apprentices, for example, cannot take on any more participants than it can find work placements for, while Founders4Schools cannot deliver more talks in schools than it has digital entrepreneurs to deliver them. Three fifths of respondents cited financial constraints or lack of volunteers as barriers to their expansion. Strengthening the links between Digital Learning Programmes and companies is therefore essential to helping them grow.

But building these relationships is not easy. When Digital Learning Programmes try to persuade digital companies to take on trainees, for example, they are often very cautious:

“Most companies are really, really scared of taking on a young person because it's a huge responsibility – what they want is a training provider who'll take that away from them.”

Digital Learning Programme provider

Startups and SMEs can find it particularly hard to support Digital Learning Programmes since they are often focused on securing their next funding round, or developing a new product, and do not have the resources to spare. There are also capacity issues to consider for companies considering taking on apprentices or offering work placements. Training somebody on the job requires a certain outlook and skill set, and this needs to be developed internally before a work placement can be offered.

“Often people like the idea of apprenticeships, because you get someone into the company and you can mould them into what you want, but finding somebody who understands how to manage this person and their work and feedback... it’s a new working relationship that they probably haven’t come across before.”

Digital Learning Programme provider

Reflecting on these difficulties, both Digital Learning Programmes and digital companies in our focus groups stressed the need for patient, close working in getting collaborations off the ground.

The companies we spoke to were enthusiastic about developing local digital talent both as a means to addressing the skills gap and helping young people, but many were unsure of how they could make a meaningful contribution, given the pressures they faced. Nor is there clarity of what might be expected of them.

We recommend (1):

The East London cluster should come together to develop a Digital Skills Charter setting out the range of ways digital companies can contribute and what it means for them to be good digital citizens. We also recommend that every company that signs the Charter agrees to make an annual contribution to supporting Digital Learning Programmes, appropriate to their size and circumstance. Contributions can range from simply volunteering hours, to hosting events, to funding support and taking on trainees or apprentices. The digital cluster should gather together once a year to celebrate the best examples of digital companies working to the standards the Charter sets out.

The current system of digital apprentices is not well adapted to SMEs, even though these companies drive the East London digital cluster. New models should build on and adapt to the work currently under way in the Trailblazers pilot (part of the Employer-ownership of Skills Pilots), which

is reforming the content of digital apprenticeships to better fit the sector's requirements. A leading group of companies and apprenticeship experts are forming a working group – the Innovation Lab Project – that will take forward this discussion and prototype and test new models.

We recommend (2):

The Department of Business, Innovation and Skills, National Apprenticeship Service, and the GLA (Greater London Authority) should continue to work with Small and Medium Sized Enterprises (SMEs) to develop more flexible, fit-for-purpose apprenticeship schemes for smaller firms in the digital sector and closely follow the work of the Innovation Lab Project.

We recommend (3):

Digital SMEs should actively engage with the Trailblazers programme to develop training schemes and funding models that work better for them.

The GLA is currently struggling meet its target to develop 250,000 new apprenticeship starts by 2016. We believe that there is an opportunity to substantially increase the number of digital apprenticeships on offer in London.

We recommend (4):

The GLA should increase the target number of digital apprenticeships in London, with more support from the LEP on strategies to achieve targets.

While digital sector bodies and corporate programmes have taken an active role in addressing the skills gap, our research suggests that Digital Learning Programmes can make a particularly effective contribution. Bodies such as Tech London Advocates, Tech City UK, BCS, Tech Partnership, Tech UK and Coadec could all to raise the profile of and promote the growth of Digital Learning and support firms, especially SMEs, in working with Digital Learning Programmes. They can also help promote the wearedotdotdot platform to companies as a way of helping them do so.

We recommend (5):

Sector bodies should use their influence to support Digital Learning Programme growth and help companies understand how they can best support these Programmes.

We recommend (6):

More Digital Learning Programmes should be included in professional networks like Tech London Advocates. These should promote Digital Learning Programmes as a means to addressing the skills gap.

The companies we interviewed agreed on the value of engaging with the community. They tended to be less interested in traditional CSR, however, and more interested in disrupting it. The SMEs in particular were clear that community involvement had to contribute to the bottom line as well as be an interesting thing to do. Recruitment and retention ticked that box, and so did activity that helped their Research and Development. Digital Learning Programmes that tap into this could be especially successful.

We recommend (7):

Companies and Digital Learning Programmes to foster more open innovation as part of working together, through 'hack-day' type events where young learners engage with real world commercial problems and develop solutions.

Strengthening links between Digital Learning Programmes and young people

Just under half of the Digital Learning Programmes that responded to our survey cited lack of awareness by young people and parents as a limit on their growth. As we have already suggested, the relatively new and fast-changing nature of the digital economy, means that schools have only a limited familiarity with it or opportunities within it. We believe there is no lack of interest from young people once they have the information about opportunities in digital, but rather that good advice about it is lacking.

We recommend (8):

Specialist digital careers advisors should be created. Based in Tech City they would deliver advice in the surrounding boroughs about Digital Learning Programmes and careers.

Digital Learning Programmes are young organisations and collaboration between them is in its early days. It is not always clear to young people what qualifications they offer or how they can help them progress. Badges, first developed by Mozilla's Web Literacy

programme, with further iterations by organisations like Codecademy, iDEA and Go Think Big, have now become a recognised currency of informal digital learning. Companies told us that they increasingly use these badges as evidence of motivation and skills and find them useful in recruiting. The East London Digital Learning Programmes could make greater use of these badges.

We recommend (9):

Where appropriate Digital Learning Programmes develop and award ‘badges’ to recognise and accredit young people’s digital skills and achievements. Professional networks like LinkedIn should make space for badges on profile pages. When recruiting, digital companies should take into account badges alongside formal qualifications.

It can be hard for young people to experience what ‘Tech City’ actually is, which exacerbates a low awareness of the cluster among local young people and their parents. There is no single door you can go through or sign you can see. There are a number of companies who open their venues up for community use, and this helps young people familiarise themselves with Tech City employees and culture.

We recommend (10):

The annual OpenCo event, which opens up the doors to startups and digital companies across the UK one day a year, develops OpenCo Junior into a significant annual event.

Strengthening links between Digital Learning Programmes and schools

Schools partnerships are crucial for some Digital Learning Programmes. But building relationships with schools can be challenging for Digital Learning Programmes. There is no recognised way for Digital Learning Programmes to demonstrate their quality and credibility to schools. Teachers we interviewed often felt inundated with offers from Digital Learning Programmes and companies.

“I was making a lot of contacts near the end of last year, but then term starts in September and you’re up to your eyes and these links disappear in the reality of day-to-day work.”

Teacher, Head of IT

Some teachers also had doubts about the quality of what they were being offered, showing the need for Digital Learning Programmes to carefully build reputation and relationships with schools.

“We’re an outstanding school, and you can’t come in here and deliver rubbish, that’s a no-no for us. We have organisations who think they can come in and deliver something that we’d never put in front of our kids.”

Head of External Affairs, Secondary School

A way needs to be found of allowing schools to make sense of and navigate offers from Digital Learning Programmes. Resources like the wearedotdotdot platform, and the Digital Skills Toolkit and Careers Resource Pack being developed through the Digital Skills Programme at the GLA are all possible avenues for this.

We recommend (11):
that the GLA and London Councils leads efforts to make it easier for schools to make sense of the variety of Digital Learning Programmes and ensure that schools are getting the best from them.

East London young people are currently offered a large number of careers events, including *Teen Tech London*, *Technopop*, *Tech Meet-Ups Jobs Fair*, and the *LLDC Careers Festival*. While many of these are good, there is a strong case for rationalising these resources. Requests to schools and companies could both be reduced in favour of a smaller number of more concentrated events.

We recommend (12):
that the GLA and London Councils lead the coordination and consolidation of London Digital Careers events creating a clearer offer for employers, Digital Learning Programmes, schools, parents and young people.

Most of East London’s Digital Learning Programmes are young and have had limited time and resource to invest in assessing their impact, though some have begun to do so. If Digital Learning Programmes are going to develop further and play a more substantial role in digital education, they will need to take an ever more robust approach to monitoring and demonstrating their impact.

We recommend (13):
all Digital Learning Programmes should continue to monitor and demonstrate their impact, through methods appropriate to their scale.

APPENDIX 1

PROJECT PARTICIPANTS

The following Digital Learning Programmes have participated
(as of February 2015) in this project:

Aha Design
Apps for Good
Apps Cluster
City Unrulyversity
Codecademy
Code Bar
Code Club
Coder Course
CoderDojo
{CODEZONERS}
Codility
Digital Business Academy
Diverse Digital
ELATT
Fluency
Founders and Coders
Founders4 Schools
Freeformers
Geek Girls Meet-Ups
General Assembly
Girls in Tech London
Go Think Big
Hyper Island
Ideas Foundation
Kano
Ko-Su
Kuato Studios
Makers Academy
My Kidsy
Newham College ICT and Social Media Apprenticeships
o2 Think Big
Sam Labs
Samsung Digital Academy
Tech City Apprentices
Tech City Stars
Tech Future Girls
Technology Will Save Us
Technopop
Teen Tech
The Mobile Academy

Wow-Elite
Wyrd
Young Rewired State

The following schools and FE colleges participated in this research:

Bethnal Green Academy
Cardinal Pole Roman Catholic School
Eastlea Community School
Elizabeth Garrett Anderson School
Holloway School
St Bonaventure's
St. Paul's Way Trust School
The Bridge Academy
City & Islington College
Ravensbourne

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9. For a full list of the sub-sectors included in this definition, see BIS/DCMS/Intellectual Property Office (2009) 'Digital Economy Bill: Impact Assessments', Table 1.
10. This figure comes from *Tech Nation* (2015), Headlines: Inner London – East. Retrieved from: www.duedil.com/technation/2015/regions/ukds-nuts3-uki12/inner-london-east#headlines 25/02/15 Here 'Inner East London' is defined as an area stretching from Wood Green in the north to Penge in the south, and Barking in the east. The area of inner London which our report focuses on is a band sitting in the middle of this, covering Hackney, Islington, Newham and Tower Hamlets.
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