ROYAL
STATISTICAL
SOCIETY

DATA | EVIDENCE | DECISIONS

Fit for Purpose?

An Exploration of Non-degree Pathways into Data Analysis Careers

GATSBY

Sarah Cumbers, chief executive of the RSS

The ability to analyse and work with data is more important than ever before, and advances in how we use data as a society are not just changing careers, but are reshaping whole industries. It is vital that our education system is able to deliver the skills needed to meet these challenges.

Impressive advances in the application of statistics and data science regularly make headlines, such as the ability to predict protein structures, interpret large sets of documents, or generate images and write code from prompts. Equally important but everyday-seeming issues around data, analysis, and statistics tend to get overshadowed. Yet, so much of modern life now generates data that issues around the systems and capability to collect, store, and use data are just as significant as these watershed events. These everyday issues are also ubiquitous, affecting every organisation from government to business to NGOs. In this context, it is crucial that there is an effective system for supporting people to develop the necessary skills to thrive in a modern data-driven society, and support them to work with data in ways that are ethical, legal, and deliver robust insights.

It is also crucial that pathways for learning new data analysis and statistics skills can accommodate people from different backgrounds, and different levels of expertise. Education and training systems absolutely need to deliver for young people entering the workforce, particularly given the levels of growth anticipated in the Universities and Colleges Admissions Service (UCAS) work on the 'journey to a million' higher education applicants by 2030. However, education and training systems also need to deliver for the existing workforce, whether that's people transitioning to a new career path or developing their data analysis and statistics skills within the context of their existing role.

As our report highlights, despite its important role in the modern workforce, the uptake of statistical training in the UK is concerningly low. Nearly 60% of respondents to our survey indicated they had not completed any statistics or data analysis training. Equally concerning was that only 15% of respondents anticipated their job being impacted in the next five-to-ten years by changes to the way we use data as a society, and 75% of those expecting change did not feel equipped to adapt. While the underlying drivers are likely to be complex, one of the main arising themes is from this report is that simply deciding what to learn and where to learn it is complicated and difficult, even for experienced data analysts.

All of this points to the need for greater support for people to navigate how to learn statistics in a way that is right for them, their career stage, and what they want to be able to do with statistics and data analysis. Raising statistical literacy is an important goal for the RSS, and publishing this report marks the beginning rather than the end of this stream of work for us.

I would also like to acknowledge the support we have received for this work, particularly to the Gatsby Foundation for their funding. Their longstanding focus on improving the delivery of STEM education made them natural partners, and we are grateful for their willingness to also be actively involved in the research. I would also like to acknowledge the contribution of RSS volunteers; your time and effort enables so much of what the RSS does, and this report is far richer as a result of your contributions.

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Improving statistical literacy is one of the key strategic goals of the RSS, which includes supporting a larger statistics and data analysis capable workforce in the UK. However, we consider that insufficient public discussion has focussed on non-degree entry points for junior data analysts or data technicians. As Level 3 Apprenticeships are one of the main structured learning pathways for these roles, we set out to understand how well these non-degree pathways were delivering for industry and for apprentices.

RESEARCH OBJECTIVES

This research for this report had three main objectives:

- Explore the skills and accreditation needs of junior data analysts

- Assess the suitability of the current Level 3 Data Technician apprenticeship to the needs of employers and recommend improvements

- Explore the influences on peoples' decisions to pursue a data apprenticeship or other alternative routes into a data career

APPROACH

To do this we carried out a nationally representative survey to understand broadly how people view statistics and data analysis in their day-to-day work, and how they perceive apprenticeships as a training pathway for data analysis. We then circulated a detailed questionnaire and conducted interviews with junior data analysts, and their managers and employers to discuss key issues around the apprenticeship experience, the skills that matter, and the barriers to uptake.

FINDINGS

There were two main themes that emerged from this project:

- Level 3 and Level 4 Data analysis apprenticeships are broadly focussed on the right skills, but the delivery, communication, and specifics of programme content often did not meet industry and apprentice needs

- For many people, both among the general public and those who work in data analysis, it is difficult to know what new data and analysis skills to learn, when to learn them, and how judge the best place to learn them from

On the first theme, basic communication from training providers to employers often lacked detail around the timing for delivery of training on techniques or software platforms. It was also often difficult to get advance notice of the specific platforms or statistical techniques that apprentices would be learning, either when trying to select a provider or programme, or after selecting a provider. Learning plans and delivery timetables also lacked the flexibility to be adapted so that they could be aligned with work projects the apprentice would be working on. This prevented employers from providing apprentices with timely project work that allowed them to use some of the skills they were currently, or had recently learned.

On the second theme, we found that a concerningly high proportion of people had not had statistics training of any kind, that most people had difficulty in judging what to learn at different stages of their career and where to learn it from, and that judging the quality of learning options was particularly difficult given the plethora of options. This theme emerged not only across the general public, but also among employers and junior analysts who work in data and analysis.

RECOMMENDATIONS

(1) We recommend that government and training providers work to improve communication and transparency of the specific skills, software platforms and techniques that will be taught in an apprenticeship, by requiring these to be provided alongside the training plan

(2) We recommend that training providers review course structures and delivery timetables to identify where flexibility could be introduced in the timing, techniques, and platforms being taught in data focussed apprenticeships so that employers and apprentices can tailor their programme to better align with their work

(3) We recommend that government (through the Department for Education) review the current online ratings system for apprenticeship providers to improve the accuracy and depth of information available on provider quality, and support employers and apprentices to make better informed decisions when selecting training providers

(4) We recommend that iFATE work with employers to review occupation maps and occupation standards across the different levels of data analysis apprenticeships so that employers and applicants can see how the different levels map to each other, and can more easily compare and contrast pathways into data analysis careers

(5) We recommend iFATE work with employers and training providers to identify how learning outcomes on the safe and effective use of AI could be included in future versions of the Level 3 Data Technician Apprenticeship, and the Level 4 Data Analysis Apprenticeship

WHERE THE RSS COULD SUPPORT FURTHER WORK

In addition to our recommendations for government, apprenticeship providers, and iFATE, there are areas where the RSS could seek funding for further work to support people to develop their statistics and data analysis skills:

- Developing guidance resources for learning statistics and data skills. These should be persona and outcome-based, providing guidance for people in particular circumstances and backgrounds with a clear approach to learning statistics and data science depending on what that person wants to achieve

- Developing outcome-based guidance resources for businesses on the types of statistics and data analysis skills they may need depending on what they are trying to achieve

- Improve access to information course quality by reviewing the RSS Quality Mark accreditation scheme. A review would seek to broaden the schemes application and increase uptake by developing a strategy to actively promote and encourage participation in the scheme from providers of Level 6 and Level 7 degree apprenticeships
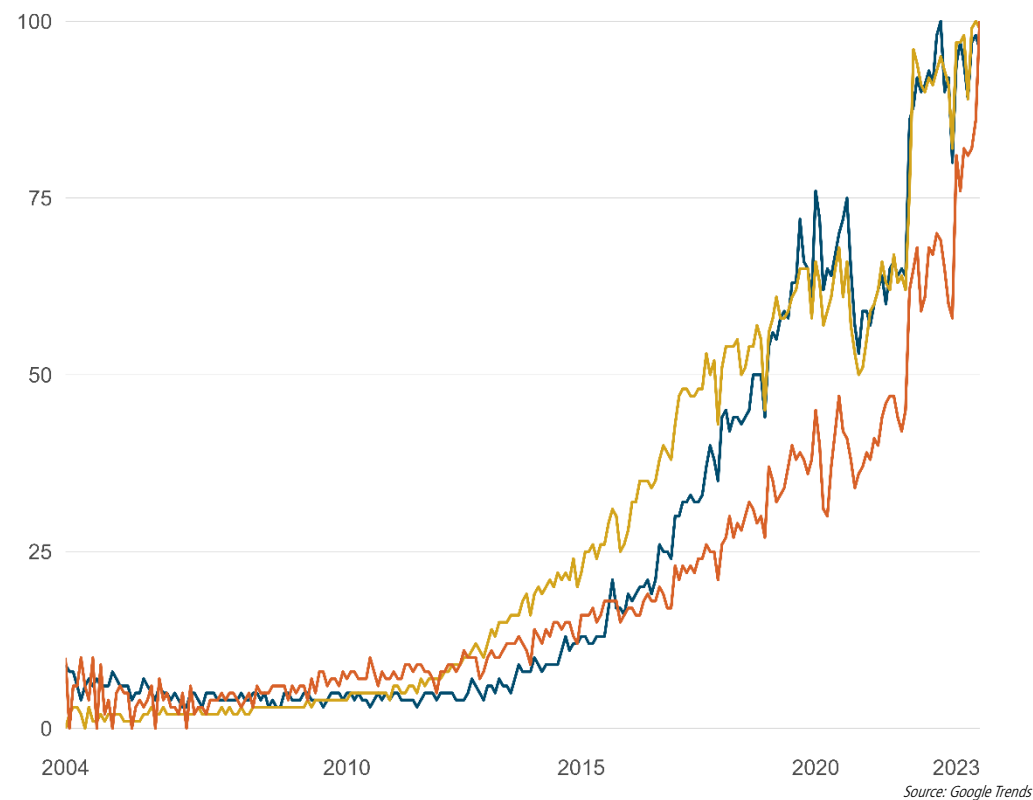
CONTEXT

Every day, massive amounts of data are being created. More data in fact, and at a faster rate, than at any time in history.[1] This data is also being generated from an ever-widening array of sources. Not only do everyday activities like interactions with government, shopping, using the internet, making calls, or sending messages generate data, but smart devices also permeate our lives. Watches, phones, cars, and even fridges can all contribute to a vast hoard of raw data that with the right expertise can be drawn on to provide insights. The global rate of data creation is so large, involving terms like zettabytes and exabytes that it is difficult to meaningfully comprehend how much data actually exists.

For modern organisations the ability to effectively source, collect, and make use of this wealth of data in a legal, and ethical manner is increasingly central to their productivity, growth, and success; this applies regardless of whether they are in the public, private, or charitable sectors. Despite the crucial role that data can play, many organisations are facing constraints on their ability to effectively convert it into insights and actions. As noted in a 2021 report out of the Department of Culture Media and Sport (DCMS), access to skills is one of the main constraints on data use by business, with 14% of surveyed firms indicating that this was the single biggest barrier.[2] Constraints on accessing skills have a domino effect, limiting an organisation's ability to improve processes and better use their data, ultimately impacting productivity and leading to lost opportunities.

While skills are often discussed, this tends to focus on advanced end of the skills pipeline, emphasising the need for highly developed expertise around cyber security, advanced data science, artificial intelligence, and machine learning. These advanced skills are vital, however so is broadly lifting more basic skills.

FIGURE 1: AWARENESS AND INTEREST IN DATA ANALYSIS IS INCREASING

Google searches for terms like **Data Science**, **Data Analytics**, and **Data Analyst Jobs** have rapidly increased over the last ten years. Here, a relative search popularity of 100 indicates the terms heaviest search usage, this scales so that 50 indicates usage was half that of the terms peak.

Source: Google Trends

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[1] World Economic Forum: https://www.weforum.org/agenda/2019/04/how-much-data-is-generated-each-day-cf4bddf29f/

[2] Ernst & Young LLP, 2021. Data foundations and AI adoption in the UK private and third sectors. Department of Culture, Media and Sport (DCMS): https://www.gov.uk/government/publications/data-foundations-and-ai-adoption-in-the-uk-private-and-third-sectors

Which is often absent from the conversation, particularly as these skills relate to *junior analyst* roles. The roles that focus on the crucial functions of sourcing, formatting, and preparing data for analysis are often overlooked in the eagerness to be seen as on trend with the current public narrative.

While these 'junior' roles vary in name, ranging from *Junior Data Analyst*, *Data Technician*, *Data Support Analyst,* to *Assistant Analyst*, the role itself is both a key part of the data workforce, and an important entry point to data focused careers for many. These roles are not only for young people entering the workforce, but also for people who are already in the workforce and looking to move into data focussed careers and leverage their existing expertise in new ways. The focus on advanced skillsets also neglects the importance of these entry-level training pathways for people who are established in their careers and looking to simply make better use of data within their existing roles – an important gap as the increasing ubiquity of data means that many roles requiring data skills at this level may not be 'data analyst' roles per se, with data role names, but rather roles in other functions that benefit from ever more data sophistication.

There is a clear need from employers, and positively UCAS has reported that interest in apprenticeships from potential applicants in recent years is high.[3] However this interest hasn't translated into the level of workforce development needed, which begs the question of why. The training pathways exist, so what is the gap? Is this a demand-side problem on the part of apprentices, where there are barriers to uptake or a disinclination for the career; or is this a supply-side problem on the part of employers, where something is preventing them from providing these roles as apprenticeships?

As a professional body for statisticians and data scientists, the RSS has a clear interest in this area of work. The stability of the statistics and data science workforce is important to the RSS, and while the boundaries between data science and data analysis careers may be hazy, the RSS supports a national workforce with strengthened statistical literacy, and improved access to statistics and statistics-adjacent careers. Given our strategic objective of lifting overall statistical literacy, it is also important that this work considers those from disadvantaged backgrounds and people who may be put off from improving their data-related skills because they don't think they have the capability or the mathematical skills they think they would need. The RSS is committed to supporting improved access to credible, visible pathways into data and statistics related careers.

The main formal pathway for learning statistics and data analysis is traditional pathway of high school, usually through GCSEs and A Levels, and/or university degrees. However non-degree pathways are increasingly prominent, with universities under a range of pressures, more people entering higher education than ever before[4] and new pathways being developed and launched. In the case of data analysis and data science, anyone can (in principle at least) learn to code or analyse data using platforms like Coursera, edX, or even YouTube. However, self-directed training pathways generally lack external validation of the skills taught, which can make it difficult for learners to judge the quality of what they are learning, and challenging for employers to evaluate the skills that candidates may have. To mitigate these challenges, formal training is the default approach.

That is where this report comes in, and since the main non-degree pathways for formal training in statistics and data analysis in the UK are apprenticeships, and the Level 3 Data Technician Apprenticeship is the first step on that pathway, these are the main focus of this report.

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[3] UCAS, The Sutton Trust, 2023. Where Next? What Influences the Choices of Would-Be Apprentices? : https://www.ucas.com/business/employers/what-influences-choices-would-be-apprentices
[4] UCAS projects that there could be up to a million higher education applicants in a single year in 2030, up from almost three quarters of a million today: https://www.ucas.com/about-us/journey-million

RESEARCH OBJECTIVES

Apprenticeships more generally are already well-researched in the UK, providing deep insights about how the apprenticeship system currently functions. However, there are fewer insights to draw on regarding entry-level statistics and data analysis roles.

This report seeks to add to this understanding, and to support the RSS in advocating for improvements to non-degree pathways into data and analysis careers. As such, this project has three main objectives:

(1) Explore the skills and accreditation needs of the field of junior data analysts[5]

(2) Assess the suitability of the current Level 3 Data Technician apprenticeship to the needs of employers and recommend improvements

(3) Identify key points at which people consider apprenticeships and improve understanding of what influences peoples' decisions to pursue a data analysis focussed apprenticeship or other alternative routes

POPULATION OF INTEREST

The objectives of this report are focussed on the experiences of junior analysts and their employers, however the perspectives of people that have chosen not to learn statistics and data analysis also need to be considered. To account for these different perspectives we identified three groups of interest for the project:

- The general public
- Junior data analysts
- Employers and managers

This three groups allows us to consider the experiences of junior analysts and their employers within the context of the broader public narrative around apprenticeships. It also allows us to identify opportunities for improving statistical literacy and access to skills more broadly.

STAGE 1: LITERATURE

The first stage of research was a scoping review of existing literature. This allowed us to identify what we already know about apprenticeships in general, and about apprenticeships as they apply to data analysis. The following key terms were used in various combinations using Google Scholar to generate literature for review:

- Data analysis, Data Technician, Data Analyst
- Employment, Labour market, Training, Skills, Apprenticeship
- United Kingdom, UK, England
- Barriers, Motivations, Discrimination, Equity, Diversity, Racism, Ethnicity, Gender

[5] To avoid confusion we use the term junior data analysts in this report to refer to entry level data analysis roles, regardless of the specific title (Junior Analyst, Data Technician, Assistant Analyst etc)

Literature published after 2018 was given priority, as the impact of COVID has shifted the national education context, as have the introduction of several new pathways in recent years. The resulting literature included both quantitative and qualitative research, academic literature, policy papers, and government and institutional reports.

STAGE 2: SURVEY

The second stage of research focussed on developing a quantitative understanding of the broader public perspective. To do this we carried out a nationally representative survey through an external survey provider. The provider constructed a representative sample from a panel they maintain of over a million respondents that includes a wide range of demographic indicators.

Participants were then sent a survey of seven multi-choice questions, and responses were weighted to ensure consistency with national demography profiles. A range of analysis was then carried out in R, including summary statistics, counts, proportions, confidence intervals, chi-square tests, and logit regression.[6] This forms the basis for Section 3: What we learned from the public.

STAGE 3: INTERVIEWS

The third stage of research focussed on developing a qualitative understanding of the experiences and perspectives of junior analysts and employers.

- First, we circulated a detailed questionnaire through a range of online channels[7]. This questionnaire asked participants questions about their perspectives and experiences as apprentices, junior analysts, and as employers and managers of apprentice and junior analysts.

- Second, we carried out a series of semi-structured interviews with a sample of junior analysts, employers, and managers. Participants were selected to ensure a broad spread of industries and experiences.

The questionnaire responses were used to focus the interview questions on areas of interest, and were treated as qualitative data along with the interview transcripts for thematic analysis. This allowed us to identify common themes, tensions, and ideas, forming the basis for Section 4: What we Learned from Junior Analysts, and Section 5: What we Learned from Employers.

Summary Table of the Overall Research Approach

	Activities	Sample size	Sampling approach
Stage 1	Scoping review	-	Key term search
Stage 2	Survey	(n=2155 responses)	Weighted, representative
Stage 3	Interviews and questionnaire	Questionnaire (n=53) Interviews (n=17)	Expert (purposive) sampling

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[6] Survey data, additional plots, the R code used to produce this report, and the interview questions are available on the RSS website, alongside this report. Interview transcripts are not.

[7] RSS social media channels, RSS mailing lists, the Association of Apprentices, a major apprenticeship provider, and through the Cross-Government Data Science Community online channels.

TRAINING OPTIONS

There are a wide range of reasons why someone may wish to undertake training in data analysis, for example:

- Upskilling in data and statistics because it is relevant to their current job
- Upskilling in data analysis and statistics to change career paths
- Gaining basic qualifications as a pathway into higher level qualifications

Despite the reasons for seeking to develop these skills, it is not always obvious which of the options for learning data analysis and statistics are most suitable. This section sets out a brief description of the main non-degree structured pathways that someone could choose to take. A summary these pathways is set out in the info-graphic Figure 2.

DIGITAL BUSINESS SERVICES T-LEVEL[8]

Launched in 2021, these are a two-year programme at Level 3 on the UK Qualifications Framework[9] (equivalent to 3 A levels) that includes mostly classroom-based learning and a 45-day industry placement with a suitable employer. There is no cost to employers to participate, and to incentivise participation there is a 'support fund' available in 2023/24 to help cover employer costs. There are also no tuition fees for learners, however T-levels are only available to applicants aged 16-to-19. T-Levels set a baseline level of skills for progressing into entry-level roles or further study.

DATA TECHNICIAN APPRENTICESHIP [10]

Launched in 2020, these apprenticeships sit at level 3 on the UK Qualifications Framework. Unlike the T-Level, the Level 3 Data Technician Apprenticeship includes full-time employment, with 20% of an apprentices time spent in off-the-job training with a provider.[11] There are no fees for learners, and employers are able to access the apprenticeship levy (which means they will pay no more than 5% of the costs of the apprentices training, in addition to the apprentice's wages). There is no age limit on Level 3 Apprenticeships, and they are available to people who already have a degree but may be retraining or upskilling. The main focus of the apprenticeship is on sourcing, formatting, and presenting data for analysis, with some analysis. It aims to deliver baseline skill levels for industry employment, data-related skills, or further study while working and earning.

DATA ANALYST APPRENTICESHIPS[12]

Launched in 2016, the Data Analyst Apprenticeship sits at Level 4 on the UK Qualifications Framework. Like Level 3 apprenticeships they include full-time employment and require 20% of an apprentice's time to be spent in off-the-job training, there are no fees for learners, and employers are able to access the apprenticeship levy (which means they will pay no more than 5% of the costs of the apprentices' training, in addition to the apprentice's wages). There is also no age limit on Level 4 apprenticeships, and they are available to people who already have a degree but may be retraining or upskilling. Their key point of

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8   https://www.instituteforapprenticeships.org/qualifications/t-levels/t-level-information-hub/t-level-in-digital-business-services/
9   https://www.gov.uk/what-different-qualification-levels-mean/list-of-qualification-levels
10 https://www.instituteforapprenticeships.org/apprenticeship-standards/data-technician-v1-0
11 In August 2023 this requirement changed from 20% to a flat rate of 6 hours per week to account for variations in peoples contracted working hours.
12 https://www.instituteforapprenticeships.org/apprenticeship-standards/data-analyst-v1-1

difference is that they provide a higher level of statistical and analytical training than a data technician apprenticeship, and have a greater focus on analysis.

DIGITAL & TECHNOLOGY SOLUTIONS PROFESSIONAL (INTEGRATED BSc)[13]

Launched in 2015, this degree apprenticeship, as its name suggests, provides an undergraduate degree at Level 6 on the UK Qualifications Framework and takes 36-48 months to complete. As these are apprenticeships, they include paid employment with 20% of a learner's time spent in off-the-job training, and employers can access the apprenticeship levy to fund training costs. In addition to learning about data analysis and statistics, degree apprenticeships include a wider range of optional topics such as information systems, business management, data management, and cyber security. They aim to provide a more advanced level of statistical and analytical training than a Level 3 or 4 apprenticeship, and embed them within a more wholistic career oriented skillset.

DIGITAL & TECHNOLOGY SOLUTIONS SPECIALIST (INTEGRATED MSc)[14]

Launched in 2018, this degree apprenticeship provides learners with a masters degree at Level 7 on the UK Qualifications Framework and takes 18 months to complete. They include paid employment with 20% of a learner's time spent in off-the-job training, and employers can access the apprenticeship levy to fund training costs. In addition to learning about data analysis and statistics, degree apprenticeships include a wider range of optional topics including information systems, business management, data management and cyber security. They aim to provide a more advanced level of statistical and analytical training than a Level 6 degree, and allow learners to specialise in a particular area.

OTHER APPROACHES

There are also a range of other training pathways that people can take, including:

- Short courses like those facilitated by the RSS
- Micro-credentials provided by companies such as IBM and Google
- Self-directed learning through platforms like Coursera, edX, or DataCamp

While there is a wealth of resources available, these approaches have varying levels of assessment, limited consistency, and differing levels of independent validation. They are also commonly focussed on specific topics, requiring the learner to develop their own learning programme, evaluate the quality of learning, and determine where to spend their time and effort.

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[13] https://www.instituteforapprenticeships.org/apprenticeship-standards/digital-and-technology-solutions-professional-integrated-degree-v1-1
[14] https://www.instituteforapprenticeships.org/apprenticeship-standards/digital-and-technology-solutions-specialist-integrated-degree/

FIGURE 2: COMPARING FORMAL PATHWAYS

Level 1
- GCSE (1 - 3 or D - G)
- Level 1 NVQ

Level 2
- GCSE (4 - 9 or C - A*)
- Intermediate Apprenticeship
- Level 2 NVQ

Level 3
- A Levels
- AS Levels
- International Baccalaureate
- Level 3 NVQ

Level 4
- Higher Apprenticeship
- Higher National Certificate
- Certificate of Higher Education

Level 5
- Higher National Diploma
- Diploma of Higher Education
- Foundation Degree

Level 6
- Degree Apprenticeship
- Bachelor's degree
- Graduate Diploma

Level 7
- Master's
- Post Graduate Diploma

Level 8
- PhD

Digital Business Services T Level
No cost | 18-months | 45-day work placement | Full-time training
Focus on sourcing, formatting, and presenting data for analysis

Data Technician Apprenticeship
Levy funded | 24-months | Employment | 20% off-job training
Focus on sourcing, formatting, preparing, and presenting data for analysis

Data Analyst Apprenticeship
Levy funded | 24-months | Employment | 20% off-job training
Focus on collecting, organising and studying data to develop insights

BSc (Hons) Digital and Technology Solutions
Levy funded | 36-48 months | Employment | 20% off-job training
Includes advanced data analysis and options for further specialisation including data management, business management, and cyber security

Bachelors Degree

MSc Digital and Technology Solutions
Levy funded | 18-months | Full-time employment | 20% off-job training
Includes advanced data analysis and options for further specialisation including data management, business management, and cyber security

Masters

PhD

THE BASIC MODEL

Apprenticeships involve a triangular relationship between an apprentice, their employer, and the training provider. To initiate an apprenticeship, the employer needs to register an *'apprenticeship services account'* with the government which allows them to access levy funds, find providers, and if needed, advertise opportunities. From their account, the employer is able to select a training course and provider, and then either run the recruitment process themselves, put forward an existing employee for the apprenticeship, or coordinate recruitment through their chosen training provider.

Once a position is available, apprentices can either apply for an apprenticeship directly (if it is advertised) or apply to a training provider who will work to match them with an employer.

COSTS AND FUNDING

The direct costs for funding an apprenticeship can be broken into two components:

- Wage costs
- Provider fees

Wage costs are borne by the employer, with minimum wage rates set by the government based on the apprentices' age and time in the apprenticeship (employers can of course opt to pay higher than these rates).[15] Apprentices are paid for time on the job, as well as time spent in off-the-job training.

Apprentice hourly wages
(as at August 2023)

	16-18	19-20	21-22	23+
1st year	£5.28	£5.28	£5.28	£5.28
2nd year +	£5.28	£7.49	£10.18	£10.42

Provider fees are covered mostly, or entirely by the Apprenticeship Levy depending on the employers wage bill:

- If an employer has an annual wage bill of over £3 million, they are required to pay a levy of 0.5% of that total wage bill, which the government then tops up with an additional 10% of their levy payment.[16] Employers can then use those funds to pay the total cost of provider fees for employees who are participating in an apprenticeship

- If an employer spends more than they have paid into the levy, or their wage bill is too low to require them to pay into the levy, then they are required to pay 5% of the cost of the apprenticeship, and the government will pay the remaining 95% from the levy

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[15] https://www.gov.uk/become-apprentice/pay-and-conditions
[16] https://www.gov.uk/guidance/pay-apprenticeship-levy

The apprenticeship regulatory landscape is complicated, with different aspects of the qualifications set, monitored, and regulated by different organisations depending on the level of the apprenticeship and the type of provider:

- The Office for Standards in Education, Children's Services and Skills (Ofsted) is responsible for the quality of training provision

- The Institute for Apprenticeships and Technical Education (iFATE) is responsible for the development, review, and approval of Apprenticeship Standards (a document containing high-level course content)

- The Department for Education (DfE) acting through the Education and Skills Funding Agency (ESFA) holds overall accountability for quality, including the quality of Apprenticeship Standards and the end-point assessments (the final assessments of an apprenticeship)

- Although DfE, has overall accountability for the quality of end point assessments (through ESFA), External Quality Assurance (EQA) of the apprenticeship standard via the Designated Quality Body (DQB) differs depending on the level of the apprenticeship:

  o the Office for Students (OfS) is responsible for assessing the quality of integrated higher, and degree apprenticeships

  o The Office of Qualifications and Examinations Regulation (Ofqual) is responsible for oversight of the apprenticeship end-point assessments for most other apprenticeships (including the Level 3 Data Technician, and Level 4 Data Analyst apprenticeships)

This report is focussed on statistics and data analysis, which is a narrow slice of the overall suite apprenticeship pathways. However it is important to note what we already know about apprenticeships more broadly.

INTEREST IN APPRENTICESHIPS

Interest in apprenticeships is generally high,[17] but year on year percentage growth rates in new apprenticeship starts has been mixed (Figure 3 over page):

- Level 6 and 7 apprenticeships have seen significant growth
- Level 4 Data Analyst and Level 3 Data Technician have grown
- Level 4 and 5 apprenticeships have seen more modest growth
- Level 2 and 3 apprenticeships have seen declines in new starts

Starts refers to someone starting a new apprenticeship so may not be unique individuals when aggregating up (someone may start one apprenticeship, drop out, and start another), but is reasonably assumed to be individuals when referring to specific apprenticeships like the Level 3 Data Technician apprenticeship. The full years data for 2022/23 has not been released as of writing, but there are indications from partial datasets (not shown here) that there is likely to be some declines.

Comparing these rates of growth with absolute number of apprenticeship starts (Figure 4 over page) shows a similar picture, in that Level 4 and Level 6 apprenticeships have gained the largest number of starters over the 2017/18 to 2021/22 period. In addition, the majority of apprenticeships are at Level 2 and Level 3, even following significant declines in new starts at these levels.

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[17] UCAS, The Sutton Trust, 2023. Where Next? What Influences the Choices of Would-Be Apprentices: https://www.ucas.com/business/employers/what-influences-choices-would-be-apprentices

FIGURE 3: GROWTH IN APPRENTICESHIP STARTS

Using Department for Education data, we index the number of new starts each year against the number of new starts in the 2017/18 academic year to show relative growth. The Data Technician (Level 3) Apprenticeship was indexed against 2020/21 as this was the first year of that programme.
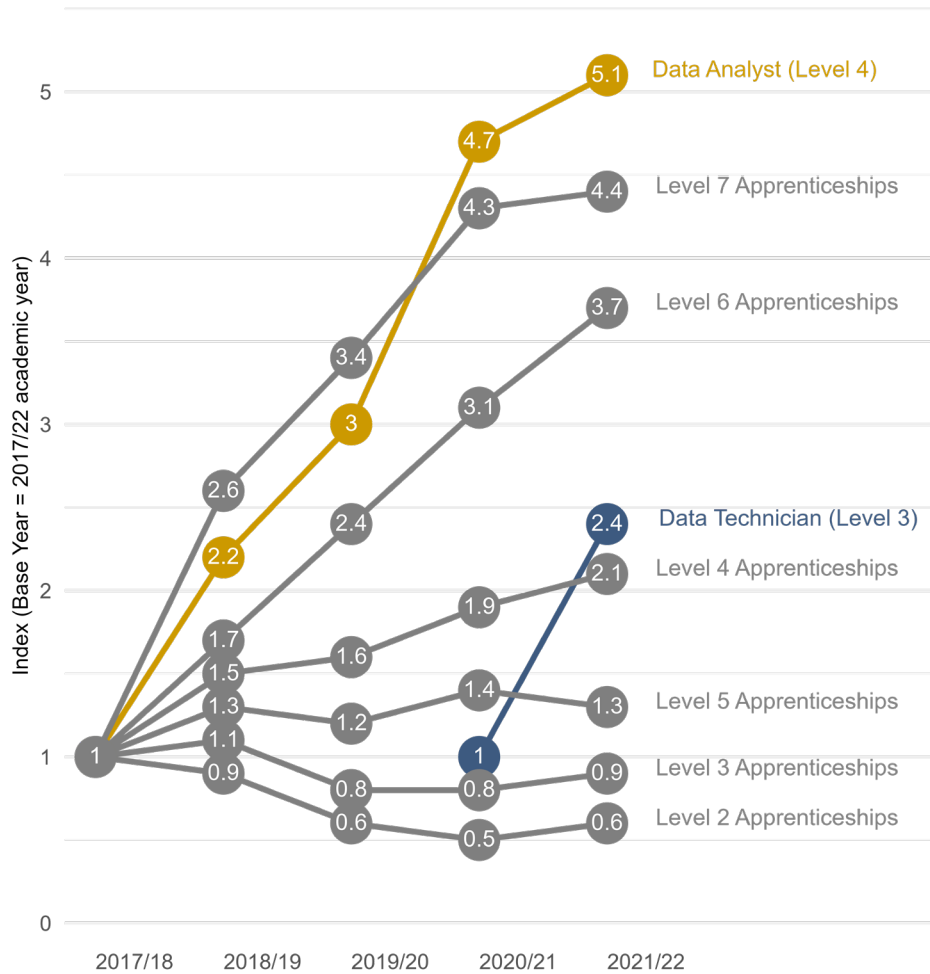
FIGURE 4: NUMBER OF APPRENTICESHIPS STARTS, BY LEVEL

Here you can see the number of apprenticeships started each year, broken down by apprenticeship level, based on Department for Education data.
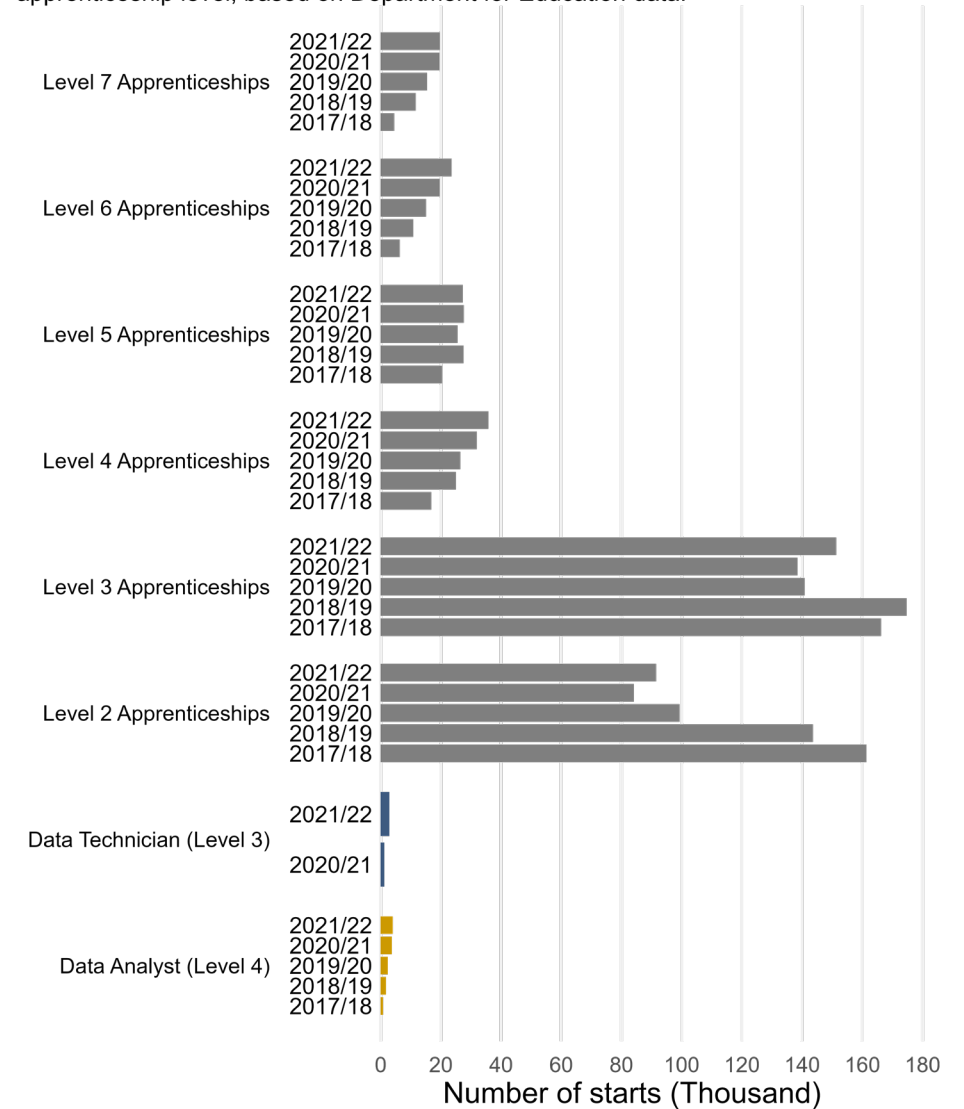
GEOGRAPHY

Geographical availability of apprenticeships has been found to be a key constraint, with 61% of former applicants (applicants who did not complete their application process) citing no apprenticeships near them as a reason for not continuing in a recent UCAS report. In fact in every region of the UK, the lack of a locally available programme is one of the top three reasons for not continuing an application despite being interested in undertaking an apprenticeship.[18]

DIFFICULTY ACCESSING INFORMATION

Recent research from UCAS indicates that the application process itself can be an important barrier, with 50% of apprenticeship applicants indicating a negative application experience, which in turn contributes to application drop-off rates.[18] Another key barrier that has been identified is accessing information about apprenticeships with a UCAS survey finding that 73% of students found it easy, or very easy to find information about university study, compared to 26% finding it easy or very easy to find information about apprenticeships.[19]

Another report found that apprentices commonly do not feel well-informed about their course, with information focussed on the number and timing of assessments, but not the actual content.[20] This report also found that up to 37% of apprentices withdrew from their apprenticeship, citing poor support from their employer, inadequate time off to study, poor provider organisation, poor quality teaching, not learning as many skills as expected, and COVID.

APPRENTICESHIP EXPERIENCE

For those that do start apprenticeships, generally, apprentices report a positive apprenticeship experience with 63% of respondents indicating they would recommend this pathway to family or friends.[18] According to the iFATE-run *Apprentice Panel Survey*, 53% of apprentices indicated that their employer and training provider were working together successfully, and 65% of apprentices indicated that they were satisfied with the quality of service from their training provider (more so those in small to medium enterprises). [21] The survey also found that 73% thought that the skills they were assessed on were needed for their occupation.

SMALLER EMPLOYERS CAN STRUGGLE

There is evidence that smaller employers find it more difficult to take on apprentices – with one study, for example, finding that small manufacturing businesses faced greater difficulty in taking on apprentices and meeting skill gaps for several reasons, including poor regulation of course quality, private providers prioritizing cost reductions over quality (which smaller employers are less equipped to compensate for), and small employers being less attractive clients to providers because they require more support and provide fewer apprentices.[22]

DRIVERS OF CHOICE

There is evidence that important factors for choosing to do an apprenticeship include access to employment, earning while learning, and a preference for more

[18] Where next? Improving the journey to becoming an apprentice Universities and Colleges Admissions Service (UCAS), 2023: https://www.ucas.com/about-us/news-and-insights/ucas-reports

[19] Where next? What Influences the Choices School Leavers Make? Universities and Colleges Admissions Service (UCAS), 2021: https://www.ucas.com/about-us/news-and-insights/ucas-reports

[20] Apprenticeship Outcomes and Destinations. The St Martin's Group, Learning and Work Institute, 2022: https://learningandwork.org.uk/resources/research-and-reports/apprenticeships-outcomes-report/?vgo_ee=elFNrzwWpG9EHcJyMisJxcalmC%2BHnTmWvLg7VQGVlUs%3D

[21] Apprentice Panel Survey Report, 2022: https://www.instituteforapprenticeships.org/reviews-and-consultations/reports/apprentice-panel-survey-october-2022/

[22] Benassi, Chiara, Niccolo Durazzi, and Johann Fortwengel. "Comparative Institutional Disadvantage: Small Firms and Vocational Training in the British Manufacturing Sector in Comparative Perspective." British Journal of Industrial Relations 60, no. 2 (2022): 371–90. https://doi.org/10.1111/bjir.12643

hands on styles of learning. UCAS research on drivers of school leaver choice for example indicated that of those not enrolling in a degree programme, the main drivers were earning money (50%), continuing to learn but in a different way (43%), and a desire to do something new and different (42%).[23]

ENROLMENT DEMOGRAPHICS

Across most demographic indicators, enrolment rates of apprentices are similar across Level 3, Level 4 and all apprenticeship levels (Figure 5):

- Around 85% of apprentices are white
- Most apprentices are over aged 24+ (51% overall)
- Around 85% of apprentices indicate no learning disability or difficulty
- Approximately half of all apprentices are female

These proportions are similar to the overall UK population in terms of gender and ethnicity, but show lower participation by learners with learning difficulties or disabilities (LLDD) according to DfE data and the most recent census.

RETENTION

Retention rates across apprenticeships vary, in some cases by up to 5-10%:

- Older apprentices have lower retention rates
- White apprentices the highest retention
- Female apprentices have slightly lower retention rates than males
- Those with learning difficulties have lower retention rates

Considering intersectionality, this means that some groups may be less likely to take up an apprenticeship, and more likely to drop out.

FIGURE 5: 2021/22 ENROLMENT DIVERSITY AND RETENTION RATES

Department for Education data shows the percentage of **All Apprenticeships**, **Level 3 Apprenticeships**, and **Level 4 Apprenticeships** within various demographic groups. The black dots show the retention rates associated with that group.
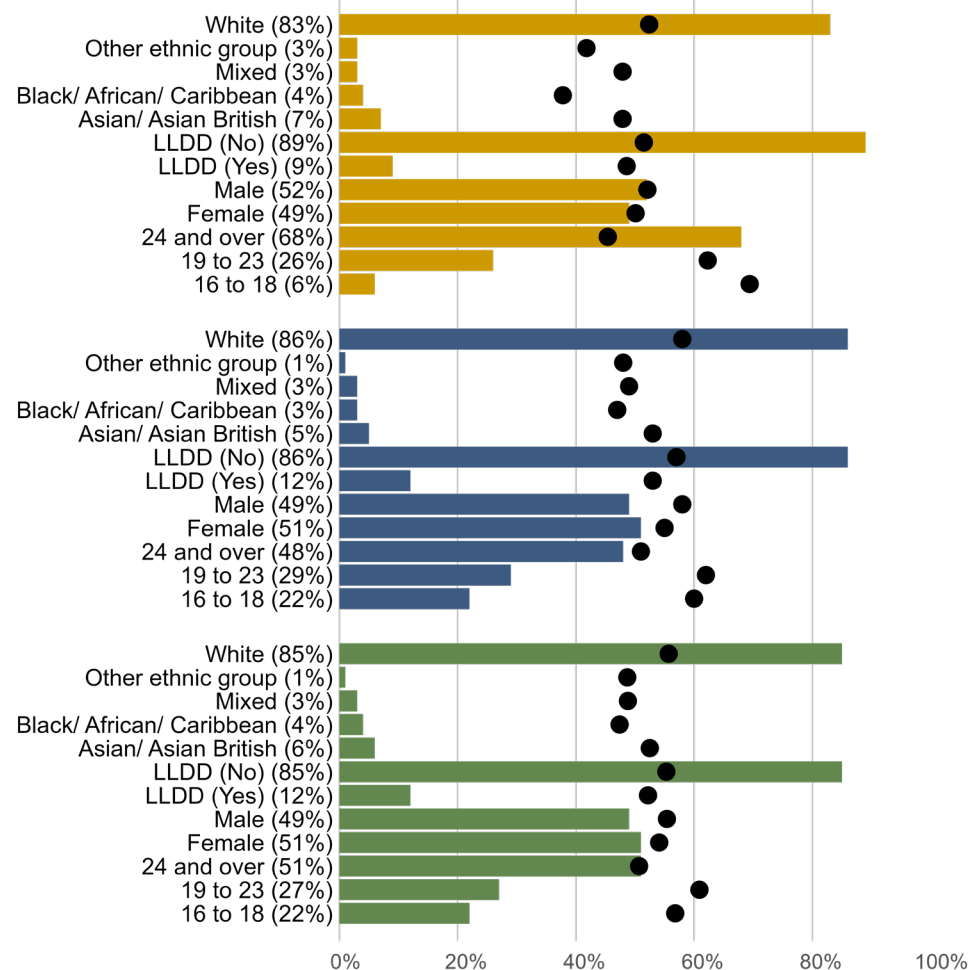
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[23] Where next? What Influences the Choices School Leavers Make? Universities and Colleges Admissions Service (UCAS), 2021. https://www.ucas.com/about-us/news-and-insights/ucas-reports

WHO IS APPLYING?

Overall, the Level 3 Data Technician apprenticeship, and the Level 4 Data Analyst apprenticeship are seeing year on year increases in enrolments (Figure 6), though it's worth noting that the Level 3 Data Technician apprenticeship only started in the 2020/23 academic year, and so it is still very early. In terms of demographics:

- The proportion of Level 4 Data Analyst apprentices over 24 has stayed fairly consistent in recent years

- Women are underrepresented in Level 3 Data Technician and Level 4 Data Analys starts, and below overall Level 3 and Level 4 starts which hover around 50%

- Both ethnicity and disability status data shows that new starts are consistent with overall Level 3 and Level 4 enrolments, though in the case of ethnicity, a more detailed ethnic group breakdown was not available

FIGURE 6: DATA ANALYSIS APPRENTICESHIP NEW STARTS

DfE data showing **Level 3 Data Technician**, and **Level 4 Data Analyst** apprenticeships started in each academic year. Only a partial year of data was available for 2022/23.
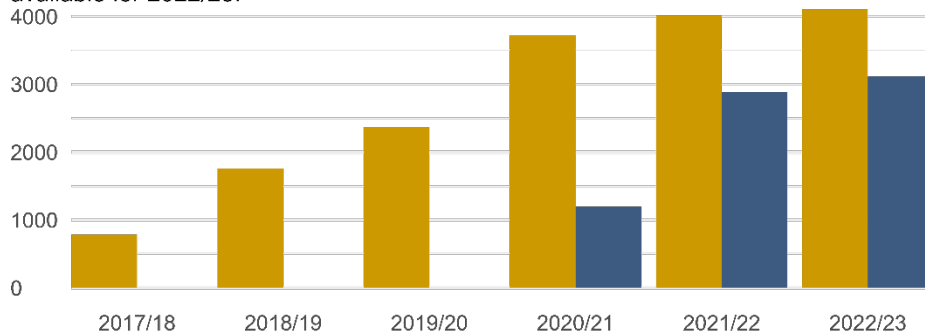
FIGURE 7: LEVEL 3 DATA TECH AND LEVEL 4 DATA ANALYST STARTS

Department for Education data on the diversity of new starts in **Level 3 Data Technician** and **Level 4 Data Analyst** starts. 2022/23 was a partial year.

18
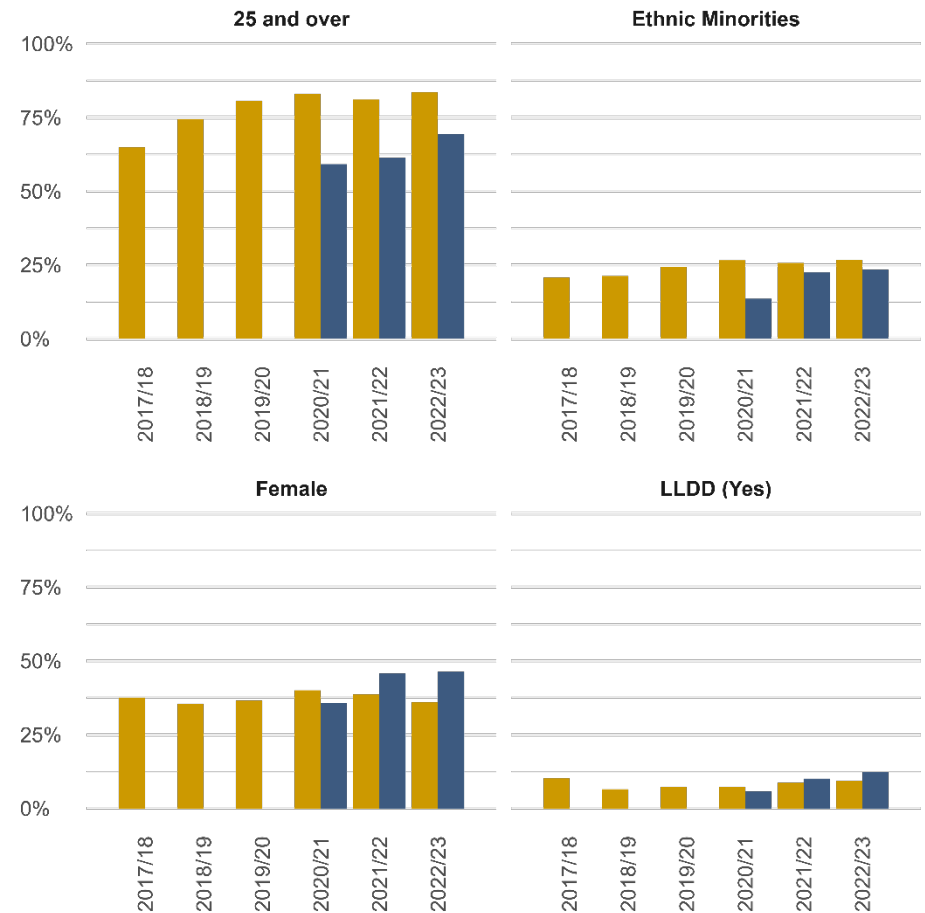
WHAT SKILLS ARE TAUGHT?

Of particular relevance to this report is the apprenticeship 'standard', the framework of skills and training developed by iFATE.[24] For the Level 3 Data Technician apprenticeship this standard is built around 10 'duties' that are underpinned by areas of knowledge, skills, and behaviours:

(Duty 1) Finding data from existing sources, and formatting it for analysis (e.g. exporting .csv or excel file from a database or downloading data from a website, and tidying it up so you can produce graphs)[25]

(Duty 2) Summarising and explaining data (e.g. producing tables, charts and graphs, etc.)

(Duty 3) Combining different datasets together to support analysis (e.g. combining data from two separate spreadsheets)

(Duty 4) Carrying out basic analysis to identify trends and patterns in the data (e.g. weekly, monthly, or seasonal trends)

(Duty 5) Checking for errors in the data and analysis by comparing different outputs (e.g. are there duplicates, too many results, proportions not adding to 100%)

(Duty 6) Storing, managing and distributing data and analysis in compliance with data security standards and legislation, and organisational requirements (e.g. saving data securely, making sure that privacy standards are maintained)

(Duty 7) Operating as part of a multi-functional team, and prioritising work within the context of a project (e.g. one person extracting and preparing data, another doing the analysis, and another preparing advice and reports)

(Duty 8) Reviewing your data skills needs, and keeping up to date with developments in technologies and trends (e.g. identify you may need upskilling in a particular area)

(Duty 9) Cleaning data, and testing and assessing your confidence in the data and its integrity (e.g. remove duplicates, typos, duplicate entries, check for out of date data, parse data - format telephone numbers according to a national standard)

(Duty 10) Clearly communicating and explaining the data and the results of analysis, either verbally or in writing (e.g. writing reports, preparing and or delivering presentations)

These duties are the central framework that a Level 3 Data Technician apprenticeship is based on, so we focus a substantial amount of analysis on how well these tasks cover the reality of working as a *'junior data analyst'*.

The Level 4 Data Analyst apprenticeship is based on 12 Duties which overlap but do not directly map with the 10 duties of a Level 3 Data Technician Apprenticeship.

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[24] https://www.instituteforapprenticeships.org/apprenticeship-standards/data-technician-v1-0
[25] Because there are two tasks here (finding, and formatting) we split this into two skills for some of the discussion and analysis

CONTEXT

PURPOSE OF THIS SECTION OF THE PROJECT

For this section of the project, we wanted to understand the perspectives of the general public: their views on learning statistics and data analysis, their overall level of statistical and data analysis training, their self-evaluation of and confidence in their skills, and how well-prepared they feel when it comes to working with data in their day-to-day life and employment. This in turn allows us to consider who might benefit from non-degree pathways like the Level 3 Data Technician apprenticeships and the new T-Levels.

APPROACH

To ensure a broad range of perspectives and the robustness of any inferences made, we conducted a nationally representative survey which yielded 2,155 responses across a range of demographics (Figure 8). The sample construction and survey collection was managed by an external surveying firm.

The survey itself included 7 multi-choice questions with each question related to a different area of interest:

1) Participants level of statistical training
2) Participants opinions on apprenticeships and statistics
3) Participants opinions on the relevance of data analysis to their work
4) Participants opinions on the importance of data analysis tasks in their work
5) Participants confidence in performing data analysis tasks
6) Participants opinions on what would encourage them to learn data analysis
7) Participants opinions on what barriers to learning data analysis

Both the question order, and the order of options within each question were randomised. The full dataset of responses and all questions asked are available on the RSS website along with this report.

FIGURE 8: SURVEY RESPONDENT DEMOGRAPHICS

Survey respondents included a mix of of demographic factors across social grade, gender, region, industry, ethnicity, and age. To account for variation from census data, responses were weighted to ensure consistency with national demographics.
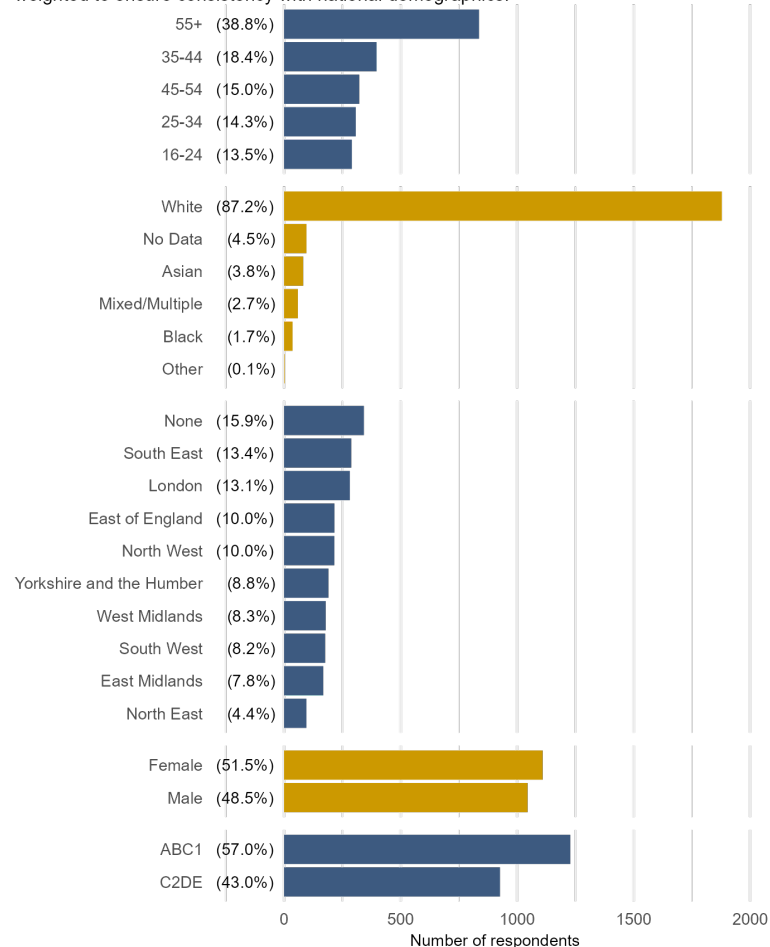
GENERAL FINDINGS

- 60% of respondents had not completed any level of training in statistics or data analysis

- Only 10% of respondents indicated they were aware of their options for learning data analysis

- 13% of respondents thought they had all the statistical analysis skills they needed for their work

- 15% of respondents expected changes in the way we use data science and statistics as a society to impact their job in the next 5-10 years, but only 11% of respondents felt equipped to deal with those changes

- The skills that more people were confident carrying out were basic analysis at 30% and summarising data into tables and graphs at 28%. Only 16% indicated they were confident in reviewing their own skill needs

- There does not appear to be a statistically significant relationship between confidence in any particular skill and having learned statistics or data analysis through a Level 3 or 4 apprenticeship

- The factors that respondents most commonly indicated would be important in encouraging them to undertake further training were: encouragement from their employer at 23%, training options that were flexible at 21% or online at 20%, and skills being applicable to their current job 19%

Q1) STATISTICS AND DATA ANALYSIS TRAINING

Here we asked participants about the types of statistics training they had completed. Of particular note, almost 60% of respondents did not think they had completed any statistics training, and outside of university and high school, most people either rely on their employers' in-house training or self-directed, independent learning. The data also indicate that age, region, gender, and social grade may play a role the type of training people participate in. Looking at 95% confidence intervals for sample proportions we also found:

- Those in older age brackets are less likely to have taken any training in statistics (42% of respondents aged 16-24, compared to 56% of those aged 35-44, and 62% of those aged 45-54)

- 65% of female respondents indicated that not completing any statistics, compared to 54% of male respondents, but were just as likely as men to have completed university level statistics

- 66% of respondents in the C2DE social grade indicated they had not completed any statistics training, compared to 55% of ABC1 respondents[26]

There also appears to be a gender component to choice of study, with women indicating they are less likely to have studied independently, through a short course, bootcamp, at A-levels, or through an apprenticeship than men. Similarly those in a lower C2DE social grade were less likely to have participated in self-directed learning, short courses, A-levels or university statistics courses. There was however no evidence of a significant difference (at the 95% confidence level) between social grades in relation to apprenticeship uptake.

FIGURE 9: TRAINING IN STATISTICS AND DATA ANALYSIS

Q1) In which of the following ways, if any, have you completed training in statistics or data analysis?

(Q1.13) None	59.6 %
(Q1.12) Don't Know	2.3 %
(Q1.11) Other	2 %
(Q1.09) Postgraduate	4.6 %
(Q1.08) Undergraduate	11.4 %
(Q1.07) Level 3 or 4 Apprenticeships	2.9 %
(Q1.06) A Levels	10.3 %
(Q1.05) GCSE	14.8 %
(Q1.04) Short courses	2.6 %
(Q1.03) In House	7.1 %
(Q1.02) Bootcamps	1.7 %
(Q1.01) Independent	5 %

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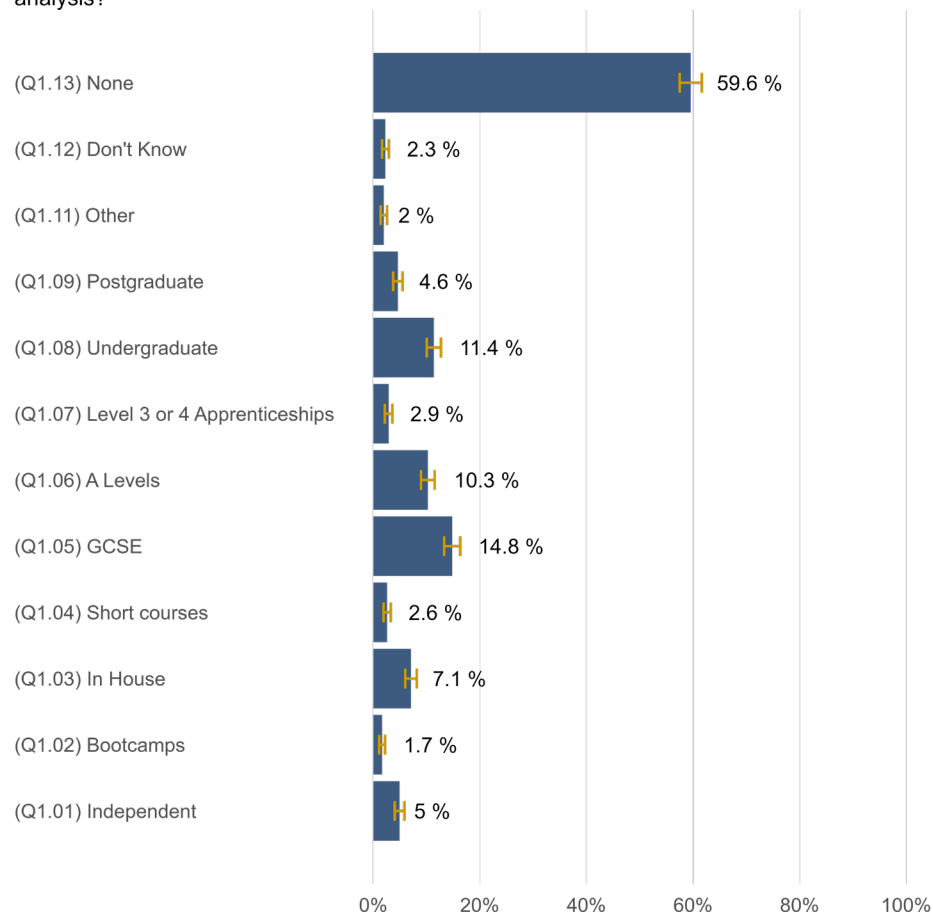
[26] Social grade is a socio-economic classification used by ONS as a way of grouping people based on their social and financial situation. ABC1 refers to the high social grade, and C2DE to the lower social grade. For more information see: https://www.ons.gov.uk/census/aboutcensus/censusproducts/approximatedsocialgradedata

Figure 10 here shows the flows between different training options, with the width of each Sankey flow scaled relative to the number of people indicating that they had completed that sort of training.

Although the training pathways do not always flow in the same direction (for example, people could complete facilitated learning before university) this diagram does provide a sense of the scale of the connections between different pathways. Training types have been grouped so that 'Facilitated Courses' includes short courses, in house training, and bootcamps, 'Highschool' includes GCSEs and A Levels, and 'University' includes postgraduate and undergraduate study.

Independent Learning: 5%

Apprenticeship (L3 or L4): 2.9%

Highschool: 21%

UK Population: 99.1%

University: 14.2%

None/Don't Know: 61.9%

Facilitated Courses: 10%
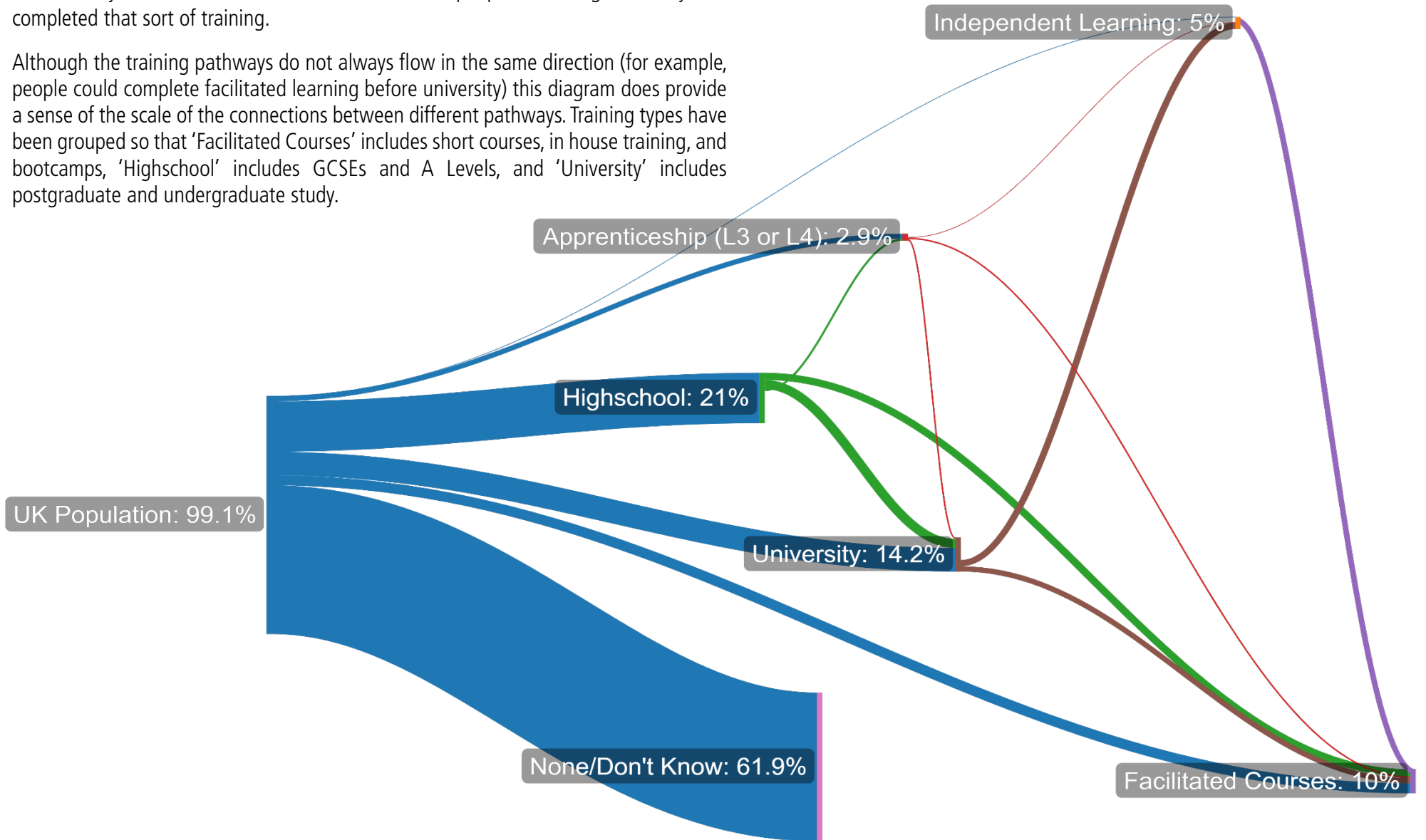
The second question presented participants with a set of statements about attitudes towards apprenticeships, particularly as pathways to learn statistics and data analysis. Of particular note:

- Just under 10% of respondents said that they were aware of their options for learning statistics and data analysis. Of those that didn't indicate they were aware of their options, 63% had not completed any training in statistics and data analysis

- Just under 10% of respondents didn't think they had the aptitude for maths and statistics needed to do an apprenticeship in the subject. Of that 10%, 74% had not completed any training in statistics and data analysis, but 18% had completed training in GCSEs or A levels

- Looking at social grade, respondents in ABC1 social grade were more likely to favour short courses at 14% compared to 9% for C2DE, more likely to favour university at 8% compared to 3% for C2DE, and more likely to be aware of their options at 13% compared to 6% for C2DE

- Female respondents were less likely to consider doing an apprenticeship at 5% compared to 10% for males, less likely to favour university over apprenticeships at 4% compared to 8% for males, and less likely to be aware of their options at 7% compared to 12% for males

This starts to paint a picture that people are broadly positive about apprenticeships, and many see them as a viable pathway for learning about statistics and data analysis even at different career stages, but a concerningly low percentage of people are aware of their options.

FIGURE 10: OPINIONS ON DATA ANALYSIS TRAINING PATHWAYS
For this question we asked participants: *'Q2) Which of the following statements, if any, do you agree with?'*
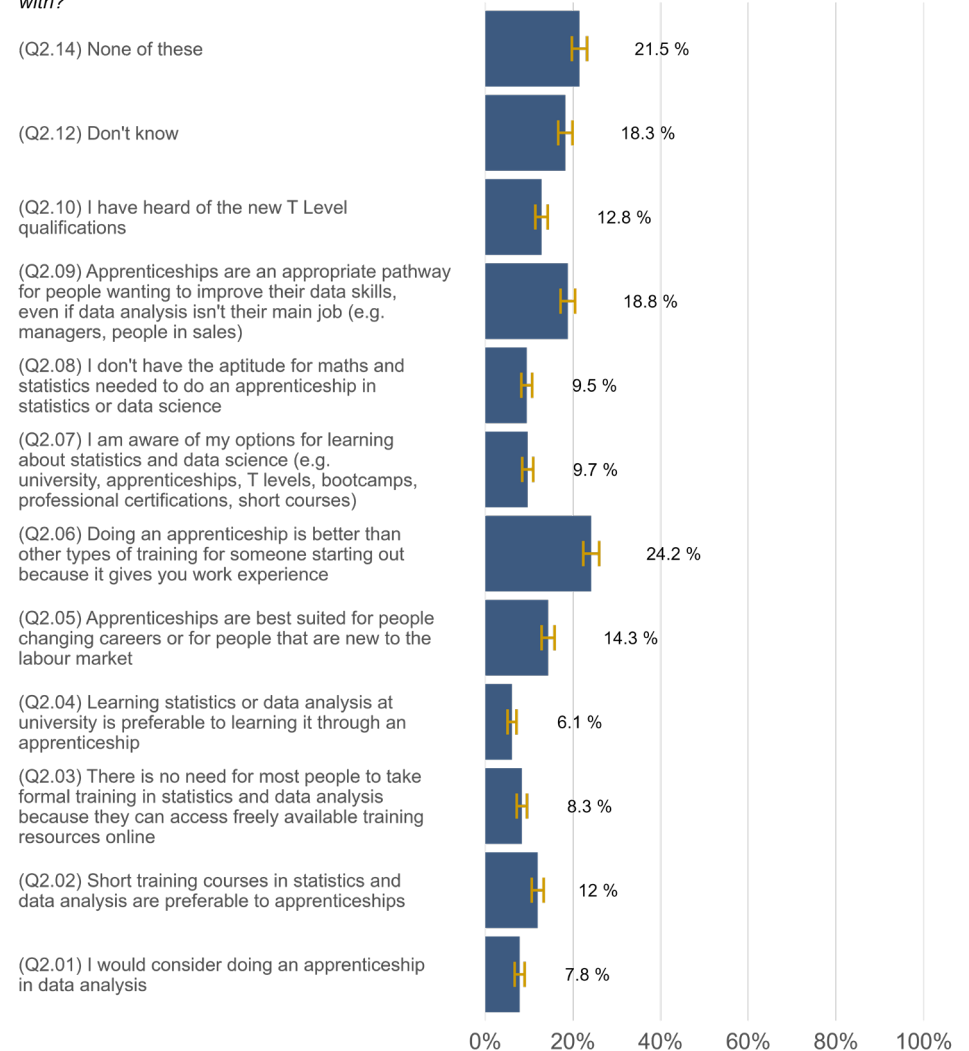

(Q2.14) None of these — 21.5 %

(Q2.12) Don't know — 18.3 %

(Q2.10) I have heard of the new T Level qualifications — 12.8 %

(Q2.09) Apprenticeships are an appropriate pathway for people wanting to improve their data skills, even if data analysis isn't their main job (e.g. managers, people in sales) — 18.8 %

(Q2.08) I don't have the aptitude for maths and statistics needed to do an apprenticeship in statistics or data science — 9.5 %

(Q2.07) I am aware of my options for learning about statistics and data science (e.g. university, apprenticeships, T levels, bootcamps, professional certifications, short courses) — 9.7 %

(Q2.06) Doing an apprenticeship is better than other types of training for someone starting out because it gives you work experience — 24.2 %

(Q2.05) Apprenticeships are best suited for people changing careers or for people that are new to the labour market — 14.3 %

(Q2.04) Learning statistics or data analysis at university is preferable to learning it through an apprenticeship — 6.1 %

(Q2.03) There is no need for most people to take formal training in statistics and data analysis because they can access freely available training resources online — 8.3 %

(Q2.02) Short training courses in statistics and data analysis are preferable to apprenticeships — 12 %

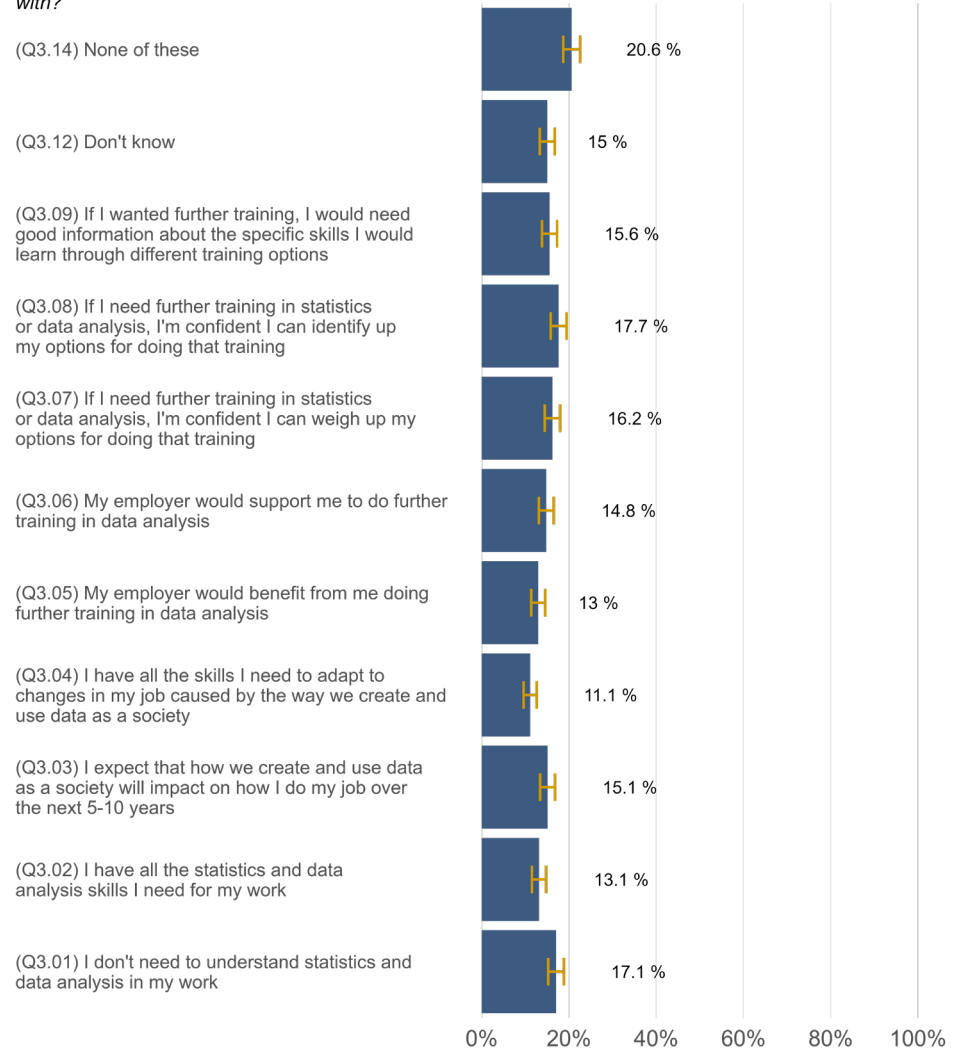(Q2.01) I would consider doing an apprenticeship in data analysis — 7.8 %

For this question, we asked people to think about how statistics and data analysis might be relevant to their careers now or in the future. Because these questions relate to future employment, respondents that were retired were excluded:

- Only 13% of respondents thought they had all the statistical analysis skills they needed for their work. Of those that didn't, 79% had indicated in Q2 that they were not aware of their options for learning statistics

- 17% of respondents didn't think they needed to understand statistics in their job. Of that 17%, 68% had not completed any training in statistics and data analysis

- 14.8% of respondents thought their employer would benefit from them improving their data analysis skills, but just over 11% of them thought they didn't have the aptitude for statistics and data analysis, and 77% didn't know what their options were for upskilling

- Only 15% of respondents expected changes in the use of data science and statistics to impact on their job in the next 5-10 years, and only 11% of respondents felt equipped to deal with those changes. Interestingly of the 15% that expected change, 75% did not indicate that they feel equipped to deal with that change. Of those expecting change, 58% of them had completed some level of statistics or data analysis training

Looking across these responses, we again see the theme of difficulty in navigating statistics and data analysis training being reinforced, despite a clear need for increased capability. A cautious interpretation of the first point above is that potentially up to 69% of respondents that were still employed felt they needed better data skills for their job, but weren't aware of their learning options. Cautiously as not responding 'yes' to a question is not automatically a 'no'.

FIGURE 11: RELEVANCE OF DATA ANALYSIS TO RESPONDENTS WORK
For this question we asked participants: *'Q3) Which of the following statements, if any, do you agree with?'*

(Q3.14) None of these	20.6 %
(Q3.12) Don't know	15 %
(Q3.09) If I wanted further training, I would need good information about the specific skills I would learn through different training options	15.6 %
(Q3.08) If I need further training in statistics or data analysis, I'm confident I can identify up my options for doing that training	17.7 %
(Q3.07) If I need further training in statistics or data analysis, I'm confident I can weigh up my options for doing that training	16.2 %
(Q3.06) My employer would support me to do further training in data analysis	14.8 %
(Q3.05) My employer would benefit from me doing further training in data analysis	13 %
(Q3.04) I have all the skills I need to adapt to changes in my job caused by the way we create and use data as a society	11.1 %
(Q3.03) I expect that how we create and use data as a society will impact on how I do my job over the next 5-10 years	15.1 %
(Q3.02) I have all the statistics and data analysis skills I need for my work	13.1 %
(Q3.01) I don't need to understand statistics and data analysis in my work	17.1 %

Q4) DATA SKILLS IMPORTANCE AND CONFIDENCE

For these questions we asked respondents to indicate how important the 10 duties listed for the Level 3 Data Technician apprenticeship were to their job on a day-to-day basis, and how confident they were in carrying these out. Participants that had never worked were excluded from the analysis.

- 37% indicated that none of these skills were important

- 23% indicated that communication of data was important

- The tasks that were important to fewer people were cleaning data (14%), combining data (14%), and reviewing their own skill needs (14%). 59% of those that indicated they thought their work would be impacted by changes to the way we use data in the next 5-10 years did not indicate they were confident reviewing their own skill needs

We then asked respondents how confident they were in performing these tasks:

- 34% indicated that they were not confident performing any of these tasks

- 17% indicated they were not confident in reviewing their own skill needs - a trend that continues through this report

- The skills that more people were confident in were: carrying out basic analysis (31%), and summarising data into tables and graphs (29%)

We also tested for independence between having confidence in any particular duty and having also completed statistics or data analysis training through a Level 3 or Level 4 Apprenticeship. The only statistically significant relationship identified was a negative relationship between completing an apprenticeship and (D.14) None. A reasonable interpretation of this is that participating in an apprenticeship can help someone be more confident in some statistical skills but there is no evidence that it has a consistent impact on confidence on any particular skill.

FIGURE 12: CONFIDENCE AND IMPORTANCE OF BASIC DATA ANALYSIS

For these questions, we presented people with the list of 10 Duties that the Level 3 Data Technician apprenticeship is based on, and asked them to indicate which of these tasks they were **confident** performing, and which of the tasks were **important** in their work.
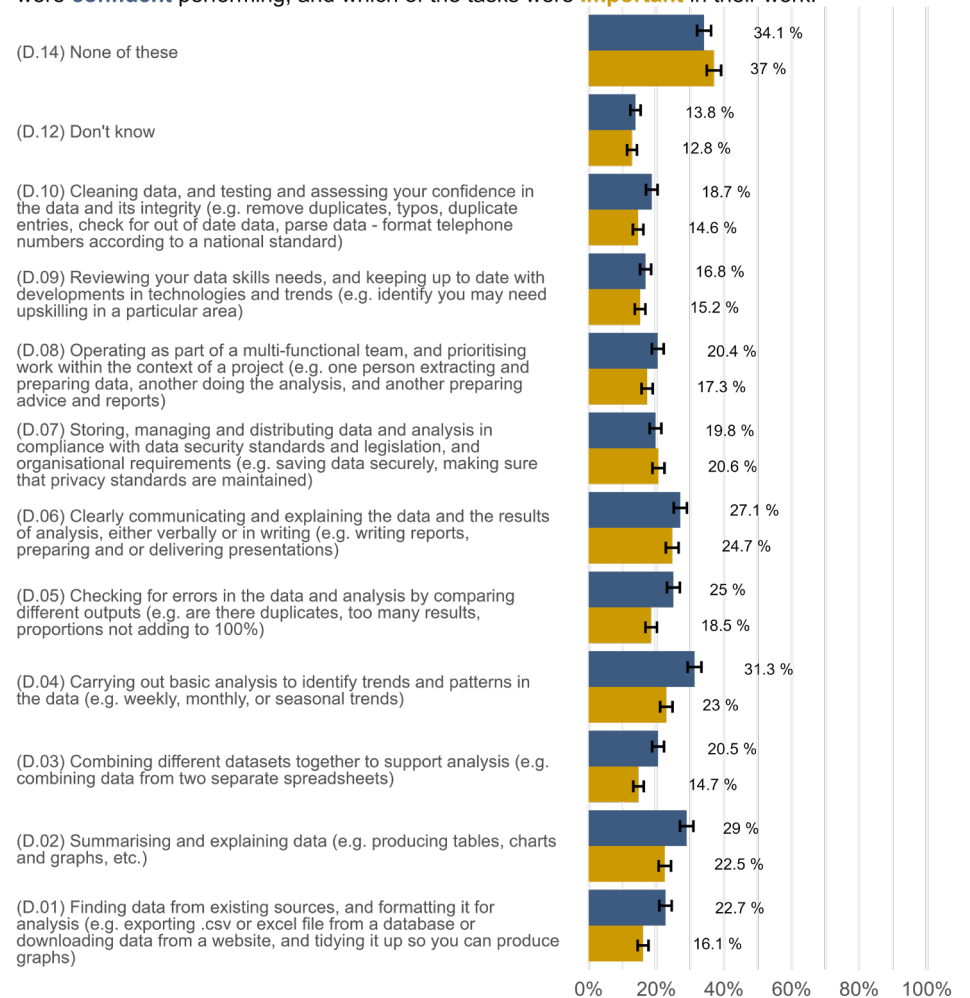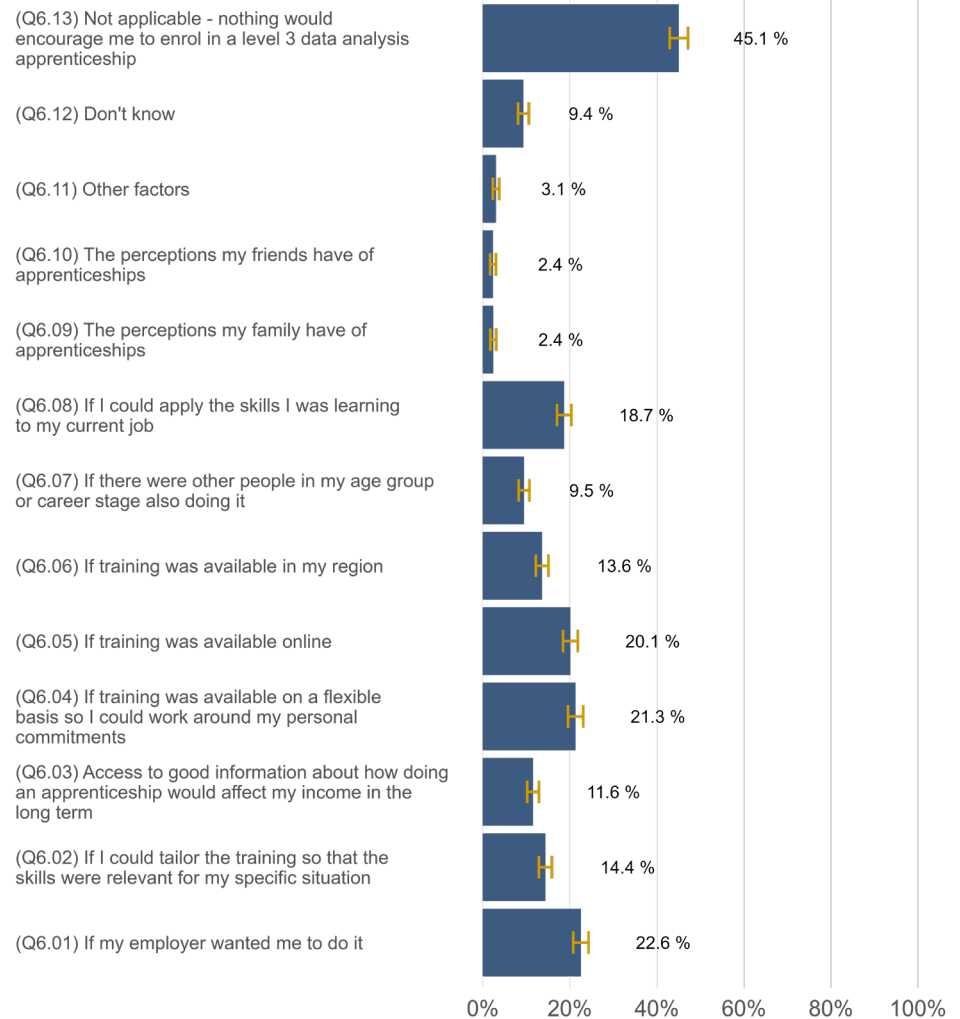
Q6) INCENTIVES TO TAKE UP TRAINING

Here we asked participants about what would be important in encouraging them to take up training through a Level 3 Data Technician apprenticeship.

- 45% indicated that nothing would encourage them to do so, this group was more likely to be in the oldest two age groups – 45 to 54, and 55+. 73% of them also indicated that they had not completed any statistics and data analysis training. Of the remaining 25%, 16% had already completed training at GCSE or A levels and 8% at undergraduate

- Of those that would consider it, the factors that were most commonly important were encouragement from their employer (23%), flexible (21%) or online (20%) training options, and skills being applicable to their current job (19%)

- 10% of respondents thought it was important to see others at their career stage or age also doing it. This was more so a factor for younger respondents (14-15% of 34's) than for older respondents (6% of those 45+)

- 14% of respondents indicated that the availability of training locally was important

- Looking at gender most responses were similar, with female respondents less likely to indicate the importance of location at 10% compared to 17% for males, perceptions of family 1% compared to 4% for males, or friends 1% compared to 4%

These responses start to show that of those that would benefit from additional statistical training at the introductory level and would also consider doing it, factors like the flexibility of training delivery, encouragement from employers, and the applicability of skills were are all important incentives.

FIGURE 13: INCENTIVES TO LEARN DATA ANALYSIS

For this question we asked participants:'*Q6) Which of the following factors, if any, would you consider to be important for encouraging you to undertake a Level 3 Data Technician Apprenticeship?*'

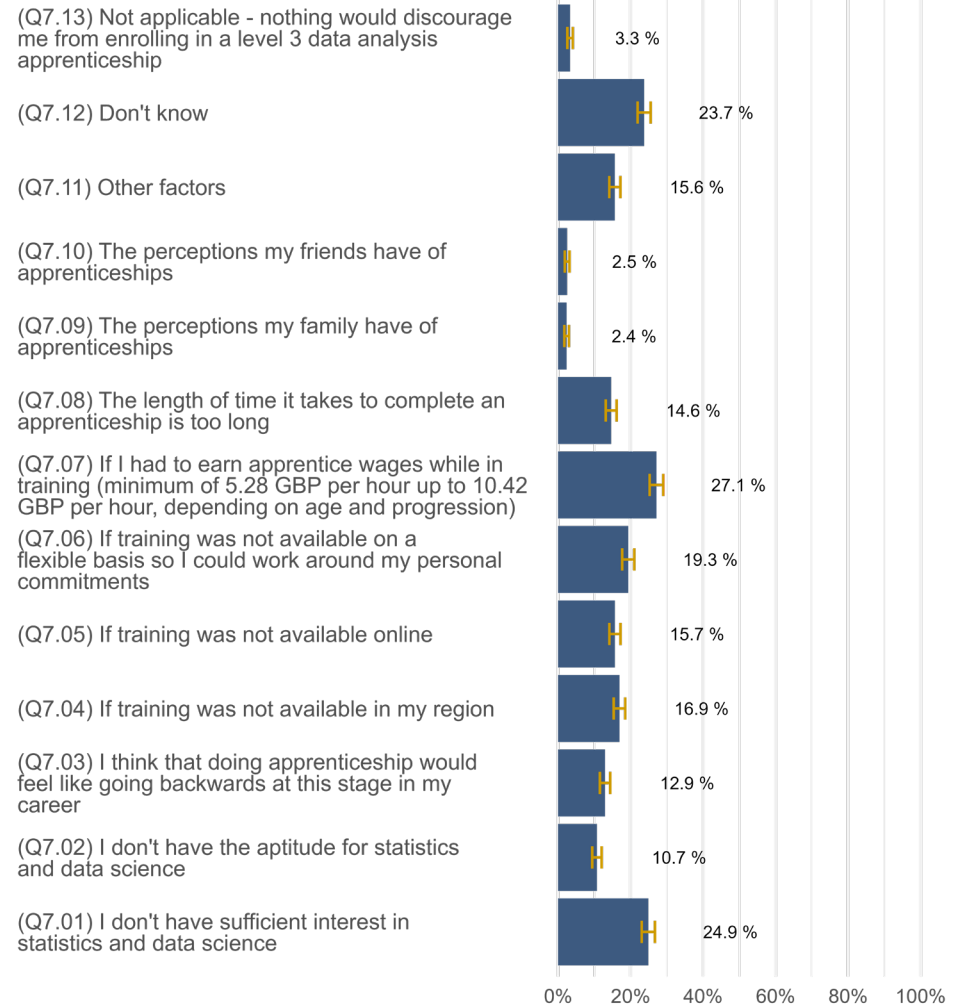| Factor	%
(Q6.13) Not applicable - nothing would encourage me to enrol in a level 3 data analysis apprenticeship	45.1 %
(Q6.12) Don't know	9.4 %
(Q6.11) Other factors	3.1 %
(Q6.10) The perceptions my friends have of apprenticeships	2.4 %
(Q6.09) The perceptions my family have of apprenticeships	2.4 %
(Q6.08) If I could apply the skills I was learning to my current job	18.7 %
(Q6.07) If there were other people in my age group or career stage also doing it	9.5 %
(Q6.06) If training was available in my region	13.6 %
(Q6.05) If training was available online	20.1 %
(Q6.04) If training was available on a flexible basis so I could work around my personal commitments	21.3 %
(Q6.03) Access to good information about how doing an apprenticeship would affect my income in the long term	11.6 %
(Q6.02) If I could tailor the training so that the skills were relevant for my specific situation	14.4 %
(Q6.01) If my employer wanted me to do it	22.6 %

The last question we asked people was about what would prevent them from taking up training through a Level 3 Data Technician apprenticeship:

- Low apprenticeship wages were the most common barrier indicated at 27% of respondents, followed closely by a lack of interest in the subject at 25%, a lack of flexible options 19% and a lack of local availability 17%

- Of those with an aversion to apprentice wages, 46% were 25-34. This was also the largest barrier for the ABC1 social grade at 32%, compared to 21% for those in the C2DE group

- Male respondents on the other hand were more likely to see an apprenticeship as a backwards step (16% compared to 11% for female respondents)

- A lack of flexibility was a considered a significant barrier by 19% of all respondents, 23% of female respondents, and 16% of male respondents

- Q3 – Q8 were all more often selected as an important barrier for those in the ABC1 social grade than they were for those in the C2DE group

Across these responses we see that not only are wages, location and flexibility key issues, but also potential signs of inequity in access and visibility – female respondents being more likely to indicate a lack of interest, or self-assess as having a lack of aptitude indicates that more work is needed to support visible career paths for women. Similarly when designing programmes, ensuring equitable access across demographics is crucial.

FIGURE 14: BARRIERS TO LEARNING DATA ANALYSIS

For this question we asked participants: *'Q7) Which of the following factors, if any, would discourage you from participating in a Level 3 Data Technician Apprenticeship?'*

(Q7.13) Not applicable - nothing would discourage me from enrolling in a level 3 data analysis apprenticeship — 3.3 %

(Q7.12) Don't know — 23.7 %

(Q7.11) Other factors — 15.6 %

(Q7.10) The perceptions my friends have of apprenticeships — 2.5 %

(Q7.09) The perceptions my family have of apprenticeships — 2.4 %

(Q7.08) The length of time it takes to complete an apprenticeship is too long — 14.6 %

(Q7.07) If I had to earn apprentice wages while in training (minimum of 5.28 GBP per hour up to 10.42 GBP per hour, depending on age and progression) — 27.1 %

(Q7.06) If training was not available on a flexible basis so I could work around my personal commitments — 19.3 %

(Q7.05) If training was not available online — 15.7 %

(Q7.04) If training was not available in my region — 16.9 %

(Q7.03) I think that doing apprenticeship would feel like going backwards at this stage in my career — 12.9 %

(Q7.02) I don't have the aptitude for statistics and data science — 10.7 %

(Q7.01) I don't have sufficient interest in statistics and data science — 24.9 %

4: WHAT WE LEARNED FROM JUNIOR ANALYSTS

CONTEXT

PURPOSE OF THIS SECTION OF THE PROJECT

For this section of the report, we wanted to understand the perspectives of junior analysts, particularly those who participated in apprenticeships, including:

- What their apprenticeship experience was like
- What motivated them to choose particular pathways
- How well the skills they learned aligned with the realities of their work
- What barriers, if any, did they face to participating in their apprenticeship

APPROACH

The discussion below is qualitative, and informed by interviews (n=8) and in-depth questionnaires (n=20) with junior analysts and apprentices. Participants included:

- 90% from large (250+ employers)

- A range of sectors including healthcare, sales, higher education, central and local government, consulting, real estate, healthcare, manufacturing and distribution

- 60% female, 40% male[27]

- 65% had participated in an apprenticeship, 20% had participated in a Level 3 Data Technician apprenticeship

- 60% white

The questionnaires were used to inform the choice of semi structured interview questions, and then to supplement the interviews for thematic analysis. Interviews were semi structured and conducted online. Transcripts were automatically recorded, and then used for thematic analysis.

GENERAL FINDINGS

- Participants generally felt supported by their employers, and positive about their decision to do an apprenticeship

- The relationship between providers and employers was commonly difficult, with providers tending to provide insufficient communication, inaccurate or vague information, and a general lack of responsiveness to employer needs

- The apprentice experience of providers was mixed, with some very happy with their tutors but frustrated by provider communication, and others dissatisfied across the board. Very few apprentices were positive about the communication and organisation of their provider overall

- Apprentices indicated that the skills being taught are generally the right ones, however there were frustrations around limitations on the specific platforms being taught (only having tableau available due to course numbers when working in a Power BI environment for example) and limited on their ability to adapt their learning plan to align with their work projects

- Motivations differed between school leavers and those undertaking a mid-career transition. School leavers tended to be attracted by the practical learning approach or dissatisfaction with university; mid-career transitioners were commonly encouraged by their employer to do an apprenticeship or considered it impractical to leave paid employment to return to study

- Barriers experienced by apprentices in data analysis roles do not appear to differ from those experienced by apprentices more broadly

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[27] Gender diverse responses were included but not selected by participants.

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THE APPRENTICE EXPERIENCE

When asked about their apprenticeship experience, there was a fairly common story – apprentices felt that an apprenticeship was the right way to learn the skills they needed to and were mostly positive about their tutors and the things they were learning. However, they or their employers found the administrative side of working with their providers difficult. Apprentices often noted that providers were unresponsive, difficult to communicate with, and difficult to get accurate and timely information from.

As a learning pathway, participants reported that they were generally positive about the appropriateness of learning data analysis through an apprenticeship. They referenced the ability to apply skills they were learning, and also to gain experience that they wouldn't have been able to get through a university degree including: giving presentations to managers; having to work with imperfect datasets; sitting in on meetings with clients or teams requesting data so they could see the real world context behind data requests; and the day-to-day basics of being in a workplace, like professional email communication and working collaboratively in teams.

Generally, respondents were positive about the support they received from their employers, noting that their employer made an effort to provide them with projects that supported their learning, and helped manage their workload so that spending 20% of their time on off-the-job training was not an undue burden. This does not mean that time management was not a challenge, however, it was not one of the more substantial challenges reported. Where this tended to cause problems was when a project was moving rapidly and required day to day visibility by the apprentice. This could lead to an apprentice missing important context while taking a day out for training, leaving them 'playing catch-up'.

Participants were less positive in relation to the administrative side of the apprenticeship, reporting that it was often difficult to get details about exactly what they would be learning, or the specifics of their assessments, and noting that the rigid structure of the learning plan made it difficult to adapt learning schedules to fit with the actual project work that an apprentice may be working on. Some participants noted that opportunities arose for them to work on projects where learning skills in a different order would be helpful however, providers respond slowly, preventing these opportunities from being taken.

We note that the sample of apprentices we interviewed was skewed towards large organisations, and so the experience of apprentices in small organisations may differ to that reported here.

ALTERNATE LEARNING PATHWAYS

In addition to apprenticeships, we also asked participants about their experience of alternate learning pathways. These included in-house training, data analysis or coding bootcamps, structured courses delivered by organisations like the RSS, micro-credentials like IBM or Microsoft, and independent learning whether through structured resources like Coursera, EdX, Datacamp, or LinkedIn learning, or self-directed through resources like YouTube.

Participants generally considered the actual skills learned to be more important than the qualifications they had, but raised that the main challenge was in identifying the right skills to learn, and where to learn them from.

Almost all participants had made use of independent learning, with mixed results. Participants noted that there was some really good quality material that could be drawn on, but the plethora of options made it difficult to decide where to focus their time and effort. The lack of an external, trusted source to help judge quality meant that often they had to engage with the material before they could judge how useful it was. There are also so many potential topics and skills that

could be learned that it was difficult to decide what they should actually learn, particularly at different career stages, given that learning everything was not a viable strategy. While some participants had sought advice from managers and more experienced colleagues, and others had taken a 'wait-and-see' approach, learning skills as and when they became useful, there was a general view that deciding what to learn could often take as much time and effort as actually learning it.

CAREER PROGRESSION AND ROLE BOUNDARIES

When asked about career development and the pathway ahead, most of the participants noted that there was not a clear pathway for them. This was not always considered a bad thing however. While in principle there was often a pathway with some variation on data technician/junior analyst to analyst, to senior analyst, the actual progression pathway, and the boundaries between stages was far less clear. Although on paper the Data Technician role is primarily about finding, formatting and preparing data for analysis rather than data analysis itself, in practice many Data Technicians were engaged in analysis.

"At the start, I wouldn't have valued multi-functional teams, but now it's really important. And being a data person, knowing how to talk to someone that isn't a data person is so useful."

Instead, the main skillset that commonly differentiated career stages and seniority was decision making and participating in conversations. Where new junior analysts/data technicians were generally tasked with smaller, specified blocks of data work, more experienced technicians and analysts noted that their role became more focussed on requests for desired outputs, and exercising judgment about how to achieve them. They also reported participating more often in discussions that scoped those outputs, and having discussions with managers and their wider teams to discuss and explain the approach they took.

Data Technicians in smaller organisations or organisations with less mature data analysis capabilities also indicated that they had a lot more freedom to shape their role. This was often helped by their employer wanting to improve its overall use of data, and lift its data capability, but not being fully aware of what that meant, or the skills that would be required.

ALIGNMENT OF THE SKILLS BEING TAUGHT

Generally, participants indicated that the specific skills being taught were right ones, and the '10 Duties' that the Level 3 Data Technician Apprenticeship was built around was the right framework. Some participants noted that some of the skills do not seem particularly important until you become more experienced, but that laying the foundations at an early stage, and reinforcing them was beneficial to long term development. Although the overall framework was right, and the things being taught were considered useful, one theme that emerged was that the timing of skills being taught were not always directly relevant to the projects they were working on. This meant that those skills could be lost and would need to be re-learned later what it was applicable.

Another common experience was the minimum class sizes for specific modules. In practice this meant apprentices may be being trained to use platforms that their employer didn't use at all – being trained on Tableau when their employer used Power BI or vice versa for example. While transferable skills are important, employers investment in a platforms was often locked. This created additional pressure on employers and apprentices, as it could double the amount of training needed - first training in one platform through their apprenticeship, and then re-training to perform the same tasks on another platform used by their employer.

MOTIVATIONS

When discussing what motivated them to choose a particular avenue of training (a Level 3 apprenticeship, a Level 4 apprenticeship, or a university degree for

example) the themes that emerged clustered around two participant groups: school leavers and people who were transitioning mid-career.

"I'd rather go and find out something interesting with [data analysis tools] than trying to prove the fact that this thing that you've told me works, actually works."

The school leavers we interviewed were commonly motivated by dissatisfaction with online university learning due to COVID (arguing that an important part of university is the social experience). They also noted greater interest in applied rather theoretical learning, and being able to learn on the job, rather than learn and then get a job in their field. Some participants also noted that while they had started with a Level 3 Data Technician Apprenticeship, they probably would have chosen a Level 4 Data Analyst Apprenticeship if they had better access to information about what was included in each apprenticeship and how the two apprenticeships related to each other when deciding on a pathway.

The mid-career transitioners we spoke to indicated a variety of motivations. Some were moving into data and analysis-focussed jobs because they were looking for a career change. Many of these already had degrees (some at PhD level) but their employers supported them into an apprenticeship as a structured programme of professional development and to pivot their existing skills within a data analysis discipline. Others had little to no experience with data, and so doing an apprenticeship was their first step into this career pathway. For many of these participants, the key benefit of facilitating a mid-career transition through an apprenticeship was the practicality of it. They had already been working and earning for years and had established lives, often with dependents and mortgages. Returning to unpaid study was simply not a practical option for them.

Participants also indicated that the perceptions friends and family had of apprenticeships, whether positive or negative, played minimal, or no role in their decisions. Of those interviewed, only one indicated that they had received advice from a school careers service, and this had been an 'accidental' conversation.

BARRIERS AND CHALLENGES

When asked to identify barriers and challenges to taking up apprenticeships, the themes identified by junior analysts were consistent with those already identified for apprenticeships across the broader apprenticeship literature:

- The lack of regional availability
- Poor communication from providers
- Poor access to information on available options
- Poor access to details of what was included in training
- Difficulty determining good-quality providers

Those managing a mid-career transitions also indicated that maintaining work-life balance with family commitments was made more challenging by balancing employment and training at the same time.

Promisingly virtually no apprentices indicated that they had experienced discrimination based on age, sex, or disability, the vast majority of those we spoke to were positive about their experiences from an EDI perspective. Many of the women interviewed noted that half, if not more, of their colleagues were women, including in management positions, and older apprentices tended to find that their skills and experience were valued, including non-technical skills like time management and collaboration.

WHAT THEY WANTED

At the end of each interview we asked the analysts we spoke to what outputs from this project they would find particularly useful, with most responses coalescing around three main themes:

- More accessible career and skills map to help support development
- Support to navigate training options at different career stages
- Better insights into quality of training and learning pathways

CONTEXT

PURPOSE OF THIS SECTION OF THE PROJECT

Here we wanted to understand the perspectives of employers and managers that worked with junior analysts and apprentices, particularly:

- What their apprenticeship experience was like
- What matters when employing someone on one pathway over another
- What skills really matter, and how well are apprenticeships delivering
- What, if any barriers they see for junior analysts in non-degree pathways

APPROACH

The discussion below is qualitative and informed by interviews (n=9) and in depth questionnaires (n=22) with employers and managers, of these:

- 90% from large (250+) employers

- 45% described their organisations data analysis functions as 'mature', the remainder as 'established, but still determining how to best use it'

- From a range of sectors including healthcare, sales, higher education, central and local government, consulting, real estate, healthcare, manufacturing and distribution

- 80% had participated in an apprenticeship, 20% had participated in data technician apprenticeship

The questionnaires were used first to inform the choice of interview questions. Interviews were semi structured and conducted online. Transcripts were automatically recorded, and then used for thematic analysis alongside the questionnaires.

GENERAL FINDINGS

- Apprenticeship experiences varied, with most employers positive about the apprentices themselves, but less so about the apprenticeship providers. The main issue raised was timely and accurate communication

- While the skills taught in an apprenticeship are generally the right ones, the major gap for a lot of junior analysts is in the grasp of the basics – what techniques to apply and when

- In terms of areas of learning, several employers noted that the broader excitement around the use of machine learning and AI often overshadowed more fundamental skills, and training on when these advanced skills are useful, and when more basic techniques are more appropriate was going to become more important

- Junior roles, particularly those focussed on collating and preparing data for analysis, were highly valued as they freed up senior analyst's time to focus on advanced analysis activities

- The significant investment that apprenticeships take up in time and support means that selecting a good apprenticeship provider is important, but there is limited information from which to compare training providers

- Employers often found that they had limited access to information about course content, and it was difficult to adjust the training schedule to align with work projects (i.e. change the order, or timing for apprentices to learn particular skills)

"As a manager I don't have a lot of visibility of what my person is supposed to be doing, and I don't always have confidence that even they [the apprentice] know what they are supposed to be doing. Which makes it difficult to know where I stand. So overall, a poor relationship with the provider."

Broadly, participants indicated that apprenticeships as an approach made sense as a way to learn data analysis - they provided structure, boosted the acquisition of soft skills, and also meant that people were learning the context of the data as they learnt how to analyse it. Apprenticeships also provided a way to validate that people actually had the skills that they indicated on paper. The relationship with providers however, was often challenging, and the inability to determine which providers delivered a high-quality product before working with them created a hesitancy to take on apprentices for some.

In relation to apprentices themselves, participants were broadly positive, and while some noted that there are still perceptions from employers that the less capable students would do T-Levels and apprenticeships, this perspective seemed to be in the minority. In practice, several of the employers we spoke to were making apprenticeships a standard part of their induction for new junior analysts/data technicians. Participants commonly noted that the cost side to the cost-benefit of hiring apprentices was often greater than originally anticipated, and involved not just additional mentoring and support (including sometimes retraining where training did not meet their needs) but also by needing to factoring in the 20% of off-the-job training which effectively made the apprentice 0.8FTE (or less).

"We've had data technician roles in the past and they have been so useful in handling the basics, and then freeing up more senior analysts for detailed, specific tasks or relationship management."

None of these were considered major barriers however, and participants noted that learning curves, support, and mentoring were all part of onboarding junior employees, and many of the same or similar challenges would occur when hiring *anyone* new to the workforce.

The relationship between employers and the providers however was frequently raised as a point of tension. The most significant areas of frustration raised by employers were:

- A lack of timely information
- Provision of inaccurate, inconsistent, and at times incorrect information
- Limited visibility of the apprentices' progress and needs
- A lack of details on what exactly the apprentice would be learning
- Limited scope for tailoring learning plans to fit with business needs

Several participants, across multiple providers, noted that at various times they had received incorrect information about general legal requirements (what counted as learning time, assessment time, and work time) and that at times the providers didn't seem to know how the apprenticeship system worked. In addition to this, there was often confusion about the actual course content, including what needed to be done, what was included in assessments, and the marking scheme that would be used. In more than one instance, providers provided marking schemes that required the apprentice to demonstrate all techniques taught across a module only to later retract this and advise that only a small subset of techniques had to be demonstrated. As the employer had put significant work into customizing a suitable a project for the apprentice, this of course meant lost time and unnecessary work for the employer and undermined their trust in the accuracy of information from the provider.

"Overall, I'd say still probably a net benefit, but would definitely be more beneficial if we'd had more of an efficient product."

When asked about the skills that matter most to for junior analysts, responses tended focus on two traits:

- The basic building blocks of practical statistical capability
- The ability to collaborate, particularly with 'non-data' people

In relation to practical statistical capability, participants noted that particularly at this level, a deep understanding of mathematics and statistical theory is not needed. Instead, what is needed is a basic understanding of what tools are available, when they are appropriate to use, and how to apply them. In addition, data manipulation and visualization are much more important than they used to be.

Several respondents emphasised that gaps around these basic skills were common and often seemed to stem from a desire to make use of fancy techniques, or having a poor grasp of the underlying principles – why does a sample size matter, when are counts more relevant than proportions, whether to be concerned about edge cases.

Respondents also noted the importance of understanding the context of the problem being worked on raising examples of analysts accidentally inflating basic tasks like counts by a factor of 10 or more, because of a lack of awareness of the context of the data. Other participants noted that exercising judgement around when to apply a particular technique could be a challenge – for example if sample sizes were marginally smaller than a technique strictly called for, junior analysts would

"Data analysis has a marketing problem, in that people seem to think you need to have maths skills, at degree level and people think they're terrible at maths because they struggle with calculus or algebra.

You don't need to fully understand how every equation works and how to prove it. You need to understand what the tests are, and how, and when to apply them, which is different."

often not use it, is the sample 'didn't meet the rules'. However, in reality a less robust analysis may be sufficient for the project so the technique was actually fine to use.

Another skillset that respondents raised was what one participant described as the difference between 'being an analyst and doing analysis'; collaboration and time management. Both of these tended to be more developed in people doing a mid-career transition, but were also strengths of learning through an apprenticeship. Although these skills should develop over time the longer an analyst was in the role, a head start was invaluable as they were a key factor in not only the analysts' progression, but also for creating more relevant analysis, by understanding the context in which any analysis was being conducted. Improving soft-skills around collaboration also enabled an analyst to work more effectively with people who are not themselves embedded in the data but might hold important insights on how it was generated, or the context in which it was being used.

"Data science has kind-of stolen the thunder a little bit. It feels like that's what everybody wants to be doing; It's what a lot of organizations are saying that they're doing. But a lot of them are actually doing very basic statistics, but kind of dressing it up as data science because it sounds cool, because that's what people want to be doing."

When asked how these things translated into new hiring decisions, responses tended focus around the following themes:

- Familiarity with a particular tool or programming language, while helpful, is not vital at this level. Instead, being able to demonstrate that they can use any statistics or analysis platform at all was more important

- Specific training pathways were less important than skills and a desire to learn. However external validation of those skills, was important which meant formal pathways like apprenticeships or university were preferable

- Understanding of the context of a particular area or topic can often count for more than hard skills in data and analysis, as it is much harder to teach years of context than it is to teach basic analysis skills

When asked if there were any important skills missing from the list of key tasks, participants broadly agreed that they were the right ones, but a few identified additional components to consider. The first was around the effective and safe use of advanced techniques like machine learning and AI. Rather than teaching how to use these advanced tools, the gap that was identified was more around the principles of when not to use AI; how to identify situations when they were less appropriate.

Participants raised that often the desire to be at the cutting edge, and more importantly to be seen to be at the cutting edge could lead to the use of these tools when more basic, well known statistical tools would be more appropriate. For example, black-box methods may have impressive predictive power, but were often difficult to explain, and in a lot of contexts, the ability to explain relationships was critical. Given this, providing junior analysts with a foundational understanding of the principles and ethics of using AI and other advanced tools was important.

Another area of important skills that participants thought could be improved were around generic project management skills – how to plan a project, how to structure a project, and how to manage their work and time within the context of the project. Some employers noted sending junior analysis on separate project management courses or qualifications in addition to apprenticeships, or other training. While junior analysts were less likely to need to plan an entire project, being able to plan their contributions to larger projects, and taking a more disciplined approach to smaller projects better prepared them in the long run, and made for more effective collaboration.

MOTIVATIONS AND BARRIERS

When asked what motivated them to hire apprentices, as opposed to candidates who came through other pathways, participants were generally in agreement that apprenticeships were in principle the right way to learn data analysis because of the hands-on component. But in order to improve uptake, they would want greater transparency around provider quality and course content, greater flexibility to align the order of learning to meet business needs, and improved communication from providers. External validation of the quality of providers was a particularly common point.

As an alternative to apprenticeships, some participants noted that they were excited about the recently launched T-levels, as they appeared to be more accessible and concise, and would encourage people who were less confident in their mathematical skills.

Participants also noted that some commonly perceived barriers were not real from their perspective, with the requirement for apprentices to spend 20% off-the-job training and that the perception that apprenticeships were a pathway for the less capable students both considered to be non-issues.

WHAT THEY WANTED

At the end of each interview we asked the employers and managers we spoke to what outputs of this project they would find particularly useful, the most common responses were:

- Best practice guidance for providers on what good communication with employers looks like

- Guidance from organisations like the RSS on what the different accreditation options are, where they fit, and how they differ

- External validation from a trusted source, like the RSS, on the relative quality of the training provided by different sources

GENERAL CONCLUSIONS

Returning to the overall research objectives:

Explore the skills and accreditation needs of junior data analysts

Throughout this project a common theme that emerged across the nationally representative survey and our conversations with junior analysts and employers was the difficulty people experienced in navigating choices around statistics and data analysis training:

- Deciding what skills to learn, particularly at different career stages
- Deciding which pathway was best for them (formal/independent)
- Evaluating the quality of different options relative to each other

In addition, our conversations reinforced existing research that points to the critical importance of soft skills and analytical basics over advanced but narrow hard skills; Being able to understand the context, work with effectively with others, and having a desire to continually learn were often more important than expertise in a particular technique or platform.

Assess the suitability of the current Level 3 Data Technician apprenticeship to the needs of employers and recommend improvements

Across our surveys and interviews we found very little evidence that people disagreed with the broad framework that this apprenticeship was built around. It covered the right areas, and while the emphasis on particular skills may shift at different levels of seniority, or in different sectors or teams, these are the right things to be focussed on.

The delivery of learning within that framework however did raise concerns from both apprentices and employers that point to clear areas for improvement:

- Poor communication frustrated employers and undermined trust
- Limited flexibility to tailor delivery order created extra work and wasted time
- Limited detail about the specifics of training made choosing providers hard

Our conversations also identified that including some learning around advanced tools like machine learning and AI would be beneficial in grounding junior analysts against being 'caught up in the hype'.

Explore what influences peoples' decisions to pursue a data apprenticeship or other alternative routes into a data career

Decision points and motivations around apprenticeship uptake do not appear to differ markedly for junior data analysts compared to apprenticeships more generally, and there is extensive research that considers this. Of particular relevance to data analysis related apprenticeships, participants reinforced the difficulty created by the ambiguity around what to learn, when to learn it, and where to learn it. For both analyst and employers, the vacuum of reliable, trusted information to support these decisions was one of the most visible challenges, and tended to lead to reliance on conventional, formal approaches to learning. Some employers also indicated a reluctance to expand their use of apprenticeships, either because of previous poor experiences, or because of their difficulty in identifying high quality options.

Considering the broader public perspective and where there may be opportunities to expand uptake of apprenticeships or other forms of statistics and data analysis training, we again find that the challenges of finding what to learn, and when to learn it may be having a chilling effect on broader uptake. The large proportion of people that have not completed any training or would benefit from further training but didn't know how to go about it, clearly indicates that there is a public need to be meet.

RECOMENDATIONS

RECOMMENDATION 1

Improve communication of the specific skills, software platforms and techniques that will be taught in an apprenticeship by requiring these to be provided alongside the training plan.

Who: Government (Education and Skills Funding Agency); Training providers

Rationale: Both apprentices and employers noted that they often struggled to get information in advance on what was going to be taught – particularly in relation to specific statistical techniques and software. Since a curriculum and a training timetable should already be part of a training providers course design activities, requiring it to be disclosed alongside the training plan should not present a significant administrative burden. It would also enable employers and apprentices to plan to align projects and work activities. Also for many employers knowing in advance whether a training provider is able to provide training in a platform that they use is an important factor in selecting providers.

RECOMMENDATION 2

Review course structures and delivery timetables to identify where flexibility could be introduced in the timing, techniques, and platforms being taught in data focussed apprenticeships so that employers and apprentices can tailor their programme to better align with their work.

Who: Training providers

Rationale: Employers indicated that a constraint for them was the lack of flexibility around what statistical techniques and platforms were being taught, and when. Greater flexibility to adjust the training timetable to include specific software platforms and statistical techniques at a time when the apprentice will be able to apply them in their work.

RECOMMENDATION 3

Review the current online ratings system for apprenticeship providers to improve the accuracy and depth of information available on provider quality, and support employers and apprentices to make better informed decisions.

Who: Government (DfE)

Rationale Both apprentices and employers noted that it is difficult to evaluate the quality of training providers. An online rating system exists on gov.uk, but only includes an average rating out of 4 for employers and apprentices. There are also gaps in information, with many providers only being reviewed by a small number of apprentices and employers. A review could include considering quality of teaching and communication, and how to increase the number of reviews.

RECOMMENDATION 4

Work with employers to review occupation maps and occupation standards across the different levels of data analysis apprenticeships so that employers and applicants can see how the different levels map to each other, and can more easily compare and contrast pathways into data analysis careers.

Who: iFATE

Rationale: Employers, apprentices, and members of the public all indicated that identifying what to learn, and when was challenging. Occupation maps and occupation standards are useful tools to help identify which training pathways. However, the current versions do not allow for easy comparison across data analysis related T Level, Level 3, Level 4, and degree apprenticeships. This makes it difficult to evaluate which pathway is more appropriate for a particular persons context, and how these qualifications relate to each other.

Work with employers to identify how learning outcomes on the safe and effective use of AI could be included in the Level 3 Data Technician Apprenticeship, and the Level 4 Data Analysis Apprenticeship.

Who: iFATE

Rationale: The only skills missing from the current Level 3 Data Technician Apprenticeship Standard that were raised during discussion with employers the safe and effective use of AI – providing junior analysts with an understanding of when AI assisted tools are useful, when they are not, and the ethical considerations around using them.

WHERE THE RSS COULD SUPPORT FURTHER WORK

In addition to our recommendations for government, apprenticeship providers, and iFATE, there are areas where the RSS could seek funding for further work to support people to develop their statistics and data analysis skills:

- Developing guidance resources for learning statistics and data skills. These should be persona and outcome-based, providing people in particular circumstances and backgrounds with a clear approach to learning statistics and data science depending on what that person wants to achieve

- Developing outcome-based guidance resources for businesses on the types of statistics and data analysis skills they may need depending on what they are trying to achieve

- Improve access to information course quality by reviewing the RSS Quality Mark accreditation scheme. A review would seek to broaden the schemes application and increase uptake by developing a strategy to actively promote and encourage participation in the scheme from providers of Level 6 and Level 7 degree apprenticeships