



Edge Grant Research

Vocational progressions, decent work, and early career transitions age 25-30 years: a four industry study using Longitudinal Economic Outcomes

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Executive Summary

English vocational qualifications form a fragmented and complex system. Vocational qualifications are undergoing significant reform with the defunding of large numbers of Level 2 and 3 qualifications¹, and the strengthening of Higher Technical Qualifications (HTQs) and degree apprenticeships pathways (Keep et al., 2021). Vocational qualifications are taken by over 50% of young people, where in 2016/17 56% of Key Stage 5 candidates were studying at least one vocational qualification (Rodeiro and Vitello, 2020, p.6). Typically, higher levels of qualification lead to higher earnings, but some vocational pathways, particularly at Level 2 and 3 are characterised by long-standing concerns over labour market polarisation and poor job outcomes (Social Mobility Commission, 2023). There is limited progression beyond Level 3 qualifications for large numbers of young workers, where young people holding vocational qualifications are under-represented in higher education (Social Mobility Commission, 2024). Despite these well-known patterns of inequality, there is remarkably little vocational Longitudinal Economic Outcomes (LEO), and pathway data collected, against extensive, annual empirical longitudinal datasets and detailed studies of graduate outcomes across industries. There is a lack of sector and sub-sector vocational qualification patterns, and how these intersect with graduate outcomes (Social Mobility Commission, 2023). The development of employer-led qualification and skills systems means it becomes important to better understand how young workers are distributed into the labour market. The following analysis contributes in part to this gap.

This study draws from secondary quantitative analysis of the "*Career Pathways: Post 16 qualifications held by employees*" Longitudinal Economic Outcomes (LEO) dataset (DfE, 2022a). The dataset allows an understanding of the qualification patterns and median wage returns for young workers aged 25-30 years in 2018-19. This study focuses on the four largest sectors by employment for those aged 25-30 years in the English labour market. Between them, these four sectors employ over 50% of young adult workers aged 25-30 years: Wholesale and Retail (16.8%); Health and Social Work (13.0%); Education (9.7%) and Professional Services (9.6%) (DfE, 2022a). Building on initial analysis by the DfE (2022), further secondary quantitative analysis was carried out as part of this study which disaggregated industry, and sub-sector level data by number of employees, highest qualification held and median earnings. Young adult outcomes (by age 25-30 years) explored were:

- Levels of education across sectors, progression opportunities, and traps at Level 2, 3, 4*;
- Earnings across sectors: national and regional profiles, and by top ten qualifications held;

¹ There are significant English Level 2 and 3 vocational qualification reforms to remove qualifications which overlap with T-Levels <https://www.gov.uk/government/publications/review-of-post-16-qualifications-at-level-3-in-england--2/post-16-qualifications-at-level-2-and-below-from-spring-2023>. These processes were halted for further review in August 2024 by the incoming Labour Government: <https://www.gov.uk/government/publications/qualifications-that-overlap-with-t-levels>

- The qualification mixes by sector: sector-specific vocational progressions or more general qualifications.

Pivot tables allowed the extraction of patterns and trends of qualifications held by sector and subsector.

Key findings:

Industries present distinct qualification and median earning profiles for young workers by age 25-30 years.

- There is an increasingly qualified young workforce, where only 3.7% of young workers in this cohort by the age of 25-30 years do not hold at least a Level 2 post-16 qualification.
- Across all industries, Level 3 and below qualifications are the highest qualification for 56% of young workers. There are some industries where over seven in ten young workers do not progress beyond Level 2 or Level 3 qualifications: Accommodation and Food; Agriculture; Construction; Transport and Storage; Water and Sewerage; Wholesale and Retail.
- Industries where Level 6,7 qualifications are held by over 60% of young workers by 25-30 years are Education, Media and Professional Services.
- There are low proportions of Level 4-5 qualifications held by young workers across all industries, averaging 4.6%.
- There exist significant differences in median salaries by industry, where some level 4-5 qualifications can meet or exceed those of graduates at aged 25-30 years.

Over half of young workers 25-30 years are employed in the four largest industries, where subsectors provide important labour market patterns.

- Over half of young workers aged 25-30 years are employed in four industries in 2018-19: Whole and Retail Trade (16.8%), Health and Social Work (13.0%), Education (9.7%) and Professional Services (9.6%).

Young workers frequently change career, but in the four largest industries, median salaries are typically strongest in occupationally aligned qualification pathways across qualification levels 3-5.

- There is longstanding evidence of over-qualification and under-employment across industries typically described through a graduate Level 6+ perspective, but similar qualification mismatches occur in the English vocational system at Levels 2 and 3.
- For many young workers, early career pathways involve frequent and significant career moves, particularly for those holding Level 2 and 3 qualifications, against an education system where vocational pathway choices are typically made at ages 14-16 years.

Qualification mismatches have two important effects:

- For young workers, qualification mismatches can limit the earnings achieved, and the progression possibilities within an industry.

- For employers, overqualification, or qualification mismatches can be a key factor in England's low 'productivity puzzle, where productivity, the output achieved by workers, is consistently below that of international competitors' (Keep, 2022).

Conclusions

Vocational reforms in train since the mid-2010s are significant and wide reaching. These aim to simplify the vocational qualification system, increase the quality of qualifications, align qualifications with employer need, and create parity with academic pathways (Anderson, 2018). But decision-making is occurring with very limited longitudinal evidence of young workers' outcomes from vocational qualifications into the labour market. Young people who take vocational qualifications are disproportionately from lower socioeconomic backgrounds and are less likely to transfer to higher education, with long standing concerns about the economic returns achieved from some vocational pathways (Social Mobility Commission, 2021). This study suggests that longitudinal data by qualification level and industry/sub-sector should routinely be available to provide better understanding of how young workers are distributed in the labour market by qualification, and the median earnings they are achieving. Young people make frequent career moves, but the strongest wage returns are from occupationally specific qualifications (Wolf, 2011; D'Arcy and Finch, 2016). Differences in median earnings, and progression patterns for similar qualifications can be significant within and between sectors. This information should be more visible to young people, education and training providers, and employers as part of career decision making, and to support opportunities for young adult reskilling and up-skilling. Finally, mapping qualifications by industry and subsector provides indications of skills mismatches, under and over qualification, which could contribute to skills and productivity discussions at a national, but also regional level.

Introduction

This report draws from secondary analysis of the DfE (2022) 'Career Pathways: Post 16 qualifications held by employees' Longitudinal Economic Outcomes (LEO). The dataset contains pathways data for over two million young workers born September 1988 to August 1993, and who were aged 25-30 years in the 2018-19 tax year (DfE, 2022b). It details the industry that young workers were employed in, their educational achievements, and the wages they earned, providing a labour force snapshot in time. For the first time, it allows detailed sector and subsector analysis of patterns of highest qualification held and the economic returns for young workers aged 25-30 years in 2018-19.

The policy context: Young workers and employer demand for qualifications

The English vocational qualification system remains fragmented and complex (DfE, 2021b). England has long standing patterns of low productivity, in part due to the misalignment of qualifications with employer needs (Keep, 2022) Increasing the number of workers qualified at Level 4+ is a key skills challenge in the English regions, where employers consistently report shortages in technical job roles (DfE, 2019) . In 2024, the new Labour Government announced the creation of Skills England², aiming to align regional and national skills demand with employers and the Post 16 education and training system, stating:

Skills are crucial to economic growth, with a third of productivity improvement over the last two decades explained by improvements to skills levels.

There is low progression from vocational level 3 qualifications to Level 4-5 Higher Technical Qualifications (HTQs) or Level 6 in comparison to A Levels, with persistent disadvantaged gaps in university participation (Anderson and Nelson, 2021). But the career pathways and outcomes achieved by young workers who take a vocational pathway, particularly in a skilled trade or technical vocational pathway through an apprenticeship can create earnings which are equivalent to or exceed those of graduates at similar career stages (Espinoza and Speckesser, 2019) There is increasing interest in vocational pathways from young people, particularly in apprenticeships, with UCAS (2023)³ reporting that 59% of young people in Year 9-12 are interested in an apprenticeship, with 42% wanting to 'earn while they learn'. Since 2023, apprenticeships have appeared alongside undergraduate routes on the UCAS website.

The English vocational qualification system is undergoing significant reform, with systematic changes to improve long standing inequalities against academic routes. This aims to improve quality in the vocational system, to create improved progression prospects from Level 2 and 3 vocational qualifications to higher levels of qualifications at

² <https://www.gov.uk/government/news/skills-england-to-transform-opportunities-and-drive-growth>

³ <https://www.ucas.com/corporate/news-and-key-documents/news/ucas-launches-new-apprenticeships-service-demand-hits-all-time-high>

Level 4, 5 and 6, and to enhance the standing of vocational qualifications to achieve parity with academic routes (Anderson, 2018). Reforms aim to align qualifications with employer's skills needs, and in doing so increase [young] workers access to higher skilled, and better quality work. This aims to support improved social mobility for disadvantaged communities (DfE, 2021b). There have been significant vocational qualification changes since the Wolf Review (2011), seeking to improve their standing and quality. This includes the introduction of T-Levels and degree apprenticeships, the strengthening of higher technical qualifications (HTQs), the defunding of Level 2 and Level 3 qualifications⁴ and the introduction of the apprenticeship levy (2017) (Cavaglia et al., 2022). Reforms aim to reduce and streamline the number of vocational qualifications on offer and to better align qualifications with employer needs, addressing long standing inequalities in the vocational system (Social Mobility Commission, 2023). In contrast, apprenticeships in some industries, particularly at Level 3, 4 and 5 create good outcomes for young workers which are comparable to graduates at similar stages of their careers (Pember, 2019).

The English education system remains stratified, with vocational pathways disproportionately taken by young people from lower socioeconomic groups. For large numbers of these young workers, progression is not expected past Level 3; over 50% of young workers by the age of 26 years hold a Level 3 or below qualification as their highest qualification: 21% at Vocational Level 3 (including BTECs), with only 6% at an academic Level 3. In addition, across all qualifications, 14% hold a Level 1 or below, with 20% at Level 2, (Farquharson et al., 2022, p.85). In addition, there is evidence that ceilings on earnings exist on Levels 2,3 and 4 qualifications by age 25, 30 and 45 years respectively. (Pember, 2019, p.6) describes this as an 'age cap':

Returns drop off significantly and can lead to a wage penalty at age 25 for Level 2, at age 30 for Level 3 and at age 45 for Level 4 and higher.

In addition, early vocational transitions are typically characterised as fluid, with multiple job moves, particularly at Levels 2 and 3, within and between sectors, as Wolf reported:

In the cohort born in 1991, 62% of employed young people changed sector in the one-year interval between age 17/18 and 18/19. About 40% also changed their broad occupational level....young people change what they are doing frequently, and the changes are major ones. The young person who follows first a Level 2 course in a vocational area, then a Level 3 one, and then goes on to a long-term career in that sector is the exception, not the rule..... Moreover, the lower level the qualification, the less likely it is to be associated with employment in the sector concerned. (Wolf 2011, p. 38)

⁴ https://assets.publishing.service.gov.uk/media/662a7b0fd6c2b8b21a8a72cc/Guide_to_the_post-16_qualifications_landscape_at_level_3_and_below_for_2025_and_beyond.pdf

In contrast, D'Arcy, and Finch (2016) identified that non-graduates who achieve high skilled work, were typically older men, gaining occupationally specific qualifications in skilled trades, and where there was a "closer matching of quals to industry and greater access to training" (D'Arcy and Finch, 2016, p.9). Despite these well-known patterns of inequality, there is remarkably little vocational Longitudinal Economic Outcomes (LEO), and pathway data generated, against extensive, annual empirical longitudinal datasets and detailed studies of graduate outcomes. In addition, the outcomes from vocational policy reform can confound expectations: the reductions seen in apprenticeships for 16-18 year olds since the levy introduction, the low engagement with T-Levels, the disproportionate take-up of degree apprenticeships by more advantaged young people. Where LEO data exists, it can provide significant insights into young people's transitions. For example, Anderson and Nelson (2021) explored longitudinal qualification and earning outcomes of groups of young people, reporting:

Education and labour market pathways are incredibly diverse. For the 3.6 million individuals taking their GCSEs between 2002 and 2007, there are over 262,000 different pathways. Of these, almost 168,000 pathways are unique, i.e. each only observed for a single individual. Whilst the complexity of pathways is, not surprising, clear, and robust evidence on their sheer diversity did not previously exist (Anderson and Nelson, 2021, p.5).

Pathway diversity and complexity means young workers, educators and employers need a better understanding of how individual pathways translate to broad sector and subsector patterns within the labour market, with the Social Mobility Commission highlighting the lack of data as a key barrier to improving social mobility through vocational pathways (Social Mobility Commission, 2023).

Data analysis: using Longitudinal Economic Outcomes

Longitudinal Economic Outcomes (LEO) data allows longitudinal labour market patterns, including earnings over time to be analysed at an individual level (DfE, 2022a). "*Career Pathways: Post 16 qualifications held by employees*" LEO dataset includes the highest qualification held, the industry employed in, the median salaries, and the most common qualification patterns for young workers aged 25-30 years in 2018-19 in England. This is a publicly available dataset which draws together data from⁵:

- The National Pupil Database (NPD) held by the Department for Education (DfE).
- Higher Education Statistics Agency (HESA) data on students at UK publicly funded higher education institutions and some Alternative Providers held by DfE.
- Individualised Learner Record Data (ILR) on students at further education institutions held by DfE.
- Employment data (P45 and P14) held by Her Majesty's Revenue and Customs (HMRC).

⁵ <https://explore-education-statistics.service.gov.uk/methodology/career-pathways-post-16-qualifications-held-by-employees>

- The National Benefit Database, Labour Market System and JUVOS data held by the Department for Work and Pensions (DWP).
- Inter-Departmental Business Register (IDBR).

Young people in this study were born in England between September 1988 and August 1993 and were aged 16 years in September 2004 to August 2009, at a time of compulsory school leaving age of 16 years. They navigated recessionary job markets, increased labour market precarity, and the early effects of Brexit. The dataset cannot provide details of occupations held, predictions of qualification return, or labour market macro-level employment data. Instead, it is a database of patterns and trends of qualifications, sectors, and median earnings at a key life course age of 25-30 years in 2018-19. Evidence suggests by this age, young workers are setting their career pathways (Cominetti et al., 2022).

This report focuses on the four largest sectors in the English labour market: Wholesale and Retail (16.8%), Health and Social Work (13.0%), Education 9.7%, and 9.6% in Professional Services (DfE, 2022a). LEO analysis shows almost half of young people work in these four sectors aged 25-30 years, meaning sector qualification patterns and earnings patterns assume significant importance for outcomes of young workers, particularly young people who take vocational qualifications. These sectors are characterised by a breadth of job structures representative of the wider labour market: polarised professional and lower-skill job roles, skills shortages and low wages, qualification mismatches, over-qualification and underemployment (Costa et al., 2023).

We explored young adult outcomes by age 25-30 years through qualification and median earning patterns by industry and subsectors. Analysis built on initial analysis by the DfE (2022), with secondary quantitative analysis used to disaggregate sector and sub-sector level data by number of employees, highest qualification held and median earnings. Analysis took three main approaches:

Section 1: Identifying industry patterns of highest qualification held and earnings patterns by age 25-30 years in the English labour market (2018-19).

Section 2: Young worker patterns in the four largest industries, which constitute outcomes for over 50% of young people in the English labour market.

Section 3: The importance of the sub-sector and occupational specificity in understanding young worker outcomes.

Pivot tables allowed extraction of patterns and trends of qualifications held by industry and subsector and comparison of median earnings achieved. In this analysis, the use of earnings is not meant to suggest only a human capital, economic framing to qualifications is important, with no measure of the social value of different jobs. However, analysis cannot ignore the reality of very low-paying sectors within the UK economy, such as retail, and social care, which take large numbers of young workers (Henehan, 2021).

Our report can only scratch the surface of what are multiple industries, sub-sectors, and qualification pathways for young workers, for a single year of analysis for 2018-19. The significant vocational qualification changes since the 2010s mean that individual

qualification pathways provide indicative patterns by subject or qualification type only. But the broad patterns identified show the importance of more detailed vocational qualification longitudinal studies, and the need to align these with industry or sector/subsector employment patterns (Wilson, 2023). These patterns contribute to policy debates which seek to increase the vocational pathways available to young workers to higher skilled work and create parity with academic routes.

Findings

Finding 1: Industries present distinct qualification profiles and median earnings for young workers aged 25-30 years

In this first analysis section, we show the patterns of highest qualification held and median earnings achieved by industry by age 25-30 years in 2018-19. These show distinct and divergent patterns by industry by highest qualification held, in an increasingly qualified young workforce, but where Level 2 and 3 vocational qualifications can create qualification ceilings for large numbers of young workers. This is in contrast to the small numbers of Level 4 and 5 qualifications held, despite the significant median earnings achieved in some industries (DfE skills white paper, Roberts).

The findings show:

- There is an increasingly qualified young workforce, where only 3.7% of young workers in this cohort by the age of 25-30 years do not hold at least a Level 2 post-16 qualification.
- Across all industries, Level 3 and below qualifications are the highest qualification for 56% of young workers. There are some industries where over seven in ten young workers do not progress beyond Level 2 or Level 3 qualifications: Accommodation and Food; Agriculture; Construction; Transport and Storage; Water and Sewerage; Wholesale and Retail.
- Industries where Level 6,7 qualifications are held by over 60% of young workers by 25-30 years are Education, Media and Professional Services.
- There are low proportions of Level 4-5 qualifications held by young workers across all industries, averaging 4.6%.
- There exist significant differences in median salaries by industry, where some level 4-5 qualifications can meet or exceed those of graduates at aged 25-30 years.

These patterns have implications for the success of vocational reform and the prospects for improved vocational progressions to higher skilled work for young adults on vocational pathways.

Distinct qualification profiles by industry by employment

Industries are treated homogeneously in qualification debates. This is despite industries presenting distinct employment opportunities by their size and demand for qualifications. Different industries and their subsectors present distinct prospects for young workers through the qualifications typically held, and the median earnings achieved:

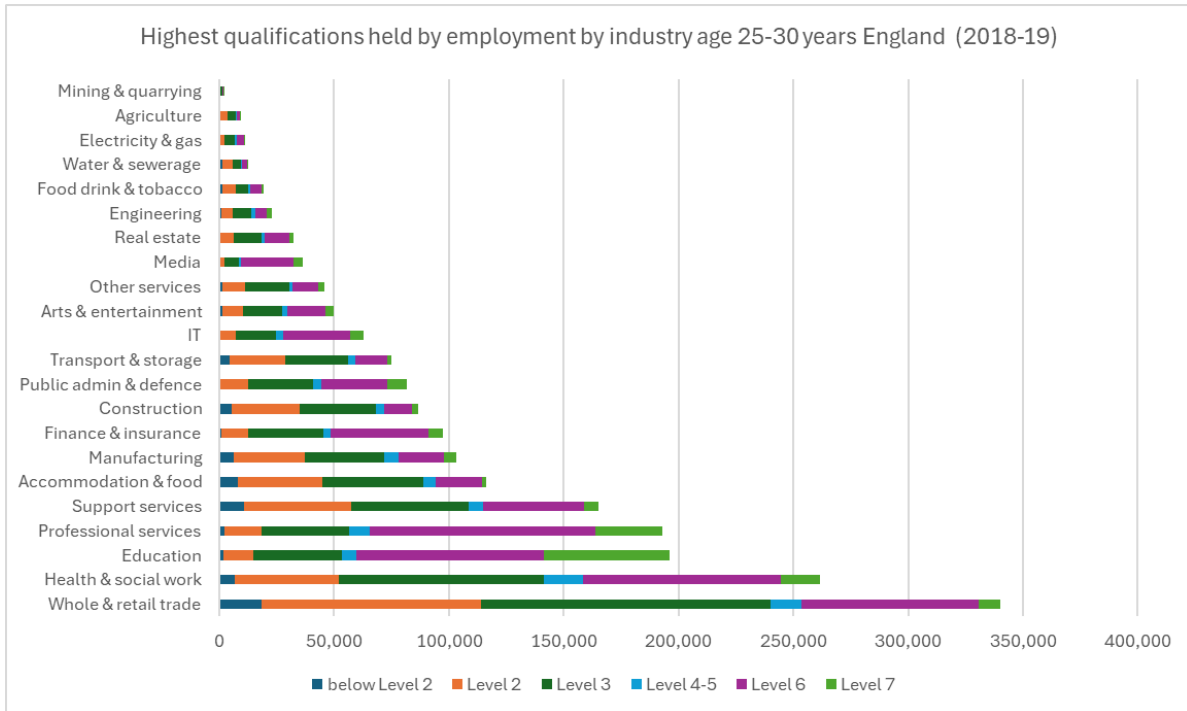


Figure 1: Highest qualification held by industry age 25-30 years England(2018-19) Source DfE (2022)

For example, in Figure 1 above we can see in England, the four largest industries employ respectively young workers aged 25-30 years: Wholesale and Retail (339,950 employees), Health and Social Work (261,710 employees), Education (196,130 employees) and Professional Services (193,110 employees) which form over 50% of young workers aged 25-30 years through PAYE. This means the qualification patterns in these industries are significant in the English skills system and of the prospects for young workers who hold vocational qualifications, particularly where industries have large numbers of lower wage jobs, for example retail, healthcare, or large numbers of graduates, for example Professional Services.

An increasingly qualified young workforce by 2018-19

The 21st century has been characterised by an increasingly qualified young workforce, where extended time in post 16 education and training is the norm for the large majority of young workers. Comparison by qualification proportions by industry shows important patterns which allow insights into qualification patterns, ceilings, and progression opportunities (Raffe, 2015).

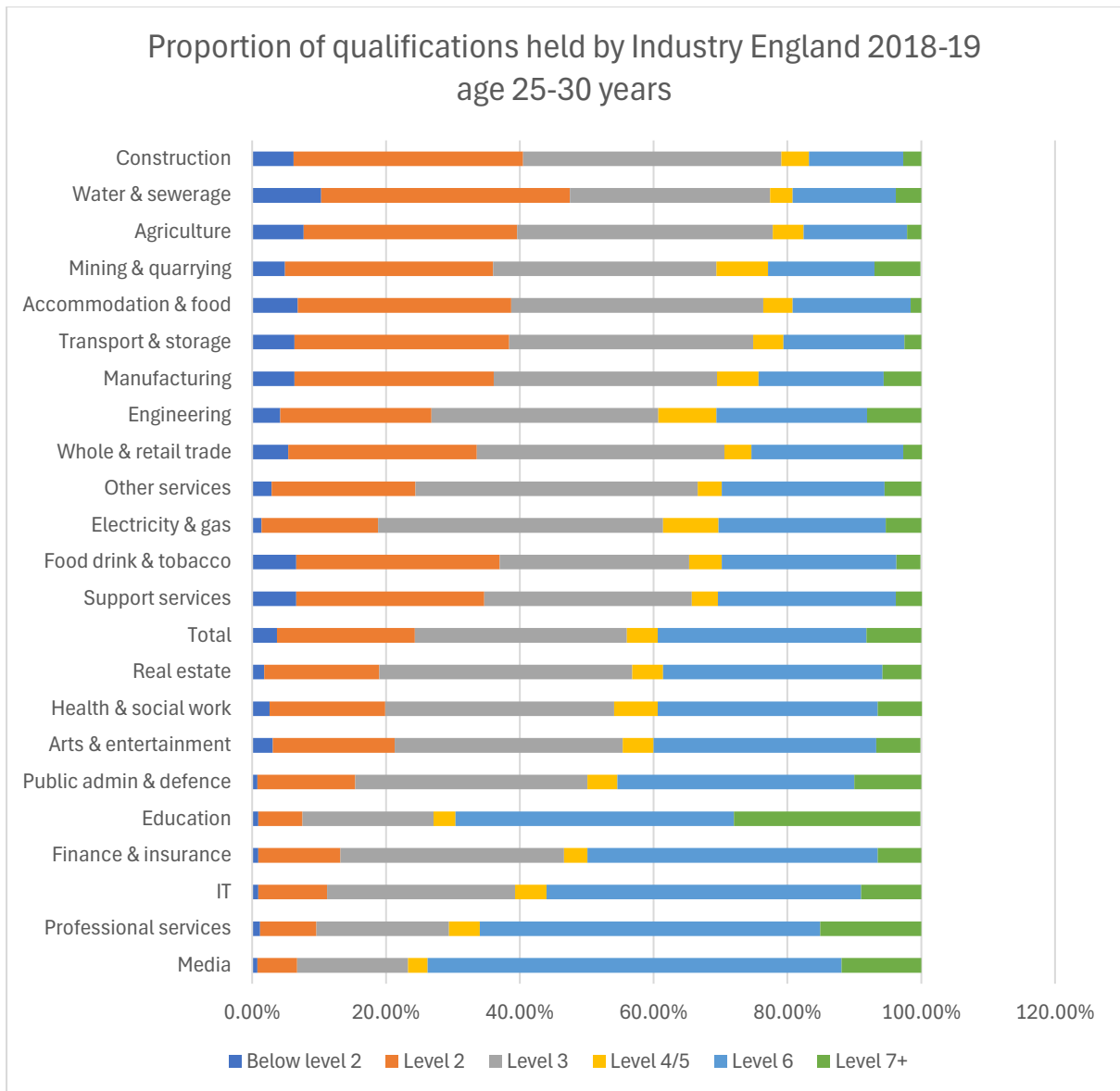


Figure 2: The proportion of qualifications held by industry. Source DfE (2022)

In Figure 2 we can see that, 56% of young workers aged 25-30 years held a Level 3 or below qualification in 2018-19, but with only 3.7% holding below Level 2. Forty-four percent of young workers held a Level 4+ qualification, reflecting the increases in participation seen in higher education since the 2000s. The proportion of Level 4-5 qualifications held across all industries is low at 4.6%. The Employer Skills Survey⁶ (2019) consistently communicates demand for technical, Level 4-5 qualifications and skills, but where graduates or Level 3 qualified workers perform these job roles (Costa et al., 2023). Explanations for low take-up of Level 4+ typically centre on young people choosing to follow a traditional university pathway in the expanded Level 6 undergraduate provision in England, and difficulties in funding for providers.

⁶ <https://www.gov.uk/government/collections/employer-skills-survey-2019>

There appear to be three broad qualification patterns by industry:

High numbers of Level 4+: First, where an industry disproportionately is a Level 4+ pathway, and likely to be bound by 'professionalisation', and where graduate Level 6+ skills may be important for large numbers of young workers. These are in industries typically categorised as knowledge intensive (Brinkley, 2007) . Industries with high numbers of Level 6+ include Media (73.8%); Education (69.5%); Professional Services (66%); Information Technology (IT) (56%).

High numbers of Level 3 and below: In contrast, where Level 3 qualifications dominate, these are likely to be through Level 3 vocational pathways because of the known translation of A' Levels into degree-level routes (e.g. see Anderson & Nelson, 2021; Farquharson et al., 2022). Industries which have relatively high proportions of Level 3 and below qualifications are those of more traditional occupations, where entry can be via vocational qualifications, particularly apprenticeships, in Skilled Trades, for example Construction (79.1%), Agriculture (77.8%), Water (77.4%), Accommodation and Food (76.4%), Transport (74.9%) and Wholesale-Retail (70.6%).

Neither 'graduate' or 'vocational': Finally, a group of industries are neither dominated by graduate or vocational qualifications; industries in this group include Health and Social Work, Arts and Entertainment, Finance and Insurance, Public Administration and Defence. Importantly, sector patterns also show the small numbers of Level 4-5 qualifications held as highest qualifications by age 25-30 years. National participation (2021/22) for Level 4-5 is routinely around 8%, as it is a qualification more typically taken after the age of 25 years, if taken at all (DfE, 2023a) . In 2018-19, highest proportions of Level 4-5 were in Engineering (8.7%), Electricity and Gas (8.3%), Mining (7.7%), Health and Social Work (6.5%), and Manufacturing (6.2%).

These patterns are important in understanding the opportunities and ceilings on vocational qualifications by sector, particularly Level 3 (Pember, 2019). This does not mean that holding a vocational Level 3 qualification leads to poor outcomes; Figure 3 shows the variety in median earnings by industry at Level 2 and Level 3. Progression to higher qualifications at Level 4+ appears more limited in some industries against those suggested through the Institute for Apprenticeships and Technical Education (IfATE) occupational maps (IfATE, 2024).

Patterns of median salaries and qualification levels: the importance of the industry

There can be significant differences between the median earnings achieved by industry for the same level of qualification. Although careers education attempts to provide earnings data alongside qualifications for young workers, these are often averages, rather than by industry. Median salaries vary by industry due to labour shortages, union representation, or the 'market value' paid for services, for example in the social care sector. Comparison of median earnings within an industry ameliorates these differences, focusing on the differences within an industry of pay and highest qualification held.

Median Earnings Patterns at Level 2 and 3⁷:

At Level 2 and 3, the higher the qualification, the higher the median earnings within an industry, where median earnings are highly industry specific:

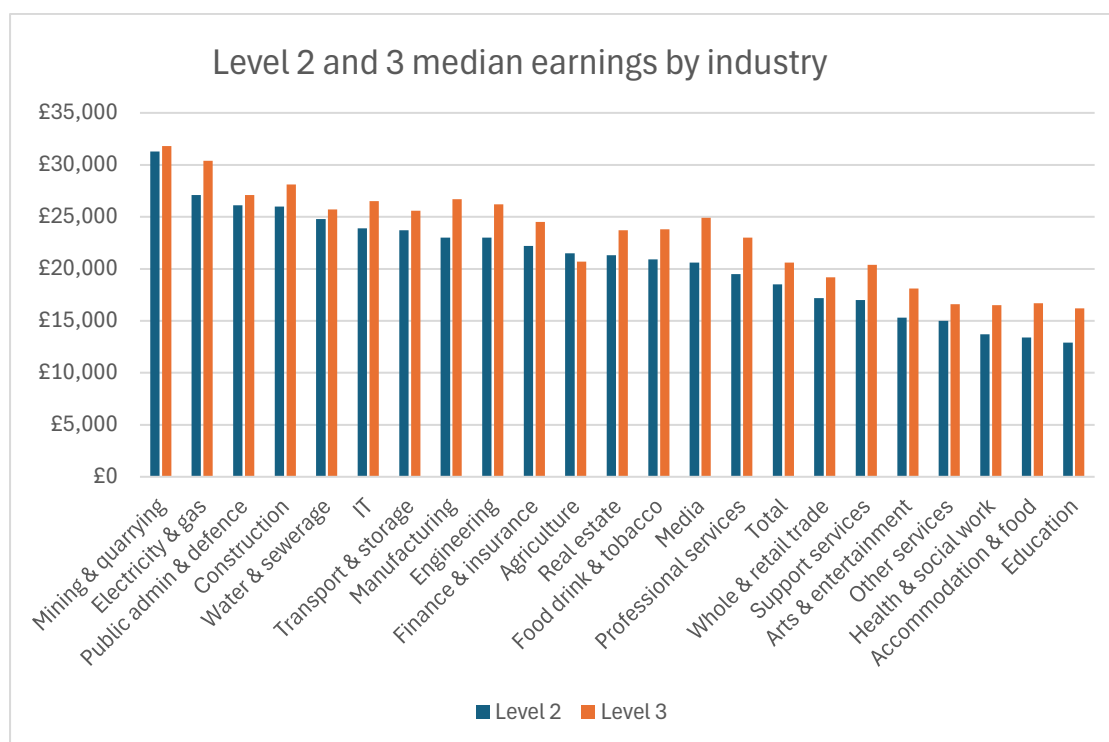


Figure 3: Median earnings by industry at Level 2 and 3. Source: DfE (2022)

There is significant median salary differences in the outcomes achieved by young workers by age 25-30 years from comparable qualifications at Level 2 and Level 3. The highest returns from Level 2 and Level 3 qualifications are in Mining and Quarrying, at Level 2 this is £31,300 compared to Level 3 at £31,800, but this is also the smallest sector at only 1,830 employees aged 25-30 years in 2018-19. The lowest are in Education, where employees earn £12,800 at Level 2 and £16,200 at Level 3. Average salary levels across sectors for Level 2 and 3 qualifications are £18,500 and £20,600, respectively. These differentials are significant. Higher salaries are typically contingent on access to technical skills or Skilled Trades and significant in-work training, typically from apprenticeships (e.g. see Kirby, 2015, p.3). There is long standing evidence of qualification ceilings on vocational qualifications at Level 2 and 3. Pember (2019) argues that vocational qualifications exhibit age ceilings, whereby after a particular age, the qualification and time spent in employment is not sufficient to give comparable skills to those achieved by workers holding a higher level of qualification. Studies estimated that the age ceilings for Level 2 qualifications is 25 years, and for Level 3 is 30 years (Pember, 2019, p.6). This is in part due to the long-term prospects afforded by graduate entry to the professions. High early median wages from Level 2 and 3 qualifications may limit

⁷ NB earnings are comparative, not as predictions of wage outcomes from qualification choices (DfE, 2022).

young workers participation in study up to the age of 30 years, due to the rational choice of choosing wage earning over participation in training.

Median Earning Patterns at Levels 3, 4, 5 and 6

Studies show high median wage returns from some higher-level vocational qualifications, typically apprenticeships and in traditional male vocational routes in early career trajectories (Espinoza and Speckesser, 2019; Roberts, 2020; Social Mobility Commission, 2023). In Figure 4 below, industry analysis by qualification Levels 3, 4, 5 and 6 allows insights into where Level 4 and 5 qualifications might stand as a higher skill qualification in its own right, indicated through median wage returns at or above those of graduate outcomes in early careers, and where it may need to be considered as part of progression to Level 6 aged 25-30 years.

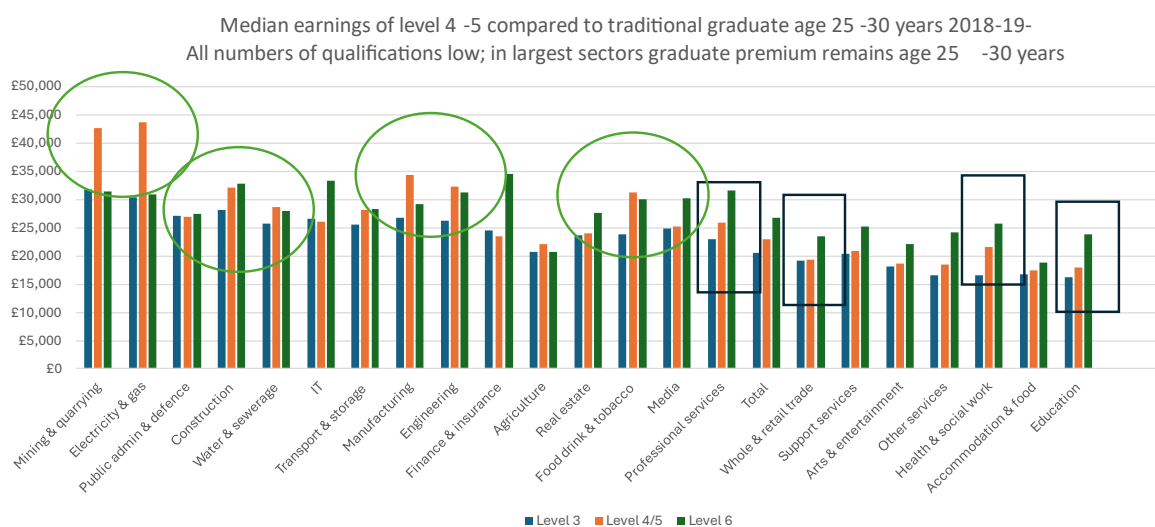


Figure 4: Median earnings at Level 4-5 compared to Level 6 by sector: the graduate premium. Source: DfE (2022)

Median earnings Level 3, 4, 5 and 6 appear to fall into three distinct patterns by sector:

- Level 6 degree with limited salary differentials Level 3, 4, and 5:** in some sectors, Level 6 outcomes are significantly more than Level 4 and 5 median wage returns. Sectors are IT, Professional Services, Media, Real Estate, Finance, and Insurance. Here the hypothesis is that 'professionalisation,' and traditions of graduate entry linked to occupational profiles, in knowledge intensive sectors and those with professional body requirements, lead to graduate-dominated sectors, and strong graduate returns. In 2018-19, median graduate returns in England were £27,400. Level 4-5 returns are similar to Level 3. This grouping contains Professional Services as the third largest employing sector.
- Low median wage returns at Level 3, 4 and 5 and limited differentials:** in some circumstances there is a more limited graduate premium, but this is below the average graduate earnings of £27,400 per annum, with Level 3, 4 and 5 median

salaries below all industry averages. Sectors include Health and Social Work, Support Services, Wholesale and Retail, Arts and Entertainment, Other Services and Education. This grouping contains Health and Social Work, Wholesale and Retail and Education as the first, second and fourth largest sectors by employment age 25-30 years in 2018-19.

- **Strong wage returns for Level 4-5 against Level 6:** Sectors where there are high median earnings at Level 4 and 5 and in some cases, for example, Mining and Quarrying at Level 3, are comparable to, or above graduate earnings at age 25-30 years. These tend to be 'traditional' male industries with strong traditions of vocational skills: Public Administration and Defence, Construction, Transport, Manufacturing, and Engineering. Mining and Quarrying, Electricity and Gas, Water and Sewerage industries also show these patterns, but here there are small numbers of employees. This grouping contains none of the highest employing four industries.

Patterns for Level 3, 4, 5 and 6 qualifications are important because of the focus in vocational reform on progression. The categorisations above show the difficulties of creating decent progressions from vocational routes at Level 3 into 4 and 5, where industries value Level 4 and 5 qualifications differently as shown through median earnings. This data reflects patterns highlighted in other studies of strong Level 3, 4, and 5 returns, particularly from apprenticeships in traditional working-class industries, against industries where higher skilled occupations require Level 6+ degree level study (Roberts, 2020; Social Mobility Commission, 2023). In addition, where there are high numbers of graduates trained in disciplines against the industry number of job roles, over qualification can displace vocationally trained young workers without a degree (CIPD, 2015). Data does not indicate whether young workers have held a Level 4 or 5 but have progressed to Level 6 or 7. The relative size of industries which are below 1,000 young workers holding Level 4 and 5 qualifications means data is indicative and further exploration is needed.

Summary: young worker outcomes patterns by highest qualification held by industry

There are significant vocational reforms in train which seek to improve the pathways available to vocationally qualified young workers to high skilled work, particularly through Higher Technical Qualifications and the development of degree apprenticeships. However, analysis of longitudinal economic outcomes data for 2018-19 for young workers aged 25-30 years presents important insights as to the challenges of implementing this reform. Fifty-six percent of this cohort of young workers did not progress beyond Level 3 by age 25-30 years. For all industries, achieving a Level 3 qualification produced higher median wage returns than holding a Level 2. Very few young workers hold below Level 2 qualifications (3.7%), meaning by 2018-19, post 16 Level 2 appears the baseline qualification.

Industries show different qualification profiles, with limited visibility of the progression possibilities. The efficacy of careers information and guidance to inform young workers of qualification ceilings and progression and training prospects aged 25-30 years by industry appears limited. For large numbers of workers, there is no progression

expected beyond Level 3. For this longitudinal cohort, this represents 1,132,160 young workers, or 56% of the cohort. The large numbers have policy implications for young workers, employers, and educators in a system seeking to improve progression. Evidence suggests vocationally qualified young workers often do not see higher education as a traditional route and who if they access Level 4+ do so at age 25 years+ via employers. Despite the consistent reporting of skills shortages at Level 4-5, across all industries, only 4.5% of young workers held a Level 4-5 qualification as their highest qualification by age 25-30 years. By industry, the highest proportion of Level 4-5 held was only 8.7% in Engineering, a traditionally strong HNC/HND pathway (DfE, 2019, p.4)

However, industries appear to be creating distinct qualification patterns of highest qualification held based on whether the industry is a 'knowledge' intensive industry, for example Information Technology, or subject to professionalisation, for example, in nursing, where holding a Level 6+ qualification forms an important occupational criterion, which is reflected in median earnings. Similarly, there are groups of industries, typically traditional, technical industries, where Level 4-5 median wage returns are equal to, or exceed those of graduates at the same career stage. These patterns are important in understanding the prospects for vocational progression under the new reforms.

Finding 2: Over half of young workers 25-30 years are employed in the four largest industries, where subsectors provide important labour market patterns

In this second analysis section, we focus on the four largest industries which employ over 50% of young workers aged 25-30 years (DfE, 2022a) Young worker outcomes in these industries are significant indicators for the English labour market.

Our findings show:

- over half of young workers aged 25-30 years are employed in four industries in 2018-19: Whole and Retail Trade (16.8%), Health and Social Work (13.0%), Education (9.7%) and Professional Services (9.6%).
- the importance of understanding industries through sub-sector qualification and earnings patterns, where median wage differences between sub-sectors are significant and can exceed the differential between qualification levels.

The importance of four industries to 50% of young worker outcomes

The industry employed in is significant in the patterns of highest qualification held by young workers, and the median earning they achieve. These patterns are not necessarily visible to young workers, particularly the differences in salaries by age 25-30 years because of the lack of longitudinal data by qualifications and earnings by industry and subsector levels (DfE, 2023b) Qualifications patterns in these industries disproportionately influence the skills system through industry size across working lives (Wilson et al., 2020; DfE, 2023b). The four sectors have very distinct patterns of highest qualification held, detailed in Figure 5, which are a function of their occupational structures within the industry and their subsectors:

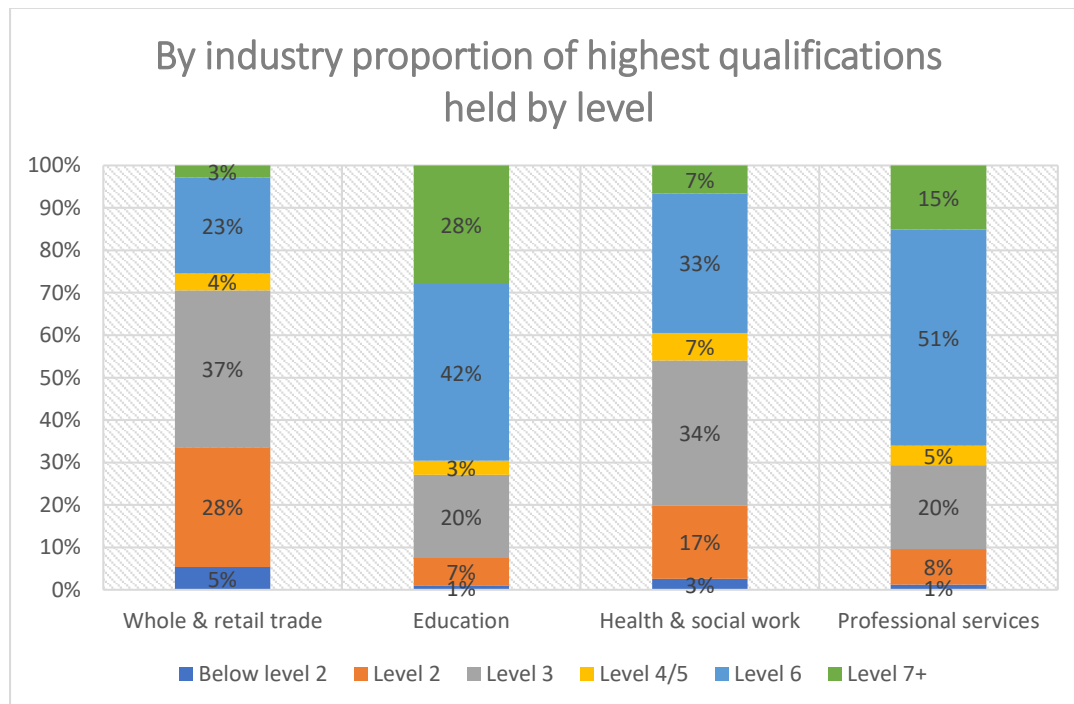


Figure 5: Four industries: proportion of highest qualifications. Source: DfE (2022)

Figure 5 reveals that Level 3 and Level 6 qualifications are the most common qualifications held, reflecting the typical Post 16 English transition to employment after attaining Level 3, or Level 6 qualifications. Level 4-5 qualifications held as highest qualification are low at between 4-8. Level 3 proportions are particularly important for questions of progression, as the key qualification to move to Level 4+. Evidence suggests little difference between young people who do progress from Level 3 and those that do not by academic background (Anderson and Nelson, 2021). This suggests significant untapped potential in young workers for further progression. Broad industry patterns can be categorised by the proportion of Level 4+, or Level 3 and below:

High proportions of Level 3 and below qualifications

- Whole & Retail Trade has 70% of 25-30 year employees holding a Level 3 or below qualification, with 37% holding a Level 3. Only 4% hold a Level 4-5 qualification as their highest.
- Health and Social Work has 54% of its 25-30 years' workforce holding a Level 3 or below qualification, with 34% holding a Level 3 as highest qualification, and with 7% of young workers holding a Level 4-5, one of the highest industry proportions.

High proportions of Level 4+ qualifications

- Education has 73% of 25-30 year employees holding a Level 4+ qualification, with 28% holding post graduate qualifications. Only 3% of young worker hold a level 4-5 qualification as their highest.
- Professional Services has 71% of its 25-30 year old workforce qualified at Level 4+, with only 5% of those holding a Level 4-5 as their highest qualification. Twenty percent of workers aged 25-30 years hold a Level 3 as their highest qualification.

Vocational progression opportunities present as two main qualification barriers. First, where large numbers of higher skilled jobs exist, but are mandated to require a degree through professional qualification requirements, there are well evidenced barriers faced by disadvantaged young people in accessing higher education, including fear of student debt, the cost of living crisis, and of needing to move away from home for study (Reay, 2017). Vocationally qualified young workers are disproportionately from more disadvantaged communities who are less likely to attend higher education (Avis, 2023). Secondly, where there are high proportions of Level 3 and below qualified young workers in an industry or sub-sector, and there are insufficient numbers of higher skilled jobs required for progression. The low proportion of Level 4-5 qualifications held across all industries show how these qualifications are currently not taken by young workers as primary forms of progression (Costa et al., 2023). These are broad industry qualification patterns. In reality, young workers are employed in 'sub-sectors;' the smaller specialist sectors that make up the industry. Sub-sectors create their own distinct qualification and earnings profiles for young workers aged 25-30 years. The following sections explore the four industries:

Young workers outcomes in Wholesale and Retail: Dominant low-wage industry and subsectors

Wholesale and Retail is the largest employing industry of 339,950 young workers in 2018-19. The size of the Wholesale and Retail sector makes it an important youth employer. The Wholesale and Retail sector has three sub-sectors: the largest is Retail (except motor vehicles) at 216,590 employees; Trade and Repair of Motor Vehicles has 39,920 employees and Wholesale has 83,440 employees.

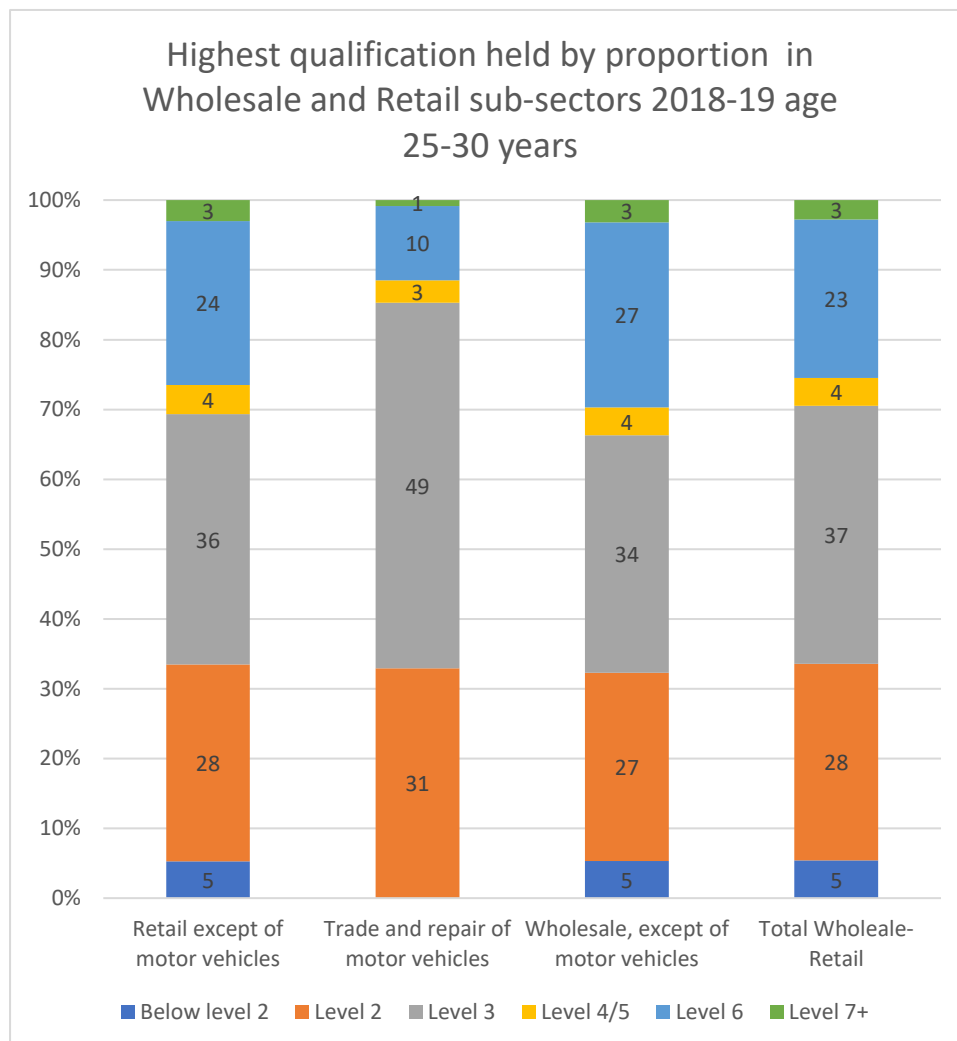


Figure 6: Wholesale and Retail Sector: Highest qualification held by employees by sub-sector (%). Source: DfE (2022)

Patterns of Level 4+ qualifications by sub-sector: Wholesale and Retail Trade as an industry is traditionally described as relatively low wage, low skilled, which employs large numbers of young people 16-30 years (Lloyd et al., 2008). Many of these are transition job roles as young people find their way in the labour market (Mann and Huddleston, 2017). Higher level 4-5 qualifications are at national levels of 4% but are low reflecting all England patterns. In the Retail and Wholesale subsectors, approximately three in ten young workers hold Level 6+ qualifications. This may be a function of overqualification as young workers find their career pathway post university. In

comparison, Trade and Repair of Motor Vehicles has small numbers of Level 6+ at 11%, reflecting the Skilled Trades nature of much activity.

Patterns of Level 3 and below qualifications:

Wholesale and Retail subsectors have large numbers of vocational Level 2, and 3 as highest qualification held, which suggest ceilings on qualifications, with low progression possibilities to high-skilled work. Importantly, numbers of Level 2 are also high at approximately three in ten workers, reflecting the sub-sectors as routes to early employment with only limited additional vocational training required for large numbers of jobs roles. Median salaries for Retail are low at Level 2 compared to Trade and Repair of Motor Vehicles and Wholesale subsectors. Level 2 Retail median salary is £14,100. In Trade and Repair of Vehicles is £21,800 and in Wholesale is £21,000, representing a 54.6% uplift from Retail Level 2 salaries. Level 3 Median salaries are Retail £16,600; Trade and Vehicle repair £21,900; Wholesale £23,200. In Retail, there is limited uplift for Level 4+, at £21,100 for Level 6, equivalent to Level 3 in Vehicle Repair, or Level 2 Wholesale. This creates specific low qualification ceilings and traps for young workers in the Retail sector, against the large numbers of jobs provided for young workers.

Young worker outcomes in Health and Social Work: polarised qualifications and median earnings across subsectors

Health and Social Work sub-sectors are characterised by polarised workforces, between sub-sectors with large numbers of professionalised, Level 6+ job roles and sub-sectors with large numbers of Level 3 and below qualifications, where there appear to be qualification ceilings in the prospect for progression. Health and Social Work forms the second largest industry by employee numbers at 261,710 employees aged 25-30 years in 2018-19. There are well known skills shortages across the Health and Social Work industries with projected growth in the workforce due to the ageing population. Health and Social Work consists of five main sub-sectors by employment. In 2018-19, of the young workers aged 25-30 years who worked in the Health and Social Work industry, 39.7% worked in Hospital Activities; 24.3% in Social Work; 20.1% in Residential Care; 6.7% in Medical and Dental Practices, and 9.1% in Other Human Health Activities. Each sub-sector has a distinct qualification profile, shown in Figure 8 below:

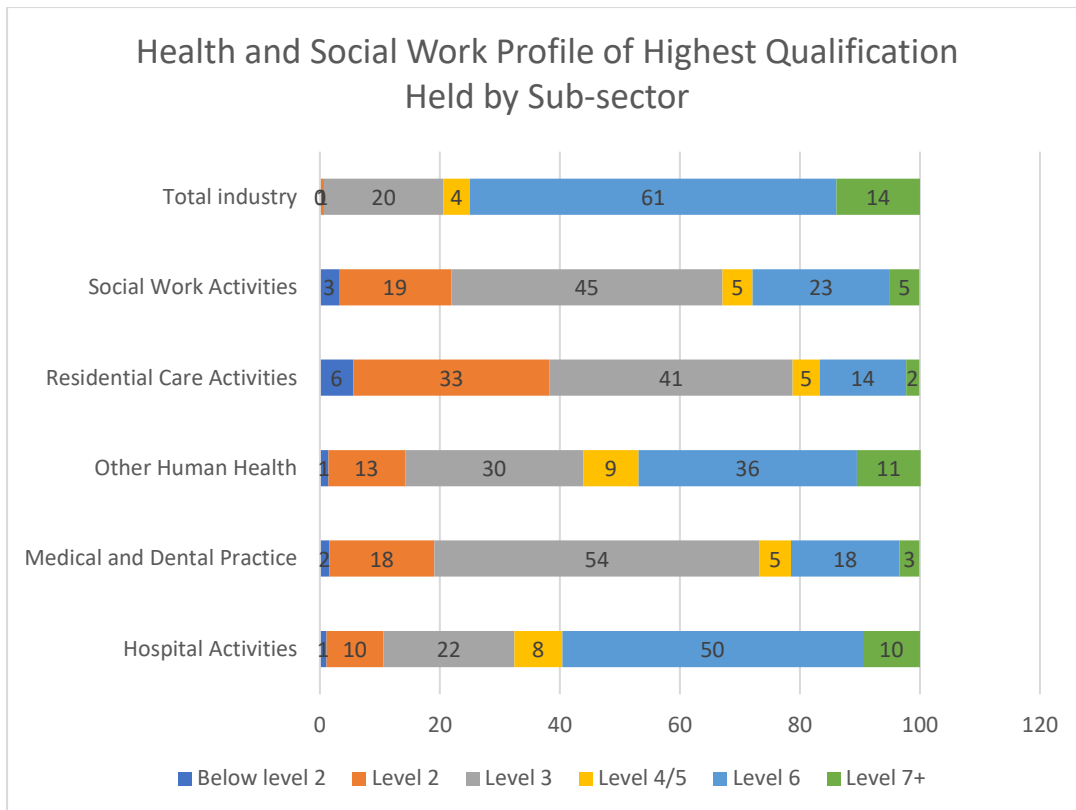


Figure 7: Health and Social Work: Qualification Profile of Subsectors Source: DfE (2022)

Subsectors in 'Health and Social Work' present different profiles of highest qualification held, with the 'shape' of this profile indicating the qualification ceilings that may be occurring at Levels 2 and 3, the use of Level 4-5, and the relative importance of Level 6+ to the sub-sector.

Patterns at Level 4+ qualifications: Level 4+ are the primary qualifications held in Hospital Activities (68%) and Other Human Health (56%), with the proportions of Level 4-5 at 8% and 9% respectively, twice the national average. The high number of Level 6+ qualifications reflect the professionalisation agendas in the health service since the 2000s, with, for example, nursing now a degree only profession (UCAS, 2024).

Patterns at Level 3 and below qualifications: In contrast, in the other three sub-sectors, large numbers of workers hold Level 3 and below qualifications, typically vocational, with low Level 6+ qualified young workers. For example, in Residential care, approximately 80% of workers aged 25-30 years hold a Level 3 or below qualification. Progression opportunities beyond Level 3 appear limited. Sub-sectors begin to show the distinct outcomes achieved by young workers from similar qualification levels in the same industry. For the largest sub-sector- Hospital Activities - median salaries were consistently above those of the next largest sub-sectors by employment, which were in Social Work activities and Residential Care. Hospital activities had the highest median earnings with Levels 6 and 7 average earnings of £28,200 and £28,400. In comparison, in Residential Care, Level 6 and 7 qualifications on average paid £20,700 and £22,600, respectively. Level 2 median salaries ranged from £11,800 in Social Work Activities to £16,900 in Hospital Activities, a difference of 43.2%. Level 3 median salaries ranged from £14,900 in Social Work Activities to £18,000 in Hospital Activities, a difference of 20.8%.

These are significant salary differentials in subsectors with longstanding skills shortages. Subject analysis in Section 4 will show further polarisation of earnings through the alignment of subjects and occupations.

Young worker outcomes in Education: professionalisation but low wages and low level 4-5 levels

Education sub-sectors are characterised by professionalisation through the large numbers of jobs requiring a Level 6+ degree, but also relatively low wages, particularly at Level 2 and 3, and 4-5 levels. Education forms the third largest sector by employee numbers at 196,130 employees aged 25-30 years. Despite its relative size, it has a homogeneous occupational profile of degree-level teaching positions and typically Level 3 qualified support staff. Primary Education forms the largest subsector at 51.6% of sector employees; followed by Secondary (24.4%); Higher Education (13.0%); Other (including FE) (8.3%) and Pre-Primary (2.6%).

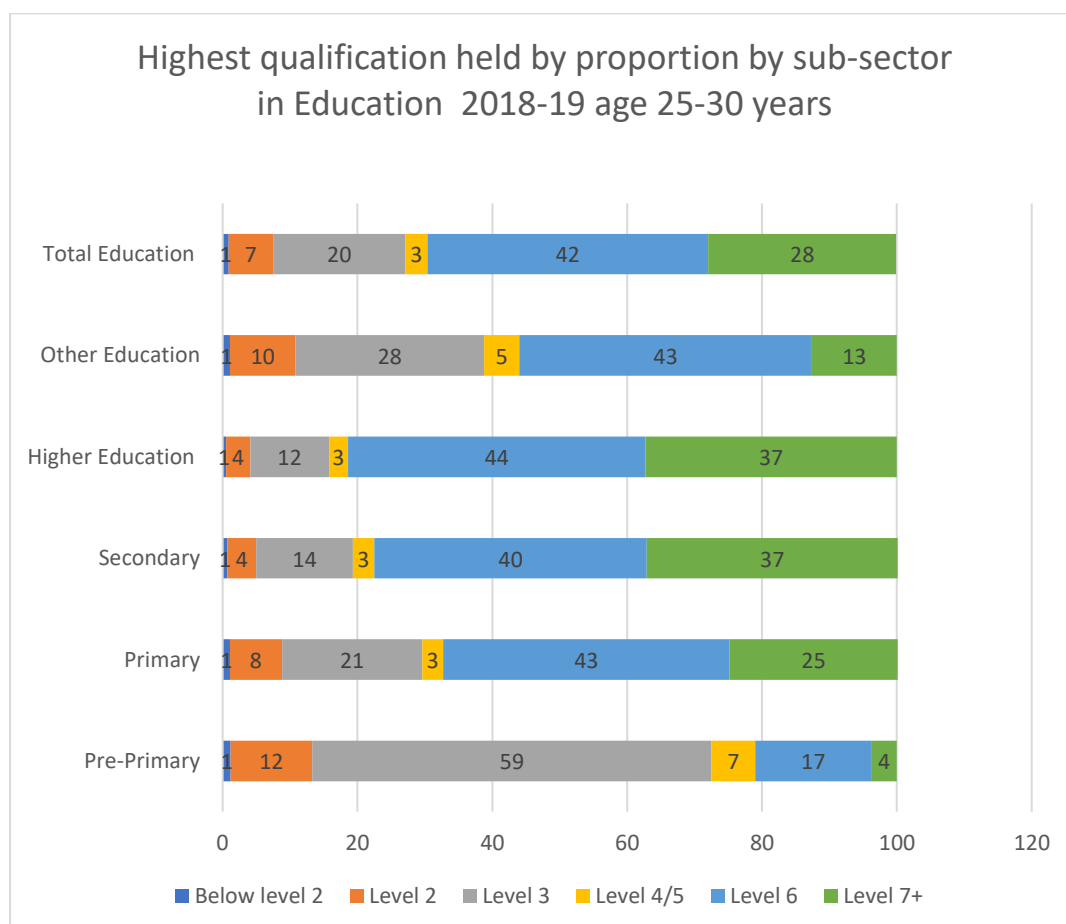


Figure 8: Education: Highest qualification held by proportion by sub-sector. Source: DfE (2022)

Patterns at Level 4+ qualifications: Education is a professionalised sector, where large numbers of teaching jobs are contingent on achieving a degree or postgraduate qualification. The most common qualifications held in the sector are degree Level 6-7+ qualifications, where 70% of employees hold a Level 6+ qualification age 25-30 years. Across subsectors, 68% of young workers hold Level 6+ qualifications in Primary, 77% at

Secondary, 81% at Higher Education. Level 6+ is only held by 56% of employees in Other Education, which includes FE and has its traditions of vocationally qualified skilled teaching staff. Level 4/5 qualifications are a small proportion of the overall qualifications held, at only 3% across Education, where the potential for Level 4-5 qualifications in the sector is limited through the need for a degree to be a qualified teacher. Traditional vocational sub-sectors of Pre-Primary and Other Education show the highest Level 4-5 at 7% and 5%, respectively.

Patterns at Level 3 and below qualifications: Support staff typically hold Level 3 qualifications. The only sub-sectors with high numbers of Level 3 and below are Pre-Primary, where Level 3 qualifications are held by 65.1% of employees, but against small numbers of sub-sector employees of 5,110, and in Other Education (including FE) at 38% of young workers. Level 2 qualified employees are low in all subsectors, with insignificant workers qualified below Level 2. Despite the dominance of degrees, Education median salaries are low at Levels 6/7, where returns from postgraduate qualifications at age 25-30 years of £27,400 are below national median graduate salary levels 5 years after graduation (2018-19).

The Education sector has the lowest median wage returns for Level 2 and 3 qualifications across industries. Level 2 median salaries are £12,900, against an all-industry average of £18,500, and Level 3 median salaries are £16,200 against all-industries averages of £20,600 for Level 3. This may be reflective of the part-time, female, and low status of many school-based support roles (Francis-Devine and Hutton, 2024).

Young worker outcomes in Professional Services: a professionalised sector but with good Level 4-5 returns

Professional Services is a degree-based sector. Sub-sectors cover a range of professions in nine main sub-sectors, but where there are significant differences by sub-sector. The range of professions mean this is a complex industry.

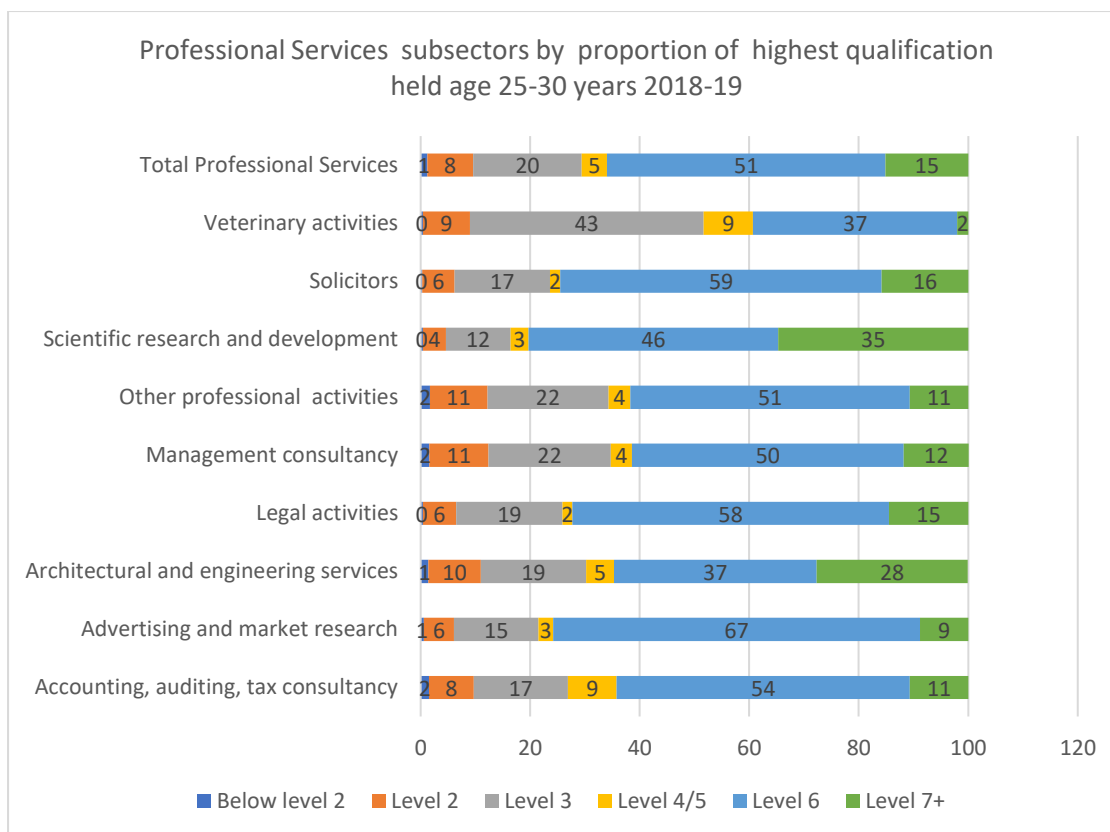


Figure 9: Professional Services subsectors by proportion of highest qualification DfE (2022)

Patterns at Level 4+ qualifications: Professional Level 6 and 7+ qualifications dominate the majority of subsectors, except for veterinary, where only 39.2% of the workforce hold Level 6+. Scientific and research services have over 80% of employees holding a Level 6+ qualification; advertising (76%) solicitors (75%) and legal activities (73%) are all degree-level qualified professions. Level 4-5 is the highest proportion in Veterinary and Accounting, auditing, and tax at 9%, twice the national levels. This means Professional Services may provide decent work routes for Levels 4-5, despite the low proportion of the qualification.

Patterns at Level 3 and below qualifications:

Subsectors typically have low levels of Level 3 and below qualifications between 20% and 30% of young workers. Veterinary activities are the only sub-sectors with large numbers of Level 3 and below. The substantial number of professional job roles suggest progression should be possible to level 6, but the low levels of Level 4-5 suggest that this may be through degree level apprenticeships, rather than level 4-5 qualifications. Median earnings in the Professional Services sector are high, with Level 6 and 7 typically giving salaries above median graduate earnings of £27,400. Subsectors reflect many characteristics of the knowledge economy of high skilled, high wage work (Brown, 2020). Although the majority of young workers hold professional Level 6+ qualifications, median salary returns at Level 3 and below are above average labour market median salaries of Level 3 of £20,600 and Level 2 of £18,500 in the majority of sub-sectors, with some sub-sectors, such as Legal Activities achieving Level 3 at £26,200 and Architectural and Engineering at £25,700, just below national median graduate earnings of £27400.

Summary: subsector patterns and the prospects for vocational progression in the four largest industries

Vocational outcomes, and the prospects for progression are a function of the sub-sector, where distinct qualification patterns affect progression:

- High proportions of Level 3 and below. In these industries, the number of higher skilled jobs available limits vocational progression from Level 3, for example in the Retail sub-sector.
- High proportions of Level 4+: in these industries vocational progression from Level 3 can be limited by the need for a mandated degree as part of higher skilled occupations, for example solicitors, and the barriers that the vocational demographic face in accessing higher education.

Sub-sector and median earning profiles are important in understanding qualification ceilings and barriers for progression from dominant industry occupational structures, and earning differentials, particularly between similar qualification levels within and between industries. The analysis above showed the divergence of industry qualification structures and median earnings for similar qualification levels. The lack of longitudinal outcome data for vocational progressions means there is limited understanding of the patterns of qualifications held and utilised by industries over early careers. Traditionally, young worker outcomes are as 'vocational' or 'graduate', but sub-sector analysis shows the importance of understanding qualifications and median earnings as an interdependent continuum across Level 2-3-4-5-6 (Social Mobility Commission, 2023). Progression prospects form a central feature of vocational reforms, particularly progression from Level 3 to Level 4-5 higher technical qualifications, but analysis by sub-sector shows the very different prospects of those pathways existing in any volume, or where additional barriers may occur through wider industry professionalisation of higher skilled job roles requiring qualifications at Level 6+ (Bathmaker, 2017).

Finding 3: Occupational alignment and subject mismatches: strong median earnings in occupationally aligned qualifications at Level 3-4-5-6

The final analysis section shows patterns of occupational alignment and mismatches of qualifications and their effects on young worker outcomes, using three sample sub-sectors. Young workers frequently change career, but in our sample sub-sectors, median salaries are typically strongest in occupationally aligned qualification pathways across qualification levels 3-4-5-6 (Mann and Huddleston, 2017). Level 3 apprenticeships typically create strong occupational median wage returns. We suggest that early career decision making at age 14-16 years for vocational pathways contradicts the reality of early adult career trajectories that are increasing elongated and complex, where changing career can result in lower earnings, and where there is limited visibility of these outcomes by aged 25-30 years for young workers.

The findings show:

- There is longstanding evidence of over-qualification and under-employment across industries typically described through a graduate Level 6+ perspective, but similar qualification mismatches occur in the English vocational system at Levels 2 and 3.
- For young workers, early career pathways can involve frequent and significant career moves, particularly for those holding Level 2 and 3 qualifications. This is in an education system where vocational pathway choices typically occur at age 14-16 years. This leads to large numbers of young workers who do not hold occupationally specific qualifications.

Qualification mismatches have two important effects:

- For young workers, qualification mismatches can limit the earnings achieved, and the progression possibilities within an industry.
- For employers, overqualification, or qualification mismatches form a key factor in England's low 'productivity puzzle, where productivity, the output achieved by workers, is consistently below that of international competitors' (Keep, 2022).

Early job experiences for young workers are characterised as one of frequent job moves, with qualifications at Level 2 and 3 often providing limited earnings enhancement (Wolf, 2011, p38). This reflects studies of qualification alignment in the Australia VET system (Sloane and Mavromaras, 2020). In contrast, the strongest non-graduate pathways to high skilled, work are those in occupationally aligned, technical and skilled trades in typically male dominated manufacturing, engineering job roles (D'Arcy, Finch 2016). There is remarkably limited vocational pathway data available for young workers (Social Mobility Commission, 2023).

Occupational alignment and subject mismatches -a sub-sector comparison

This section compares three sub-sectors which characterise important aspects of the English labour market:

- Retail (excluding Motor Vehicles) as an example of the service economy which takes high numbers of young workers.

- Hospital Activities, as an example of the healthcare sector, which experiences consistent skills shortages, but where there has been significant focus on professionalising the health workforce.
- Architecture and Engineering, as an example of a knowledge intensive and professionalised sub-sector where high proportions of young workers hold a Level 6+ qualification.

We use median earnings by subject by sub-sector, and top third of qualifications by earnings in the dataset, as indicators of where decent work progressions might be occurring.

Hospital Activities: a workforce characterised by professionalisation and low wage vocationalism.

Hospital Activities is part of the Health and Social Work industry, concerned with the hospital workforce. Typical job roles: Healthcare support workers, nurses, radiographers, porters, occupational therapists. It is an important subsector because of the persistent health care skills shortages and the projected growth from an ageing population. The sub-sector consists of 103,890 workers aged 25-30 years of which 63% hold a Health, Public Services and Care qualification as their highest qualification. The 37% of young workers who do not hold a health care qualification as their highest qualification equates to 38,480 young workers. These may work in generic business support roles, or hold other, lower health qualifications:

Hospital Activities Median Earnings	Agriculture, Horticulture and Animal Care	Arts, Media and Publishing	Business, Administration, Finance and Law	Construction and Planning	Education and Training	Engineering and Manufacturing Technologies	Health, Public Services and Care	History, Philosophy and Theology	Information and Communication Technology (ICT)	Languages, Literature and Culture	Leisure, Travel and Tourism	Preparation for Life and Work	Retail and Commercial Enterprise	Science and Mathematics	Social Sciences	Total
Total Emp	570	5250	6600	470	1100	1090	65410	950	1850	2860	2890	970	2880	8940	1890	103890
Below level 2		£11,400	u	u	u	u	£15,800	u	u	£15,200	u	£14,300	£18,700	£16,900	u	£15,400
Level 2	£16,800	£16,500	£16,900	£20,500	£13,300	£17,700	£16,600	£17,100	£17,300	£16,800	£17,700	£16,500	£16,500	£17,400	£18,300	£16,900
Level 3	£17,200	£17,800	£18,200	£20,500	£15,600	£20,100	£17,500	£17,500	£19,400	£18,000	£18,300	£19,200	£16,600	£22,000	£18,600	£18,000
Level 4/5	£17,300	£17,700	£21,000	£24,000	£17,300	£22,300	£26,300	£16,700	£19,200	£19,200	£18,000	u	£17,400	£18,900	£18,100	£24,300
Level 6	£18,500	£18,400	£21,500	£23,000	£18,500	£21,300	£30,600	£19,600	£21,700	£19,200	£19,700			£21,300	£20,700	£28,200
Level 7+	£17,600	£21,400	£30,200	£25,100	£36,300	£27,800	£29,800	£21,400	£25,800	£22,800	£23,600			£22,900	£31,200	£28,400

Table 1: Hospital activities: Median earnings by subject by level. Source DfE (2022)

Patterns at Level 3 and below qualifications: There are patterns of limited differentials against other subjects from Health specific qualifications in the Hospital Activities sub-sector. Level 2 and 3 Health qualification median salary returns are just below the sub-sector median of £16,900 and £18,000 respectively, showing the poor status of vocational healthcare roles in Hospitals. Level 2 and 3 median salaries are below national median wage levels for these qualifications, reflecting the low wage nature of healthcare jobs. Higher than average salaries in are in specialist subjects rather than in healthcare; maintenance of buildings (construction, engineering, and manufacturing), IT, and scientific support. These are small numbers of employees compared to the size of the health workforce. At Level 2 and 3 there appears to be only limited advantages to holding a health care qualification over other subject routes. Individual qualifications reflect these patterns for the most common qualifications held:

- At Level 2, the most common qualification held is Health and Social Care Apprenticeship, held by 960 young workers, who achieve a median salary of £17,200 by age 25-30 years.
- At Level 3, the most common qualification held is Health and Social Care Apprenticeship held by 1,680 young workers, who achieve a median salary of £17,600 by age 25-30 years. Note there is little differential between those workers who are qualified in healthcare between Level 2 and Level 3.
- Level 3 Business and Administrative Apprenticeship is held by 690 young workers, who achieve a median salary of £17,800 by age 25-30 years.
- In contrast, 510 young workers held A 'Level Biology as their highest qualification and achieved a median salary of £30,700 by age 25-30 years.
- National median salaries for Level 2 are £18,500 and for Level 3 £20,600.

Patterns at Level 4+ qualifications: the pattern is quite different at Level 4+, where health subject pathways become important. Level 4-5 median wages are strong at £26,300 in health pathways, just below national graduate salaries of £27,400 for the equivalent career stage, with health having some of the highest numbers of Level 4-5 workers.

- At Level 4-5 the most common and highest earning qualifications are Diploma of Higher Education (DipHE) in Nursing, held by 5,070 young workers, who had a median salary of £27,700.

The importance of occupational specificity continues at Level 6 and 7, with the strongest wage returns seen for health specific qualifications. This reflects the professionalisation agendas of the health workforce, particularly nurses:

- At Level 6, the most common and highest earning pathway is Nursing Degree, held by 17,020 young workers, with a median salary of £27,500.

Within-subject areas with large numbers of young workers, Art and Media, Business and Science and Maths, the median salaries are similar to health qualification levels at Levels 2 and 3, but Level 4+ show lower returns against occupational-specific qualifications.

Architectural and Engineering Services: A degree dominated sub-sector.

Architectural and Engineering Services is one of the largest sub-sectors in the Professional Services Industry. It provides an example of a knowledge intensive sub-sector. Typical job roles include Architects, Civil Engineers, Construction Design and Build Technicians, Civil Engineering Technicians. The sub-sector provides an important example because of the skills shortages reported in construction and engineering, including from the need to move towards net zero, and the technical skills of the sub-sector. Qualification patterns reflect the professional degree dominance of the industrial sector. Evidence suggests technically skilled occupations create decent progression routes for young workers who take vocational qualifications, often through apprenticeships. Of 32,570 employees, 9,560 hold construction qualifications, 6,280 hold engineering and manufacturing, and 5,030 hold science and mathematics.

Architecture and Engineering Median salaries	Agriculture, Horticulture and Animal Care	Arts, Media and Publishing	Business, Administration, Finance and Law	Construction and Planning	Education and Training	Engineering and Manufacturing Technologies	Health, Public Services and Care	History, Philosophy and Theology	Information and Communication Technology (ICT)	Languages	Literature and Culture	Leisure, Travel and Tourism	Preparation for Life and Work	Retail and Commercial Enterprise	Science and Mathematics	Social Sciences	Total Employees
Total	410	2600	2430	9560	140	6280	860	570	1050	930	1010	320	450	5030	840	32570	
Below level 2	u	u	u	u	u	u	u	u	u	£23,000	u	£21,800	u	£25,000	u	Median Salaries	
Level 2	£20,700	£22,600	£22,200	£28,000	u	£26,200	£20,900	£19,500	£23,800	£23,200	£23,800	£21,800	£21,100	£25,000	u	£24,000	
Level 3	£21,900	£23,500	£24,300	£28,600	£18,900	£32,200	£21,200	£22,900	£26,300	£23,100	£24,900	£24,800	£20,600	£23,400	£25,700	£25,700	
Level 4/5	£23,300	£20,400	£27,300	£31,300	£22,900	£34,700	£23,100	u	£27,200	u	£22,800	u	u	£23,800	u	£30,000	
Level 6	£26,000	£26,200	£28,500	£30,100	£20,800	£33,000	£26,000	£25,400	£31,100	£27,000	£27,100	u	u	£26,500	£30,200	£28,800	
Level 7+	£25,600	£28,400	£33,600	£31,900	£24,100	£35,000	£27,600	£22,300	£36,900	£22,700	£28,200	u	u	£28,500	£30,700	£31,700	

Table 2: Median earnings Architecture and Engineering qualifications by subject by level. Source: DfE (2022)

Construction and Engineering create strong median wage returns Level 2 to Level 7, showing the importance of occupational specificity to this sub-sector.

Patterns of Level 3 and below qualifications: apprenticeships are the most common highest qualification held, with the highest median salaries by age 25-30 years. At Level 2, individual qualifications are less than one hundred workers, and too low for comparison.

- At Level 3, 330 young workers hold Engineering Apprenticeships, and 290 hold Electrotechnical Apprenticeships, with median earnings of £34,900 and £38,800, respectively. These earnings are well in excess of median graduate earnings 5 years after graduation of £27,400 (2018-19).

This shows the patterns of high median wage returns from occupational apprenticeships in technical routes.

Patterns at Level 4+ qualifications: Occupational pathways translate to stronger wage returns in construction, with Level 4-5 (Level 4-5 = £31,300; Level 6 = £30,600); and in engineering (Level 4-5 = £34,700, Level 6 = £33,000).

- Level 4-5 numbers are low, with individual HNC and HNDs typically in Construction and the Built Environment, Electrical and Electronic Engineering or Mechanical Engineering, with individual qualifications too low (<100 workers) for comparison, but where reported wages across all Level 4-5 qualifications in this sub-sector are £30,000, in excess of graduate earnings at the same career stage
- The most common Level 6 qualification is a degree in Architecture held by 1610 young workers who achieve median salaries of £27,000, and in Building, held by 1150 young workers who achieve median salaries of £35,700.

Thirty-five percent of the highest earning qualifications were at Level 7 and 55% at Level 6 (90% at Level 6-7+) showing the professionalisation of the sector. But the highest earning Level 3 and Level 4-5 qualifications produce earnings beyond those of graduates at commensurate career stages, particularly for Level 3 apprenticeships. Although traditionally, graduate salaries continue to increase over the career life-course 30 years +, this data demonstrates the potential if vocational routes can be secured, which allow young workers to move up the qualification ladder across their early career life-course from 16-34 years.

Over qualification: Retail (excluding Motor Vehicles) Qualification alignment and mismatches.

Retail is a traditional 'holding' career while young workers find their career pathway, as well as a career destination for large numbers of young workers. Workers are often characterised as overqualified or underemployed, but the sub-sector also includes high street health care, for example in pharmacies and opticians. Retail qualifications typically focus on Level 2 and 3 qualifications, despite the industry's importance as one of the largest employing sectors. Typical jobs include Sales Assistants and Cashiers, Sales Managers, Buyers, Advertising and Marketing, and Pharmacists. 44,710 employees hold Arts, Media, and Publishing qualifications at Level 3 (17,640) and Level 6 (17,110); against only 21,110 employees that hold retail qualifications. Median salary levels are low, and occupational specificity appears unimportant in the value placed on qualifications, with retail qualifications producing low median salaries. The highest returns are from health qualifications at Levels 6 and 7 of £24,900 and £37,800, reflecting pharmacists and optician professional job roles.

Retail Median Earnings	Agriculture and Animal Care	Arts, Media and Publishing	Business, Administration, Finance and Law	Construction and Planning	Education and Training	Engineering and Manufacturing Technologies	Health, Public Services and Care	History, Philosophy and Theology	Information and Communication Technology (ICT)	Languages, Literature and Culture	Leisure, Travel and Tourism	Preparation for Life and Work	Retail and Commercial Enterprise	Science and Mathematics	Social Sciences	Total
Total employees	4570	44710	25850	5060	1790	10640	22210	4640	13460	15730	13660	7350	21110	17950	6660	216590
Below level 2	£11,100	£10,200	£11,100	£13,100	u	£14,600	£11,600	£9,500	£10,300	£12,400	£12,300	£12,300	£10,500	£13,900	u	Median Earnings Retail
Level 2	£13,100	£13,100	£14,500	£17,700	£10,800	£17,000	£11,800	£14,200	£14,800	£14,300	£15,600	£12,400	£13,600	£15,900	£17,000	£14,400
Level 3	£15,000	£16,300	£18,200	£18,000	£12,600	£18,500	£13,900	£17,300	£17,300	£17,300	£17,600	£17,500	£15,300	£17,100	£18,100	£16,600
Level 4/5	£16,400	£16,500	£19,700	£19,100	£15,600	£18,100	£16,500	£16,800	£17,100	£16,300	£17,700	u	£22,400	£16,600	£17,700	£17,300
Level 6	£16,900	£19,300	£25,400	£20,800	£16,200	£22,700	£24,900	£22,100	£20,600	£22,000	£20,800		£19,900	£20,400	£23,700	£21,100
Level 7+	£15,800	£17,900	£25,600	£18,700	£17,000	£31,200	£37,800	£19,200	£27,900	£17,800	£20,200			£21,000	£21,000	£24,800

Table 3: Retail median earnings by subject by level Source: DfE (2022)

Patterns of Level 3 and below qualifications: Occupationally specific qualifications in retail had some low median salaries were achieved as highest earning qualifications by employees, with apprenticeships showing no uplift against general vocational qualifications. The most common and highest earning pathways were:

- At Level 2, the most common qualification held by 3,920 young workers aged 25-30 years is Retail Apprenticeship with a median salary of £15,600, followed by Level 2 Customer Service Apprenticeship held by 1,470 young workers with a median salary of £14,800.
- At Level 3 2,260 young workers hold a GCE A Level Art and Design, with a median salary of £17,500, together with 1,920 holding Level 3 BTEC National Diploma in Art and Design at a median salary of £15,800. Level 3 Retail Apprenticeship held by 1,870 young workers delivers a median salary of £19,400, showing a re-tune from occupational specificity and the apprenticeship. However, Level 3 NVQ in Beauty Therapy provides one of the lowest median earnings of £12,100 for 1,210 young workers. The numbers employed in Retail are shown by the large cohorts per qualification.

Patterns at Level 4+ qualifications:

Despite the characterisation of retail as a dominant low-skill sectors, 55% of the highest earning qualifications were degree Level 6+ or above, but typically on lower than

average, all degree median salaries of £27,400 (DfE, 2022c). There were no Level 4-5 qualifications in the most common and highest earning pathways for the retail industry. At Level 6, patterns show possible overqualification in the most common and highest earning pathways, which ranged from salaries of £17,700 to £24,700, all below national levels of median earnings for graduates at £27,400.

- Level 6 in Design Studies is held by 7,240 young workers aged 25-30 years, attracting median earnings of £21,800; Level 6 Business Studies is held by 2,660 young workers, attracting a median salary of £24,700 by age 25-30 years; Level 6 in Cinematics & Photography is held by 1,650 young workers with a median salary of £17,700, and Level 6 in Psychology is held by 1,630 young workers with median salaries of £20,100.
- Outliers were health professionals on the high street where a Level 7 integrated Masters in Pharmacology was a high earning route at £38,400, held by 1,940 young workers aged 25-30 years.

The dataset does not link qualification to occupation, so it is not possible to identify the extent to which this profile represents graduate overqualification and displacement into the plentiful jobs supply of retail, or whether employers use Level 6+ qualifications as means of recruitment. This profile also indicates the problematic nature of using qualifications as proxies for skills, in an era of graduate oversupply, and an increasingly qualified degree-educated workforce. There were no Level 4-5 qualifications in the highest earning pathways, despite Wholesale Retail being one of the largest sectors for Level 4-5 qualifications (see Section 2). Note pharmacists' high returns, but where for some Level 6 qualifications, median earnings were no higher than Level 3. The high numbers of employees compared to other sectors means qualification effects are significant.

Summary: Occupational alignment and subject mismatches: the need for better pathway data by subject choices and industry destinations

There is a need for pathway data to better reflect median earnings and progression prospects from occupationally aligned qualifications, from generic, business support qualifications, and where qualification mismatches or overqualification occurs. In this analysis, three distinct patterns of qualifications were seen: in hospital activities there is a polarisation between Level 4-5-6 professionalised job roles, where there were strong returns from occupationally specific qualifications, and Level 3 and below, where returns were less marked and below national levels. Large numbers of young people hold qualifications which are not specific to the industry they are employed in; these patterns appear important in young worker outcomes at all qualification levels and may be one of the factors affecting productivity in England (Keep, 2022). The vocational tradition of training for specific occupations, necessitating career decision making aged 14-16 years, can lead to poorer long term outcomes for young workers who change careers and find their qualifications mismatched with their sector. Young workers holding vocational qualifications at Level 2 and Level 3 are less likely to progress to higher-level 4-5-6 qualifications than young people with A 'levels (Anderson and Nelson, 2021), but this is likely to be more challenging in qualification mismatches within industries. Improving progression is a key focus of current vocational reforms (DfE, 2021a). Sections 2-3

showed that industries and subsectors play a significant role in the qualifications held, and median earnings achieved by young workers, for example in Health and Social Work, between the 'professionalised' workforces of Hospital Activities, against the vocational and lower skills profiles of Residential Care. This affects the earnings available to young workers from their current qualifications and their progression prospects.

The relevance of the data to future industry projections

Analysis of 2018-19 young worker patterns is important because of the current and projected importance of the four sectors in the UK labour market. The Skills Imperative (2020-2035) dataset provides workforce projections to 2035 of the jobs and industries in the UK labour market, and the skills and qualifications needed (DfE, 2023b)

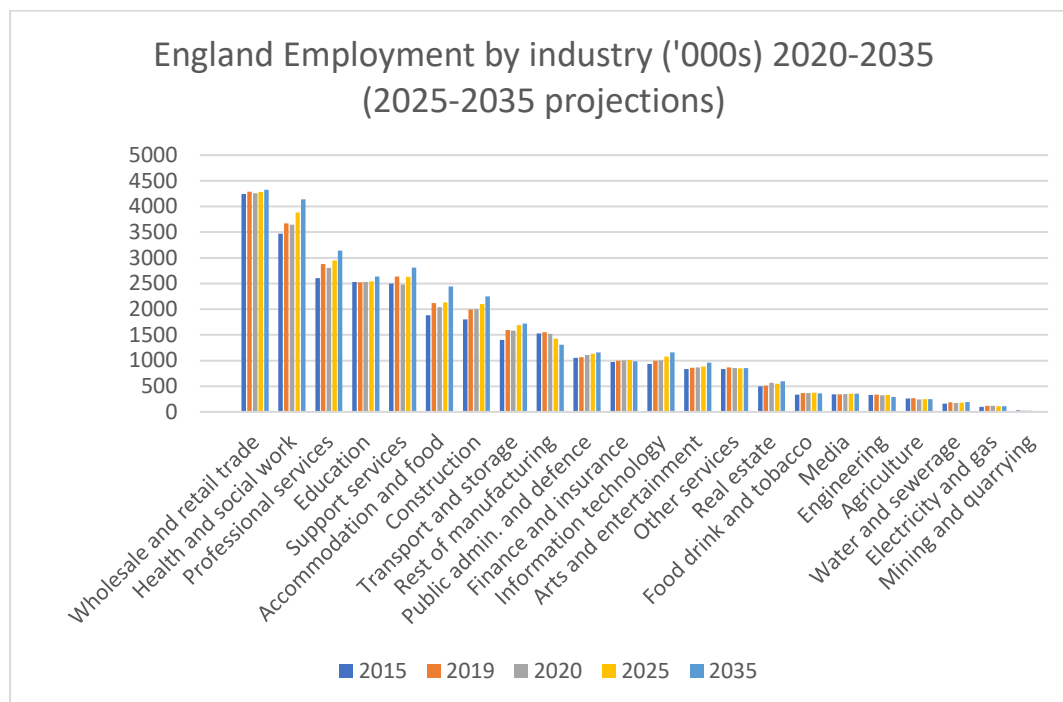


Figure 13: England: Industry employment projections to 2035: Source:(DfE, 2023b)

Wholesale-Retail, Health and Social Work, Education and Professional Services continue to be the four largest sectors. Data is indicative of trends rather than absolute measures of future employment (Wilson, 2023). Job projections include sector replacement demand, the workers who leave the sector each year, together with estimates of sector growth or contraction of the workforce. For all four sectors, growth is only a small proportion of the overall sector workforce, for example, Health and Social Work employment projections suggest a rise from 12% of the total workforce in 2015-2020 to 13% by 2025:

Proportion of the workforce	2015	2019	2020	2025
Wholesale and retail trade	15%	14%	14%	14%
Health and social work	12%	12%	12%	13%
Professional services	9%	10%	9%	10%
Education	9%	8%	8%	8%

Table 4: Projections England Proportion of the workforce by sector 2015-2035 Source: (DfE, 2023b)

These patterns suggest our Longitudinal Economic Outcomes analysis for 2018-19 has relevance to forward workforce projections.

Conclusions and policy implications from the study:

Vocational progression to higher level skills, particularly to Higher Level 4-5 qualifications was a central objective of the Skills for Jobs White Paper⁸ (2021) through the 'Lifetime Skills Guarantee':

"Clear progression routes for students, with more attaining the higher-level skills that employers need". (p 36)

This is a welcome focus on progression and career prospects, particularly for vocational technical qualifications. But our analysis suggests that more attention is needed on the qualifications held by young workers by industry, how employers utilise those qualifications, and the industries where higher level skilled work and progression might come from. Analysis of the highest qualification held suggests the following patterns are important in understanding sub-degree (Level 2-5) outcomes for young workers:

1. **The distinct qualification patterns and median earnings by industry and sub-sector for young workers aged 25-30 years should form part of routine longitudinal outcomes data for post 16 Level 2 through to Level 7 qualifications.** This would allow a more comprehensive understanding of the employment and qualification distribution of young workers in the labour market, the potential for decent work routes and progression from Level 2 and 3 vocational qualifications. This is important in an age of increasing qualifications, elongated pathways to eventual careers, concerns over in-work poverty, and persistent low productivity.
2. **Qualification ceilings exist within industries for large numbers of young workers at Level 2 and Level 3.** These patterns are industry and sub-sector specific, with quite different median earnings, and progression prospects. For some young workers, for example in Retail, this means low wage work, but in other subsectors such as engineering, wages at Level 3 can be above graduate earnings. There are questions as to whether sufficient high skilled jobs exist to allow large numbers of young people to progress, and in which industries (Roberts, 2020). This is important if participation in Level 4 and 5 qualifications are to increase, and to achieve parity with academic routes.
3. **Employers appear to value Level 4-5 qualifications in different ways,** but numbers holding this level qualification are low. In some industries and sub-sectors median earnings at Level 4-5 meet or exceed those of graduates at the same career stage, for example engineering, construction and energy. But in other pathways the outcomes are more limited. The low proportion of Level 4-5 raises questions as to whether the skills shortages reported by employers require Level 4-5 qualifications, or whether they are filled through Level 3/Level 6 mismatches. In some industries, for example health, a degree may be necessary long term for higher skilled work as part of professionalisation agendas.

⁸ <https://www.gov.uk/government/publications/skills-for-jobs-lifelong-learning-for-opportunity-and-growth>

4. **The vocational education and training system requires occupational career decisions at the age of 16 years.** High importance placed on the occupational specificity of vocational qualifications, but the reality at Level 2 and Level 3 is a youth labour market where young people make frequent, and often significant sector and occupational changes in early careers. The English education system forces early vocational career decision-making, which can lead to overqualification and skills mismatches across all industries. Given the large numbers of young workers, this may form part of the 'productivity puzzle' of low outputs. There should be more options for second chances within the vocational system, for retraining into new occupational tracks, but which recognise existing qualifications.

5. **Future research:** Quantitative longitudinal economic outcomes data for non-graduate routes remain fragmented, along with limited qualitative studies which explore vocational progressions by industry, particularly for workers aged 25-30 years, despite this age being central to future employment pathways. Industry and subsector qualitative studies which examine the broad quantitative patterns highlighted in this study, might help develop industry-based qualification approaches, allow better understanding of generic occupational routes, and develop strategies to reskill from qualification mismatches, which appear endemic across all industries. The data suggests lost potential on the part of employer labour utilisations, which evidence suggests affects productivity (Keep, 2022). Importantly, qualification mismatches depress young workers' potential earnings, and result in qualification traps and lost career ambitions. Careers information and guidance, but also vocational qualification providers need to better recognise the elongated nature of career transitions for young workers, and how early occupational specificity and career decision-making at age 16 may be acting as a progression trap for significant numbers of young workers (Hughes, 2017; Mann and Huddleston, 2017).

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Appendices

Appendix A: Section 2: Proportion of highest qualification held by industry. Workers aged 25-30 years in 2018-19

Industry	Below level 2	Level 2	Level 3	Level 4/5	Level 6	Level 7+
Water & sewerage	10.30%	37.20%	29.90%	3.40%	15.40%	3.80%
Construction	6.20%	34.30%	38.60%	4.10%	14.10%	2.70%
Transport & storage	6.30%	32.10%	36.50%	4.50%	18.10%	2.50%
Accommodation & food	6.80%	31.90%	37.70%	4.40%	17.60%	1.60%
Agriculture	7.70%	31.90%	38.20%	4.60%	15.50%	2.10%
Mining & quarrying	4.90%	31.10%	33.40%	7.70%	15.90%	6.90%
Food drink & tobacco	6.60%	30.40%	28.30%	4.90%	26.10%	3.60%
Manufacturing	6.30%	29.80%	33.40%	6.20%	18.70%	5.60%
Whole & retail trade	5.40%	28.20%	37.00%	4.00%	22.70%	2.80%
Support services	6.60%	28.10%	31.00%	3.90%	26.60%	3.90%
Engineering	4.20%	22.60%	33.90%	8.70%	22.50%	8.10%
Other services	2.90%	21.50%	42.20%	3.60%	24.30%	5.50%
Average across industries	3.70%	20.60%	31.70%	4.60%	31.20%	8.20%
Arts & entertainment	3.10%	18.20%	34.10%	4.60%	33.30%	6.60%
Electricity & gas	1.40%	17.40%	42.60%	8.30%	25.00%	5.30%
Health & social work	2.60%	17.30%	34.20%	6.50%	32.90%	6.60%
Real estate	1.80%	17.20%	37.80%	4.60%	32.80%	5.80%
Public admin & defence	0.80%	14.60%	34.70%	4.50%	35.40%	10.00%
Finance & insurance	0.90%	12.30%	33.40%	3.50%	43.40%	6.50%
IT	0.90%	10.30%	28.10%	4.70%	47.00%	9.00%

Professional services	1.20%	8.40%	19.80%	4.60%	50.90%	15.10%
Education	0.90%	6.60%	19.60%	3.30%	41.60%	27.90%
Media	0.80%	5.90%	16.60%	2.90%	61.90%	11.90%

Appendix B: Section 2: Number of employees aged 25-30 years: highest qualification held by industry 2018-19.

Employees	Total	Below level 2	Level 2	Level 3	Level 4/5	Level 6	Level 7+
Total	2,020,240	74,830	416,340	640,990	92,330	630,810	164,930
Accommodation & food	116,480	7,940	37,190	43,920	5,140	20,460	1,830
Agriculture	9,120	700	2,910	3,480	420	1,420	190
Arts & entertainment	49,680	1,520	9,060	16,950	2,290	16,560	3,290
Construction	86,450	5,350	29,660	33,350	3,560	12,210	2,330
Education	196,130	1,840	12,940	38,500	6,530	81,550	54,780
Electricity & gas	11,240	160	1,960	4,790	940	2,810	600
Engineering	22,720	950	5,130	7,710	1,980	5,120	1,840
Finance & insurance	97,300	840	12,000	32,470	3,430	42,220	6,340
Food drink & tobacco	19,350	1,280	5,890	5,480	960	5,060	690
Health & social work	261,710	6,720	45,190	89,440	16,990	86,110	17,250
IT	62,890	590	6,470	17,700	2,950	29,540	5,640
Manufacturing	103,450	6,500	30,820	34,550	6,430	19,390	5,760
Media	36,590	290	2,170	6,070	1,070	22,640	4,360
Mining & quarrying	1,830	90	570	610	140	290	130
Other services	45,670	1,330	9,800	19,290	1,660	11,100	2,500
Professional services	193,110	2,230	16,190	38,190	8,930	98,380	29,200
Public admin & defence	81,540	640	11,880	28,290	3,700	28,880	8,150
Real estate	32,250	580	5,550	12,190	1,490	10,590	1,870
Support services	165,250	10,900	46,380	51,150	6,440	43,940	6,450
Transport & storage	75,020	4,730	24,060	27,350	3,370	13,610	1,890
Water & sewerage	12,520	1,290	4,650	3,750	420	1,930	480
Whole & retail trade	339,950	18,380	95,870	125,790	13,510	77,020	9,380

Appendix C: Section 2: Median earnings by industry by qualification level workers aged 25-30 years in 2018-19

Industry	Level 2	Level 3	Level 4/5	Level 6	Level 7+
Mining & quarrying	£31,300	£31,800	£42,600	£31,400	£42,000
Electricity & gas	£27,100	£30,400	£43,600	£30,900	£38,000
Public admin & defence	£26,100	£27,100	£26,900	£27,500	£29,800
Construction	£26,000	£28,100	£32,100	£32,700	£36,700
Water & sewerage	£24,800	£25,700	£28,700	£28,000	£31,300
IT	£23,900	£26,500	£26,000	£33,300	£36,400
Transport & storage	£23,700	£25,600	£28,100	£28,200	£34,300
Manufacturing	£23,000	£26,700	£34,400	£29,200	£35,000
Engineering	£23,000	£26,200	£32,200	£31,300	£34,000
Finance & insurance	£22,200	£24,500	£23,500	£34,500	£45,300
Agriculture	£21,500	£20,700	£22,100	£20,700	£22,500
Real estate	£21,300	£23,700	£24,000	£27,600	£32,700
Food drink & tobacco	£20,900	£23,800	£31,300	£30,000	£31,200
Media	£20,600	£24,900	£25,100	£30,200	£30,000
Professional services	£19,500	£23,000	£25,800	£31,500	£32,200
Average earnings by level	£18,500	£20,600	£23,000	£26,800	£28,900
Whole & retail trade	£17,200	£19,200	£19,400	£23,500	£27,300
Support services	£17,000	£20,400	£20,900	£25,200	£24,600
Arts & entertainment	£15,300	£18,100	£18,600	£22,000	£22,900

Other services	£15,000	£16,600	£18,400	£24,100	£25,300
Health & social work	£13,700	£16,500	£21,500	£25,700	£26,500
Accommodation & food	£13,400	£16,700	£17,400	£18,800	£17,400
Education	£12,900	£16,200	£18,000	£23,800	£27,200