

# **Signalling new opportunities? An analysis of UK job adverts for degree apprenticeships**

## **Abstract**

### **Purpose**

The purpose of this study is to gain insight into the degree apprenticeship labour market and employers' strategies for apprenticeship recruitment using job advertisement data.

Specifically, this study identifies the skills, attributes, experience, and qualifications that employers look for in IT apprentices. The study also identifies the salaries and responsibilities of apprentices and considers the alignment between the advertised jobs and apprenticeship definitions.

### **Design/methodology/approach**

Degree apprenticeship job adverts (n=290) were collected from the official websites used by employers in England and Scotland to advertise apprenticeship roles, between March 2019 and March 2020. Data was analysed using content analysis to systematically elicit salaries, candidate requirements in terms of skills, qualifications and experience, and specific job details from these adverts.

### **Findings**

A wide variation in advertised salary was found. Entry routes were similar to the traditional high school qualifications (A-levels or Highers) sought by universities. The skills and attributes being sought at recruitment were the same skills that employers were seeking in graduates, and the same skills that the apprenticeships were designed to develop. Most adverts focused on the training that the apprentices would be receiving, rather than work tasks, which were rarely specified.

### **Originality and Research Implications**

This is the first study of how apprenticeship roles are advertised to potential candidates and thus contributes to ongoing research into this new work/degree-level education model. By analysing job adverts we share insights into how employers position apprenticeships to attract candidates.

**Keywords:** job adverts, degree apprenticeship, work-based learning, recruitment, skills, social mobility, IT

**Article classification:** Research paper

## **Introduction**

The UK's evolving apprenticeship policy has two explicit aims: to increase productivity and social mobility (QAA, 2019). Productivity is to be increased by driving up skills levels, thus maximising national competitiveness, while social mobility is to be assured by offering “an alternative route into higher education for non-traditional learners” (QAA, 2019, p. 3). Degree apprenticeships (DA) are collaborations between employers and universities to deliver work-experienced graduates, with skills aligned to industry needs. Apprentices are salaried employees, spending 80% of their time working, including work-based learning (known as *on-the-job training*), and 20% studying away from the workplace (e.g., *off-the-job training* at university). The apprenticeship's financial model also serves to counter the shift of the costs of higher education (HE) study onto individual students and their families (Burke *et al.*, 2016) which has proved to be a barrier to widening participation of students from underrepresented and disadvantaged groups (Hoskins and Ilie, 2017). The financial model of degree apprenticeships is promoted to (prospective) apprentices as “Earn as you learn” (Smith *et al.*, 2020a), including variants on “Get a job, get paid and get a degree at the same time” (Skills Development Scotland, 2020). The paid employment and payment of fees are key to their potential for social mobility (QAA, 2019).

Skills improve productivity, but a sizeable digital skills gap has been identified in the UK. Shadbolt's (2016) review of computing graduates' employability highlights a shortfall between the predicted number of digitally-skilled workers needed to fill roles and the anticipated number of computing graduates in the UK. The digital skills gap discourse also underscores employers' concerns that computing graduates do not arrive ‘oven ready’, and often lack soft skills, specific technical knowledge, business awareness, and necessary work experience (Shadbolt, 2016). In parallel, Wakeham's (2016) review noted a decline in employers' investment in on-the-job training. In sum, the (graduate) digital skills gap has three elements: shortfall of computing graduates, graduates not meeting employers' skills needs, and lack of training for employees (cf. Taylor-Smith *et al.*, 2019). Within the UK's apprenticeship policy, degree apprenticeships aim to match employers' needs to graduates' skills by providing opportunities that “explicitly develop professional competence” (Rowe *et al.*, 2016, p. 365).

Skills and social mobility aims rely on the central role of the employer: they fund the majority of the training costs and pay apprentices' salaries; they influence the curricula through input into the frameworks (or standards) that govern the content of the degrees (Powell and Walsh, 2018) and they recruit the apprentices. QAA positions employers as the "primary gatekeeper for admissions working closely with the higher education provider" (2019, p. 4). These entwined aspects of the employers' role in degree apprenticeships are the focus of this study, examined through recruitment adverts, placed by UK employers. Following some criticisms and concern over quality of apprenticeships in England (Lester, 2020), employers remain in a position of significant influence, helping to set the standards/competencies they require, in collaboration with higher education institutions (HEIs) (Bravenboer, 2016). Though frequent changes in oversight, such as the role of the Institute for Apprenticeships and Technical Education (IfATE), have led employers and university employees to be sceptical about whether the apprenticeships are really 'employer-led' (Mackay, 2022). Further, concerns have been raised that degree apprenticeships are less accessible to people from disadvantaged backgrounds, with only 17% of new starts drawn from such backgrounds in England in 2017/2018 (Battiston et al., 2020). In terms of new hires, social mobility is not increasing (Smith *et al.*, 2021; Cavaglia, McNally and Ventura, 2022). Mackay (2022) highlights the "middle class grab" (p. 208) for degree apprenticeships and calls on government to incentivise employers to recruit with consideration for social mobility. As things currently stand, apprentice recruitment gives significant new powers to employers over access to degree-level education. It is therefore both important and urgent to better understand how employers articulate their recruitment requirements and how employers describe tasks for prospective apprentices. At present there has been no such research, so this study was designed to fill this gap in knowledge between policy intention and employers' expression of specific roles through job adverts.

## **Literature**

### *Skills and attributes*

The computer science and IT landscape varies greatly, including software development, cyber security, cloud computing, data analytics, web development, business and social informatics. Shadbolt's (2016) review found inconsistency and contradictions among the skills employers report as lacking in IT graduates: some emphasising very specific technical skills and others prioritising soft skills. Attempts have been made to address the

skills gap, including a focus on accreditation of computer science courses (Crick *et al.*, 2020), closer industry-university links (Davenport *et al.*, 2020) and greater emphasis on work-based learning (Herbert *et al.*, 2020). Degree apprenticeships were designed to incorporate these key elements.

Higher educational institutions' (HEIs) investigations into the skills that employers look for in graduates and how to instil them is generally couched in terms of *employability*. While this is a highly sought-after quality, it is weakly conceptualised (Behle, 2020). In practice, HEIs help identify and try to develop technical and soft skills in their students that reflect what employers purport to need. The Institute of Student Employers (ISE) surveyed their members at the beginning of 2020. The top ten skills they found employers demanding of graduates were, in order of popularity: teamwork; interpersonal skills; listening; problem-solving; taking responsibility; time management; self-awareness; business-appropriate communication; resilience and dressing appropriately (Institute of Student Employers, 2020). Distributed work arrangements such as hybrid working, which are now increasingly adopted by employers, require a new set of skills from new hires. Bayerlein *et al.* (2021) argue that the new workplace requires employees with skills in IT, teamwork, and communication, along with a substantially higher level of self-motivation and self-direction.

Specific IT roles require different skills and attributes from their employees. In a review of job postings for data analysts, Verma *et al.* (2019) found decision-making, organisation, communication, and data management to be among the key skills required of data analysts. For developers, key skills included technical skills and project management. Soft skills such as problem-solving, being a team player and communication skills are frequently mentioned in job adverts (Ahmed *et al.*, 2015; Florea and Stray, 2019; McGill, 2009). For cyber security professionals, Parker and Brown's (2019) review of job adverts identified technical, business, and interpersonal skills as common requirements. Graham and Lu (2022) added knowledge management and data analysis skills to these requirements. These examples illustrate that while there may be a variation in the tasks and the technical skills required from IT recruits, there is an overlap in the soft skills required in IT roles. The skills identified through previous job advert studies are in broad agreement with Shadbolt's (2016) report highlighting technical skills, soft skills, and project management, illustrating how analysing job advert data is a potentially useful strategy to understand employers' approaches to, and understanding of, degree apprenticeships. Attributes such as business-

appropriate communication and dress could be interpreted as signifiers of cultural fit, rather than graduate skills per se (Tomlinson and Anderson, 2020). Notably, ISE also asked employers what they needed from non-graduate entry-level hires and dressing appropriately (a signifier) was one of the few attributes considered more important for the non-graduates. Whether the degree apprenticeship job advert data in this study aligns more closely to employers' needs for graduate or non-graduate hires could indicate how employers are advertising their apprenticeships.

### *Job advertisement*

An important emerging issue concerning the provision of degree apprenticeships is the need to recruit appropriate candidates (Rowe *et al.*, 2017). Recruitment and selection have always been critical human resource management (HRM) processes for organisations. A key role for HR is to align performance within roles with the organisation's strategy, so recruiting the right candidates for a role depends on how that role is defined in terms of the performance needed to achieve organisational aims and objectives (Bratton *et al.*, 2022). Traditionally, creating a job description containing the requirements for a role has required the use of job analysis techniques to provide information on the work to be carried out, the knowledge, skills and attitudes needed to perform the job, and the conditions under which the work is performed. Approaches to recruitment and selection attempt to attract a wide pool of candidates for vacancies before screening out those who do not meet the criteria set out in job descriptions. While a good job description highlights requirements for a role, a good job advert highlights why a potential candidate should apply for the job and can include values associated with working practices such as inclusion and training provision. Adverts where job security is expressed are more likely to attract applicants (Keppeler and Papenfuß, 2021).

Posting job adverts is the most common recruitment strategy to attract degree apprentices (Drewery *et al.*, 2022). As a form of persuasive communication, employers use job adverts to attract the best candidates. In the German apprenticeship labour market, organisational-level characteristics were found to shape employer's decision-making during the selection process (Protsch, 2017). Informed by institutional theory, the study reports that larger organisations' selection decisions at the early stages of the recruitment process are likely to be more open to a broader pool of candidates. This suggests that larger organisations typically have access to more resources, in terms of time, money and skills needed to adopt a more inclusive recruitment and selection strategy.

Job adverts can signal organisational commitment in developing the young inexperienced workforce (Moore and Khan, 2019). However, adverts can also deter applicants through the language used and the focus of the advert (Deter-Schmelz *et al.*, 2020; Protsch, 2017; Wofford and Smith, 2022). An illustration of the importance of ethical recruitment processes is highlighted in a qualitative study of apprenticeships in Switzerland by Goastellec and Ruiz (2015) who found that the criteria used to identify candidates tend to reproduce inequalities by using a “hidden curriculum” during the recruitment process, based on soft skills, used to identify the “right apprentice”.

Job advert data has been used in studies to research the changing nature of skills in the workplace (Harper, 2012), and exploring the range of duties and responsibilities for ill-defined roles (for example, Pitt and Mewburn, 2016). It has also been used to compare curriculum content with employer expectations (Behpour *et al.*, 2019). Smith *et al.* (2020a) used an early survey of Scotland-based degree apprenticeship job adverts to provide (and lightly critique) employers’ perspectives.

Using job advert data, this research aimed to map the IT-related degree apprenticeship offerings in England and Scotland to provide information about the apprenticeship labour market; and to gain insight into employers’ strategies for both skills recruitment and development, as they search for employees prior to starting their degrees, rather than on completion. Specifically, this study set out to identify the skills, attributes, experience, and qualifications employers look for in IT apprentices, along with the job responsibilities advertised, enabling consideration of the alignment between the advertised job tasks and expected outcomes as specified in apprenticeship standards.

## **Research methodology**

This study was designed to identify how employers signalled their expectations of degree apprentices through their job adverts. Content analysis, a systematic process to analyse qualitative data to identify consistent patterns and relations between variables and themes (Julien, 2008), was used to map the degree apprenticeship offerings and identify the skills and attributes employers look for in their prospective apprentices, as signalled in job adverts. A post-positivist approach was adopted, both allowing for manifest content analysis (Kleinheksel 2020), while recognising the effects of biases or “signals” by employers (Ryan 2006), and also the influence of the perspectives of the researchers.

### *Data collection*

Prior to the start of the study, ethical approval was sought from the host department's ethics committee. Following anonymous peer review, approval was obtained. Job adverts were gathered from two government websites: apprenticeships.gov.uk and apprenticeships.scot from March 2019 to March 2020. These websites are used by employers to advertise apprenticeship roles.

A total of 370 IT-related degree apprenticeship adverts were collected and checked for duplicates. Duplicate jobs (same role and same content) from the same company were removed to ensure that this did not affect the frequency of summaries related to tasks and skills identified in the job adverts as shown in Table V. Adverts for different positions within the same company, and adverts for the same position in the same company *but with substantially different content* were also retained as separate adverts. Removing the duplicates reduced the adverts from 370 to 290.

### *Data extraction and analysis*

Data concerning candidate requirements, job description, and salary, were identified using a coding protocol. Using a deductive approach to allow for analysis across a large data set (Linneberg and Korsgaard 2019), the coding framework was developed to map out job offerings, person specifications, and work tasks. The use of a codebook can increase coding reliability (Kleinheksel et al., 2020). Shadbolt's report on skills gaps was the initial basis for coding the skills identified in the adverts, as it recorded skills requested by employers in the IT sector. Apprenticeship standards were used to identify broad categories for tasks the apprentice would be asked to perform in the role. One researcher coded all the adverts while another researcher independently coded 10% of the sample. Inter-rater reliability was .71 Cohen's kappa which means that there was substantial agreement. The coders were from different research groups, helping to balance any impact of their perspectives. The systematic coding of content into different pre-determined categories allowed for the number of occurrences to be quantified and themes interpreted (Payne and Payne, 2004).

The job adverts were categorised into the relevant IT apprenticeship frameworks (Table I). The original intention was to code similar degrees in England and Scotland into the same framework. However, the advert templates for the apprenticeship frameworks for the two

nations were quite different, so data from these two versions of degree apprenticeship were kept separate.

Table I. IT Standards and Frameworks

English Standards	Scottish Frameworks
Cyber Security	Cyber Security
Data Science	Data Science
Digital and Technology Solutions (DTS)	IT Software Development
	IT Management for Business

The Digital and Technology Solutions (DTS) degree has six specialisations: business analyst, cyber security specialist, data analyst, network engineer, IT consultant, and software engineer. As set out in the apprenticeship standard for the DTS apprenticeships, all apprentices cover core skills, and employers then select a specialism (Institute for Apprenticeships, 2019). However, few of the English-based DTS job adverts identified the specialisation pathway, so DTS adverts were coded under a general category Digital and Technology Solutions.

The analysis included 290 IT degree job adverts, comprising 879 positions, advertised through Apprenticeships.Scot and England’s Find an Apprenticeship service, collected from March 2019 to March 2020. These adverts were from 174 different companies and delivered in partnership with 45 different learning institutions (FE, HE, and private learning providers).

## Findings

The findings from the content analysis encompass the offer (in terms of salaries and training), the skills, attributes, experience, and qualifications that employers look for in IT apprentices (including a comparison of qualification with advertised salaries), and the nature of the work as expressed through job descriptions.

### *Salaries*

The minimum starting salaries for the apprenticeships ranged from £7500 to £30000 and this spread was the case for both apprenticeships based in England and Scotland. The mean annual salary was £16497 (SD=£3451) with a mean hourly wage of £8.54 (SD=£1.82). Table II shows the distribution of the salaries in relation to the mean and standard deviation.



Table II. Distribution of salaries

<b>Salary Range</b>	<b>Frequency</b>	<b>Percentage</b>
below 9595	12	4.14%
9595 – 13045	21	7.24%
13046-19948	180	62.07%
19949-23399	34	11.72%
24000 up	5	1.72%
data not available	38	13.10%

Most (62%) adverts fell within the range £13046 – £19948. Three adverts were advertised at the minimum wage for apprentices (£3.90 per hour between April 2019 and March 2020). About half of the adverts (49.7%) advertised salaries greater than the national minimum wage of £8.21 in 2019. However, some adverts (n=38; 13.1%) did not specify the salary for the post, so these adverts were not included in the computed average. Permanent employment was offered as a possibility in only 46 out of the 290 adverts (15.86%).

#### *Qualifications and skills required*

The majority of the adverts in England mentioned A-Levels, in their requirements (94.3%), a university-entrance, subject-based qualification. However, 35.7% of those did not specify the grades needed. Having appropriate university entry points was specified in 60.7% of the adverts in England. There was also a requirement to have a maths qualification (73.8%). The academic requirements for Scotland-based apprenticeships were similar. Apart from one job advert that did not specify any grade requirement, having Highers (Scotland's subject-based qualifications to enter university) was specified as one of the routes to gain entry to the apprenticeship. A qualification in maths was a requirement for most adverts (84.8%).

Other routes into the apprenticeship degree were also mentioned in most adverts (66.4%) and a breakdown of these is listed in Table III. In Scotland, alternative entry routes (aside from the Highers requirement) include completion of a lower-level apprenticeship (20%), an HND or BTEC qualification (24.4%) or work experience (42.2%). While the proportions for alternative entrance routes seem to be the same within the England-based degree apprenticeships, the numbers in England could be higher as these qualifications have equivalent UCAS points. However, having work experience, was mentioned more in the Scotland-based apprenticeships, 42.2% vs 12.3%. Looking at the intersection between initial salary offerings and entry requirements to apprenticeship, the mean and standard deviation

salary for the alternative pathways is shown in Table IV. Statistical tests were not conducted to compare salaries based on pathway as the alternative apprenticeship pathways were not mutually exclusive (for example, an advert could specify entry based on completion of modern apprenticeship, having an HND or work experience). However, adverts which only indicate the usual university UCAS or subject requirements versus adverts that clearly specify entry based on work-experience had an average lower salary (16322 SD=3299) as opposed to 17299 (SD=4020) but this difference is not statistically significant ( $p=.921$ ,  $d=.013$ ).

Table III. Other entry routes to degree apprenticeships

<b>Alternative pathway</b>	<b>England</b>	<b>Scotland</b>	<b>Total</b>
Apprenticeship	42 (17.1%)	9 (20%)	51 (17.5%)
Higher National Diploma or BTEC	82 (33.5%)	11 (24.4%)	93 (32.0%)
Work experience	30 (12.3%)	19 (42.2%)	49 (16.9%)

Table IV. Pathways to apprenticeship and advertised salary

<b>Alternative pathway</b>	<b>England</b>	<b>Scotland</b>	<b>Total</b>
University requirements based on UCAS or Highers	16726 (SD=3398)	15095 (SD=3454)	16322 (SD=3299)
Apprenticeship	16137 (SD=3307)	14936 (SD=2179)	15921 (SD=3149)
Higher National Diploma or BTEC	15607 (SD=3004)	17450 (SD=1741)	15870 (SD=2922)
Work experience	17666 (SD=4666)	16798 (SD=2967)	17299 (SD=4020)

The structures of the Scottish and English templates for apprenticeship adverts had an effect on how the requirements were presented in the adverts. In the English adverts, there were separate subheadings for desired skills, personal qualities, and qualifications; whereas, in the Scottish apprenticeships, there was a heading reading “what qualification or qualities are required?” Due to this structure, a few job adverts (13 of 46; 28%) did not specify skills or personal attributes, only the qualifications needed to be able to join the programme.

As for the skills required, across the English computing apprenticeships there was an emphasis on communication skills (76.2%), on being a team player (72.5%), and being self-motivated and an independent learner (71.7%). For Scotland-based apprenticeships, there was an emphasis on interest in IT (60.9%), being an independent learner (47.8%) and having good problem-solving skills (34.8%). See Table V for more details on skills and attributes required.

Table V. Skills and attributes required for the post

<b>Skills and personal attributes</b>	<b>England (244)</b>	<b>Scotland (46)</b>	<b>Total (290)</b>
Communication	186 (76.2%)	12 (26.1%)	198 (68.3%)
Team player	177 (72.5%)	4 (8.7%)	182 (62.4%)
Self-motivated /Independent	175 (71.7%)	22 (47.8%)	197 (67.9%)
Problem-solving skills	169 (69.3%)	16 (34.8%)	186 (63.8%)
Technical skills	158 (64.8%)	13 (28.3%)	172 (59.0%)
Time and project management	134 (54.9%)	4 (8.7%)	138 (47.4%)
IT interest	123 (50.4%)	28 (60.9%)	152 (52.1%)
Detail-oriented	109 (44.7%)	3 (6.5%)	112 (38.6%)
None specified	0 (0.0%)	13 (28.2%)	13 (4.5%)

### *Job responsibilities and apprenticeship standards*

The adverts from the two websites follow a different template in terms of the job overview. For the England-based apprenticeship, the structure of the advert includes an apprenticeship summary, which typically lists the responsibilities and duties associated with the post. The Scotland-based apprenticeship includes a job overview and a section on what apprentices will be learning. Due to this structure, information about the tasks that the apprentices would be doing and the topics that they would learn as part of the work-based learning programme overlapped at times. For example, one advert described the learning activities as

*You will start your career with Company A as a tester, with opportunities to progress in software development as you gain more experience. [paraphrased for anonymity]*

Some adverts only described the learning activities (n=47;16.2%), with an emphasis on the training and support that apprentices would receive, while key responsibilities of the job were not outlined; so, it was not possible to categorise these tasks. However, the majority of the adverts provided some details about the tasks (n=230; 79.3%). A breakdown of the categories of tasks by framework is listed in Table VI.

Aspects of software development were common in the tasks across the different IT apprenticeship degrees (including pathways within the DTS degrees). This is probably due to more opportunities for the software development pathway in the DTS framework even though not specifically labelled. Other pathway-specific tasks like those relating to cybersecurity, networks, and data science were mentioned far less in comparison to the software development-related tasks. Regardless of the subject, however, tasks relating to project management came out as a common responsibility of the apprentices (n=142, 49%). Tasks relating to the development of business skills were also common (n=124, 42.8%). There was also an emphasis on the development of interpersonal skills across the frameworks (n=100; 34.5%).

The initial plan was to analyse the different tasks by pathway and/or degree; however, this wasn't possible for all pathways due to the low number of adverts per pathway and/or degree and because tasks specific to pathways were not always specified. For example, one data science advert specified the different responsibilities, such as liaising with stakeholders and building knowledge about the business but did not specify tasks that are specific to the data science framework, such as data analysis, management, or engineering. This was also the case for cyber security, where the majority of the adverts for both England and Scotland (55%) did not specify cyber security-related tasks. Subject-specific tasks were more explicit for the software development roles, as indicated in Table VI. These roughly align with some of the skills listed in the DTS Software Engineer Pathway, such as:

- Creating and delivering software solutions (77% of the software development jobs)
- Performing code reviews and debugging (37%)
- Testing code to ensure functionality (53%).

For some of the adverts (n=13; 4.5%), the level of detail provided about the tasks of apprentices provided very little information about the job (example is paraphrased to keep anonymity).

*We are a tech company delivering business solutions.*

*You will be part of a team.*

*At the start of the apprenticeship, you will receive training to help you start your career with us. As part of the training programme, you will also spend time at university. The job involves travel, so you need to be flexible.*

Overall, despite giving some indication about the tasks and responsibilities, some of the adverts did not specify tasks related to the pathway/subject. This means that the original intention to map the tasks to the apprenticeship frameworks could not be fully met. It also has implications for the job adverts in terms of signposting the extent of alignment of work and study and this is discussed below.

Table VI. Categories of tasks by apprenticeship framework

	N	Business Skills	Project management	Develop interpersonal skills	Cyber Security	Networks	Software development	Support and Debugging	Testing	Data analysis	Data management
Cyber security	3	1 (33.3%)	-	-	2 (66.7%)	-	-	-	-	-	-
Cyber security (Scotland)	6	4 (66.7%)	4 (66.7%)	4 (66.7%)	2 (33.3%)	-	-	-	-	-	-
Data Science	27	20 (74.1%)	8 (29.6%)	6 (22.2%)	-	-	-	-	-	13 (48.1%)	6 (22.2%)
Data Science (Scotland)	5	2 (40%)	2 (40%)	2 (40%)	-	-	-	-	-	-	-
Digital and Technology Solutions (General)	161	69 (42.8%)	87 (54.0%)	48 (29.8%)	12 (7.5%)	31 (19.3%)	89 (55.3%)	54 (33.5%)	24 (14.9%)	26 (16.1%)	8 (5.0%)
ITMB (Scotland)	7	3 (42.9%)	3 (42.9%)	2 (28.6%)	1 (14.3%)	-	-	-	-	1 (14.3%)	-
Software Development (Scotland)	28	12 (42.9%)	14 (50%)	10 (35.7%)	-	1 (3.6%)	19 (67.9%)	10 (35.7%)	14 (50%)	0	1 (3.6%)
Software Development (DTS)	53	13 (24.5%)	24 (45.3%)	28 (52.8%)	2 (3.8%)	3 (5.7%)	43 (81.1%)	20 (37.7%)	29 (54.7%)	2 (3.8%)	-
Total	290	124 (42.8%)	142 (49.0%)	100 (34.5%)	19 (6.6%)	35 (12.1%)	151 (52.0%)	84 (29.1%)	67 (23.1%)	42 (14.5%)	15 (5.2%)

Note: percentages are row percentages

## Discussion

There is no doubt that apprenticeships have been well received in the UK. However, a concerning picture of low wages and vaguely worded adverts that cannot be mapped onto the apprenticeship standards, has emerged from this study. The discussion first considers what seems to be on offer to prospective apprentices, the qualifications and experience required to access these opportunities, then what they would be doing in the role once hired.

In terms of the *earn while you learn* mantra, the job adverts showed wide variation in terms of the salary on offer, with some set at the (then) minimum apprenticeship salary of £3.90p.h. and about 50% advertised at slightly higher than the minimum hourly wage rate. Previously the hourly salary of first-year degree apprentices was reported as £9.14p.h. (Incomes Data Research, 2019). However, the computed hourly wage for the advertised IT degree apprentices was *significantly lower* at £8.62p.h. (SD=1.75). Low pay has already been found to deter economically disadvantaged applicants (Lester, 2020). With inflationary pressures and the ongoing cost-of-living crisis, salary levels need ongoing monitoring and action if necessary.

Employers, after committing to invest in the skills and development of their apprentices, rarely mentioned the possibility of a permanent post at the end of the apprenticeship as inducement. Providing learning and development to apprentices is a substantial financial commitment (Gambin and Hogarth, 2016) and one of the aims of the degree apprenticeship was to meet employers' skills needs (Rowe *et al.*, 2016). Employers have "complete confidence that the learning [apprentices] get at college or university is relevant" (SDS, 2019, p. 25). Smith *et al.* (2020a) suggest that "employers may be more vulnerable to apprentice mobility due to the sector-based approach to framework design" (p.16). It may be that employers are still somewhat uncertain of the value of apprenticeships, and may become less cautious about longer term prospects in the future. Employers should be encouraged to create and articulate routes to a permanent role.

The academic qualifications cited in the adverts echoed traditional qualifications sought by universities, with an emphasis on obtaining specific pre-university, subject-based qualifications. This suggests that recruitment is from the same pool as other higher education recruitment, reflecting Lester (2020) who accused degree apprenticeships of perpetuating the barriers associated with conventional higher education by using the same entrance

requirements, thus limiting their social mobility potential. The adverts would seem to perpetuate educational inequalities that affect those from lower socio-economic groups who are then further disadvantaged when approaching the labour market (Bukodi and Goldthorpe, 2018). While alternative routes were identified in some adverts, information on advanced entry was not provided (for example, with prior qualifications or experience). To ensure no repeat of learning, policy directives emphasise the need to consider level of entry based on an assessment of prior learning (DfE 2022). This directive was not apparent in the job adverts. Innovation at various stages of recruitment helps to increase diversity in the apprenticeship workforce (Reichwald, 2020), but was not in evidence in the job adverts. Lester (2020) identified a need to promote degree apprenticeships beyond the traditional A-Level cohort; to have effect, such promotion must be incorporated into job advert text and selection intentions. Given that the degree apprenticeship offers an alternative pathway to obtaining a degree, having alternative entry routes should be expected, as had been expressed in policy documents in Scotland (SDS, 2016). This was not reflected in the Scotland-based job adverts. Through the recruitment process the “employers are the key influence on social inclusion” (Reeve and Gallacher, 2022, p.162). We recommend that a change is made to the job advert templates to emphasise equivalence as a means of surfacing inclusion. This is necessary, but insufficient. There have been recent calls for the government to reduce the disadvantage gap, especially for degree apprenticeship places (Battiston et al. 2020, Cavaglia et al., 2022, Mackay 2022). Work to achieve these targets would have a direct impact on recruitment and selection processes, which commence with the job advert, over which regulatory bodies have some control, but continue through the selection process and beyond, where regulation has less direct influence.

Communication skills, problem-solving skills and interpersonal skills are among the skills valued in most graduate-level IT roles (Florea and Stray, 2019; McGill, 2009)—the skills that employers were seeking (and finding lacking) in graduates (cf. Shadbolt, 2016). These same soft skills/attributes were being sought from prospective apprentices, skills that the apprenticeships aim to develop; skills less related to the merits of the individual. Non-merit related jobs are better recognised and accessed by those with cultural capital (Jackson, 2007), leading to questions about diversity among apprentices selected on the basis of interpersonal skills and teamworking. In Barr and Parkinson’s (2019) survey of potential employers for software engineering apprentices, one employer suggested that a more



introverted apprentice might struggle with teamwork (and subsequently not thrive in their organisation). Barr and Parkinson also found emphasis on being self-motivated and an independent learner, which may feature increasingly as many tech companies continue aspects of hybrid workplace/home working. So, while most of the roles highlight that apprentices will be working as part of a team receiving guidance from mentors, those adverts that called for self-motivation signal that the mentor's support may be limited; instead the role requires responsibility/independence. Such adverts signal a disconnect between apprenticeship policy aims and employer expectations which should be addressed by those managing apprenticeships. UCAS (2017) note that the selection processes for degree apprenticeships can be extremely competitive and favour already-privileged applicants. According to the findings of this study, this bias would seem to start with the job advert.

Technical skills were also explicitly required in some of the adverts. Some could easily be met (for example, knowledge of Excel) but other technical skills required were pitched at those who already had a computing background (for example, a software engineer apprenticeship required prior knowledge of programming). Previous studies have indicated that IT apprentices have some technical background (Taylor-Smith *et al.*, 2019), however there is a variation in the level of technical skills apprentices have (Somerville *et al.*, 2020). This raises the question of whether the requirement for specific technical skills steers away those with limited technical backgrounds, including women who are more likely to develop an interest in computing later than men (Smith *et al.*, 2020b).

In terms of what the apprentice would be doing, most of the job adverts focused on the learning and development that the apprentices would be receiving as part of the programme. Indeed, the workplace would be the primary site of learning and knowledge generation, a signature pedagogy of work-based learning (Lester *et al.*, 2016). Drewery *et al.*'s (2022) research on job attractiveness of work-based learning adverts found that signalling learning opportunities enhanced job attractiveness for apprentices, as opposed to traditional job adverts. Highlighting these opportunities could be a means of increasing the pool of candidates. However, such messages should also warn that “young people need to ensure they are well prepared for the rigours of working and studying for a degree at the same time” (UCAS, 2017, p.40).

Lillis and Bravenboer (2020) describe degree apprenticeships as “first and foremost a job, with a specified training programme” (p. 729). One of the original intentions of this

research study was to match the job description with the apprenticeship framework. However, due to the lack of details of the job adverts, it was necessary to use broader categories for the tasks rather than subject-specific ones. For example, within the data science tasks, data engineering and machine learning were among the initial categories, however, because very few adverts featured these tasks, the categories were dropped: the overall goal of the coding of job adverts was to identify *tasks common across adverts*. While 21% of the adverts omitted information about the work responsibilities, most job descriptions provided some details about what the work would entail, especially focusing on duties with regards to project management, developing business, and interpersonal skills. Tasks that were more technical and subject-specific were not always clearly defined. Whether such approaches amounted to deliberate attempts to increase the potential candidate pool or a lack of knowledge of the role (either within the team or by the person wording the advert) is not known. Either way, the impact of this is that those reading the adverts had little information on which to base application decisions. Mismatched expectations between the selected candidate and the employer can lead to employee dissatisfaction (Wilden, Gudergan, and Lings, 2010). The use of non-technical wording for tasks, for example “you will be part of a team delivering technology solutions to our clients”, is limited in its capacity to orient prospective applicants about the nature of the role, especially compared to detailed descriptions. Drewery *et al.* (2022) suggest that applicants for work-based learning are likely to have limited work experience and knowledge of the subject, so more technically-phrased duties may be less appealing, especially to applicants who are new to IT. Candidates’ may misconceive what the role involves (Lester, 2020). Future research could usefully investigate the link between what has been promised in the advert and the actual work once in role.

## **Conclusion and further work**

Job adverts are essentially communication tools. Carefully crafted job adverts for apprentices signal the opportunities. However, the majority of current job adverts seem biased towards employers recruiting people who already possess many of the skills that the apprenticeships are promoted as providing. Through the adverts, employers seem largely unable or unwilling to articulate what the job is, which rather conflicts with their claims around graduate skills gaps. We recommend a wider discussion, amongst apprenticeship providers and those approving job adverts for posting on official websites, on standards for adverts to ensure that degree apprenticeships are not used as an excuse to pay workers on a

lower salary scale, enticing candidates in with the promise of learning and development opportunities but with little detail of the work involved nor of the route to a permanent job. A starting salary of at least more than the current average degree apprenticeship wage could avoid the perception of low pay. Further, we recommend that the organisations hosting job adverts and apprenticeship providers work with employers to improve the clarity of their job adverts as crucial communications with potential apprentices. We concur with calls for adopting targets for the recruitment of disadvantaged apprentices, with oversight provided by new inspection/ regulation bodies. Employers must pay more attention in their job adverts: to inclusion (especially by including qualification equivalences and potential for advanced entry); to providing sufficient detail about the role to support expectations on both sides; and explaining how apprentices might achieve permanent roles within the employing organisation.

In terms of future work, research should be conducted into the *impact on apprentices* of the wide variation in the offerings provided by different employers, particularly in salary, opportunities, and clarity of the responsibilities in the job roles. After all, apprentices will be committing to these roles as they also complete degree study. Research into employer intentions when crafting job adverts is also necessary to better understand their perspective. Such future work would serve to provide a wider context for all stakeholders, while ensuring that the inclusive nature of job adverts remains.

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