Research paper from HESA, part of Jisc
Online version at https://www.hesa.ac.uk/insight/19-09-2023/non-financial-job-quality-measure-summary
Contact +44 (0) 1242 388 513 [option 6]

Adding value to UK graduate labour market statistics: The creation of a non-financial composite measure of job quality

Author: Tej Nathwani

Abstract: Recent decades have seen growing interest in the quality of employment available to citizens, with decent work for all being one of the objectives outlined in the 2015 Sustainable Development Goals developed by the United Nations. Consequently, this has generated debate about how we define job quality, with the literature indicating that this is a multi-faceted concept and relates to those features of a person's work that influence their wellbeing. In the UK, job quality is considered to consist of eighteen indicators covering seven broad dimensions. Despite this, earnings is the only recognised job quality indicator used when assessing the graduate labour market (which we show is not particularly well correlated with wellbeing). The other outcome that is often drawn upon (whether or not a graduate moves into 'highly skilled' employment) is generated using occupation type and is not in itself an indicator of job quality. The purpose of this paper is to expand the data available on the work undertaken by UK graduates through creating a composite measure for one of the seven components of employment quality – the 'job design and nature of work'. This is non-financial in nature and encompasses features of work such as the extent to which it provides a sense of purpose, utilises the individual's skills and offers progression opportunities. We illustrate how the composite variable has a positive association with wellbeing, before demonstrating how the measure can complement current statistics produced on graduate outcomes (e.g. in highlighting previously unknown inequalities in the labour market).

Keywords: Composite indicator, measuring job quality, money and earnings, wellbeing

Section 1: Introduction

> It often seems easier for the general public to interpret composite indicators than to identify common trends across many separate indicators (Nardo *et al.* 2005).

The study of a topic that is multi-dimensional in nature will often lead to an array of variables being collected on the matter. While the rich data that is gathered can often be useful within academic research, one of the key drawbacks of this can be the difficulty in explaining key findings on the subject to the wider public. As noted by Mira (2021), this is one of the main benefits of creating a composite indicator. Job quality is a good example of a multi-faceted concept. Based on an annual survey of graduates, the aim of this article will be to present a composite measure for one dimension of job quality in the UK (the design and nature of work) - as defined in Irvine *et al.* (2018) by the Measuring Job Quality Working Group (MJQWG). We will then illustrate the potential relevance of this measure to key stakeholders in the UK higher education sector, such as policymakers and graduate employers.

The last few decades have seen growing international policy interest in not only the quantity of jobs available in nations, but also the quality of the employment opportunities available to citizens. For example, just before the turn of the millennium, the International Labour Office (1999) outlined that a primary goal going forward was to ensure there was decent work for all. This commitment has been reiterated in objective 8 of the United Nations Sustainable Development Goals (United Nations 2023), which apply to all Member States, including the UK. Naturally, this has led to increased academic focus on how job quality should be defined (Green 2006; Holman 2013) and how this concept might be best captured through data (Handel 2005; Mitlacher 2008; Ritter and Anker 2002). The general consensus that appears to be emerging in the literature is that job quality comprises numerous elements and relates to those aspects of an individual's work that influence their wellbeing (Green 2006; Munoz de Bustillo *et al.* 2011; Holman 2013; Boccuzzo and Gianecchini 2015). That being said, researchers differ in their views on what the most appropriate job quality indicators are and whether they should be aggregated into a smaller number of dimensions (Mira 2021; Boccuzzo and Gianecchini 2015).

In the UK, the attention placed on job quality has particularly increased since the publication of Taylor *et al.* (2017) - commonly referred to as the Taylor Review. This was commissioned as a result of wider concerns around the quality of work following a decade of flattening wages and growing job insecurity. It was left to the MJQWG to advise what information on employment quality should be collected on a regular basis and the group concluded that there should be a total of eighteen job quality indicators covering seven broad dimensions, as summarised below.

- Terms of employment (job security, minimum guaranteed hours, underemployment)
- Pay and benefits (actual pay, satisfaction with pay)
- Health, safety and psychosocial wellbeing (physical injury, mental health)
- Job design and nature of work (use of skills, control, opportunities for progression, sense of purpose)
- Social support and cohesion (peer support, line manager relationship)
- Voice and representation (trade union membership, employee information, employee involvement)
- Work-life balance (over-employment, paid and unpaid overtime)

Despite the growing recognition in the academic literature and among those advising UK government that job quality cannot be fully understood through analysis of a single variable, the employment outcomes of graduates continue to be predominantly examined using just one of the job quality indicators identified by the MJQWG – (graduate) earnings. For instance, one of the primary pieces of information released by the Department for Education in England on graduates relates to what they are being paid a certain period after graduation based on administrative data that links education, tax and benefits records (Department for Education 2022). Yet, there is evidence to suggest that UK graduates do not see higher wages as the only benefit from studying for a degree. Rather, Terjesen *et al.* (2007) illustrate that graduates are looking for an employer that shows care for their workers, alongside allowing them to utilise their skills and progress towards their career ambitions. Indeed, all these alternative features are considered by the MJQWG to be indicators of job quality.

The other key metric through which graduate destinations are analysed in wider society is whether they attain 'highly skilled' employment, which as we shall discuss later, is defined as being in a professional or managerial occupation. This is not an indicator of job quality based on the work of the MJQWG, though it has been assumed that these are the roles where graduates will utilise their skills, as well as being aligned with their career aspirations (both of which form part of the 'job design and nature of work' component of job quality). To the best of our knowledge though, this assumption has not been empirically examined.

Clark *et al.* (2021) illustrate in their research that inequalities in labour market outcomes are perhaps greater than an analysis based on earnings alone indicates. Though there have been a number of papers looking at pay disparities among early career graduates (examples include Crawford and Vignoles 2014, as well as Cornell *et al.* 2020), the same level of focus has yet to be given to non-pay related outcomes for this group. Indeed, until relatively recently, there had been a paucity of work assessing the quality of jobs undertaken by graduates more broadly. Okay-Somerville and Scholarios (2013) hypothesise that this may have been due to the presumption that, in an era of increasing job polarisation, these individuals sit on the favourable side of this phenomenon and are thus in well-paid employment with indefinite contracts.

However, papers are emerging that reveal this group are facing increasing difficulty in the labour market (e.g. in the form of underemployment and less secure work), alongside some evidence suggesting that the graduate premium may also be falling (Green and Zhu 2010; Schmitt 2008; Mavromaras *et al.* 2007; Boero *et al.* 2021). For UK policymakers aiming to meet the United Nations Sustainable Development Goal of decent work for all, these trends indicate a need for the quality of jobs undertaken by graduates to be given closer attention.

This paper will explore a dimension of job quality that goes beyond earnings. In particular, we will concentrate on the design and nature of work component defined by the MJQWG, which encompasses skills utilisation, progression opportunities and the extent to which employment provides a sense of purpose. Our first contribution will be to create a composite measure using these indicators that has the potential to help facilitate enhanced discussion about graduate job quality in the public domain. Secondly, since the survey we utilise to conduct our work also contains questions on wellbeing and earnings, we illustrate how our composite measure has a positive and linear association with wellbeing (as would be expected given what the definition of job quality entails), but also that such a clear trend is not apparent when examining the correlation between income and wellbeing for graduates. If there is no evident pattern between pay and non-monetary outcomes, this in itself brings into question why earnings are given so much focus when it comes to graduate destinations, given the recognition after the financial crisis that societal and individual progress cannot be understood solely through a monetary lens. We also illustrate that – contrary to the assumption that those jobs classified as 'highly skilled' are the ones which use graduate skills and line up with their objectives – there are employment opportunities outside of these categories which score highly on our design and nature of work measure. Taken together, these findings indicate that our composite measure could complement existing variables used to assess graduate outcomes and thus enable policymakers to develop a better understanding as to how they are faring within society and the labour market.

Finally, through a regression analysis, we attempt to show how our measure can be useful in examining inequalities in employment outcomes. The study by Clark *et al.* (2021) highlights that there are greater variations in outcomes by ethnicity when non-monetary factors are also taken into account. In the graduate labour market, it has been found that there is little difference in earnings by ethnicity, though no similar work has been conducted for non-financial job quality indicators. Given the findings of Clark *et al.* (2021), we look to see whether disparities by ethnicity do emerge when considering a non-monetary component of job quality (i.e. our job design and nature of work measure). Our model demonstrates that – contrary to the results for earnings – all ethnic minority groups have lower design and nature of work scores. These differences are statistically significant and remain so even after controlling for personal, study and employment characteristics. Such findings again illustrate the need to look beyond earnings and are likely

to prove useful to both (graduate) employers and policymakers aspiring to design interventions that aim to ensure decent work for all.

The structure of this paper will be as follows. Section 2 will provide a brief overview of the dataset we use to conduct our analysis with this being followed by a discussion of the method utilised to form our composite measure. In section 4, we will consider how our measure correlates with wellbeing and the current 'highly skilled' employment variable utilised within the sector, before presenting a quantitative exploration that is designed to showcase how the measure can also help with identifying inequalities in outcomes by ethnicity. We close the study with concluding remarks.

Section 2: Data

While higher education is now a devolved matter across the four nations of the UK, the responsibility for the collection and dissemination of data on students has resided with a single organisation (the Higher Education Statistics Agency (HESA) - now part of Jisc) since the mid-1990s. Each academic year, providers are required to submit data on all students enrolled on their courses to this body, with this covering aspects such as their demographic characteristics, subject of study and qualification aims. Additionally, the rapid expansion in university participation in the late 1980s and early 1990s started to raise queries about how the sector should be funded in the longer-term. There was therefore growing interest in understanding the public and private benefits of higher education among students and policymakers. Consequently, alongside the annual gathering of administrative records on students over the last thirty years, HESA have also conducted yearly surveys of graduates shortly after they complete their studies across the same time period.

Up until the academic year 2016/17, the primary questionnaire relating to graduates was known as the Destinations of Leavers from Higher Education (DLHE) survey. This asked individuals to supply information on their activities six months after they had qualified. Since then, DLHE has been superseded by the Graduate Outcomes survey. As with DLHE, this is sent to all qualifiers from a particular academic year and participation is optional, with the initial cohort invited to take part being those who graduated in 2017/18. There is some alignment in the topics contained within the two questionnaires, with both querying graduates in employment on matters such as their annual earnings and the type of organisation they work for. However, there are a few ways in which Graduate Outcomes differs to DLHE. Firstly, the survey is administered fifteen months after an individual finishes their qualification. Secondly, the content of the questionnaire has been partially altered to better reflect present policy objectives and the need to capture subjective (as well as objective) outcomes. For example, the financial crisis of 2008 led to an acknowledgement that an economy cannot solely be judged by Gross Domestic Product (GDP) and that it was important to also concentrate on citizen wellbeing (Stiglitz *et al.* 2009). In the UK higher education sector specifically, there was a desire to see information assembled on how graduates perceive their employment outcomes, with the importance of subjective data on job quality also noted by the MJQWG.

Questions on wellbeing and individual perceptions of the extent to which their work was meaningful, utilised their skills and aligned with their career objectives were thus new additions to the Graduate Outcomes survey that did not form part of DLHE. In the section on wellbeing, graduates are asked to rate the below aspects of their life on an 11-point scale that goes from 0 to 10, where 0 represents ‘not at all’ and 10 indicates ‘completely’. These match the four questions put forward by the Office for National

Statistics (2018) and that are presently used as part of the data dashboards that track national wellbeing over time.

- Overall, how satisfied are you with your life nowadays?
- Overall, to what extent do you feel that the things you do in your life are worthwhile?
- Overall, how happy did you feel yesterday?
- Overall, how anxious did you feel yesterday?

Meanwhile, the part of the survey requesting graduates to reflect on their activity to date asks those in employment to highlight the extent to which they agree or disagree with the following three statements:

- My current work is meaningful
- My current work fits with my future plans
- I am utilising what I learnt during my studies in my current work

A Likert scale is used that comprises five options ranging from strongly disagree to strongly agree. All three of these indicators seem to align closely with the job design and nature of work dimension developed by the MJQWG. In the next section, we shall empirically investigate whether there is evidence to suggest that all do relate to the same component and, if so, whether we can create a composite measure that would support communication of job quality information in the public domain.

For our quantitative work, we focus on the first two collections of the Graduate Outcomes survey, which consists of those who qualified in either 2017/18 or 2018/19. Survey information is linked to administrative records on students held by HESA to enrich the dataset we use for our analysis. We restrict our sample to UK domiciled graduates (those whom we could not assign a UK region or from Guernsey/Jersey/Isle of Man were excluded, though this constituted less than 0.5% of the sample) whose sole activity at fifteen months was paid employment in the UK for which they were renumerated in pounds sterling. Additionally, they must have responded to all three statements above in their survey submission. The final sample we had available to us contained a total of 286,240 observations (please note that all totals in this paper are rounded to the nearest five to align with the HESA rounding methodology, which is designed to prevent the disclosure of personal information).

Section 3: Methods

The development of our composite measure comprises of three stages. The first of these relates to exactly how we treat the three indicators relating to the extent to which an individual believes their work is meaningful, aligns with their future plans and utilises their skills. Despite measures of wellbeing often being ordinal in nature, it is often the case that researchers will treat the data as being continuous with equal distance between the values (Blanchflower and Oswald 2011; Dynan and Ravina 2007; Hetschko *et al.* 2014). A question that merits further consideration at this point is whether such an assumption can be justified. Van Praag (1991) discusses an experiment carried out in a context-free setting in which participants were asked to assign numbers to five verbal labels (very bad, bad, not bad/not good, good, very good). As Kaiser and Vendrik (2022) highlight, the results suggest that respondents treat such labels on a linear scale with Van Praag (1991) stating that such verbal label sequences can be transformed into a numerical format. We therefore convert our three variables accordingly such that they range from 1 to 5 (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree). In line with the wellbeing literature, our three indicators are presumed to be types of interval (i.e. continuous) data.

The second phase of work assesses the degree to which the statements are all part of the same underlying (latent) concept, which in this instance is the design and nature of the job carried out by the individual. This can be examined by calculating Cronbach's alpha, which lies between 0 and 1. A statistic closer to 1 indicates greater shared covariance between the items. We determine this value for our overall sample and by academic year to evaluate the robustness of the results. Among the entire sample, alpha is found to equal 0.83 with little variation found if the analysis is run separately for those qualifying in 2017/18 (0.82) and 2018/19 (0.83). Acock (2013) suggests that an alpha above 0.70 implies that the variables are likely to be part of the same underlying concept. Consequently, we conclude that the three statements all sit within the same component.

The final element of our exploration evaluates whether these three statements can be reduced into a single dimension. As we are assuming the three variables are continuous in nature and that any composite measure is also of this form, the most appropriate reduction technique to implement would be factor analysis. There are a number of potential extraction methods one can apply when using this approach. As Fabrigar *et al.* (1999) point out, in instances where the distribution of the variables is not normal, it may be preferable to apply a principal component factor analysis (PCFA) as opposed to utilising the maximum likelihood (ML) approach. With our data exhibiting distributions that are not normal, we begin by utilising the PCFA approach, before carrying out a sensitivity analysis using ML. It is often the case that different extraction methods will produce similar results (Tabachnick and Fidell 2019) and we find that to be true in

our investigation too. For the overall sample across the two years, we find the factor loadings from running a PCFA (i.e. the correlation between the statement and the latent dimension) to be high with a range from 0.84 to 0.89 (similar results emerge if we look at each academic year in turn). The first factor has an eigenvalue of 2.25 and thus accounts for 75% of the overall variance, while the second and third factors have eigenvalues of 0.44 and 0.31 respectively. These values suggest that the three items can be reduced into a single dimension. The MJQWG argue that the design and nature of work is one component of job quality comprising of aspects such as skills utilisation, progression opportunities and whether employment provides a sense of purpose. Our empirical findings appear to support this theoretical formulation.

In conclusion to this section, we consider exactly how the composite measure should be constructed. Acock (2013) remarks that in instances where the factor loadings are all very similar, there will be little difference in a composite measure formed from PCFA to that composed by taking a mean of the three items. Indeed, we find the correlation between two measures generated in this way to be 0.999. Additionally, deriving a composite variable using ML shows a similarly high association with a measure produced by either taking an average or using PCFA. Given the interest in utilising the created variable in the public domain, our preferred approach is to use a composite measure that is based on the mean value from the three statements and thus ranges from 1 to 5.

Section 4: Exploring associations with subjective wellbeing and 'highly skilled' employment

One of the distinctive features of the Graduate Outcomes questionnaire is that it contains sections on earnings, job quality indicators relating to the design and nature of work, as well as subjective wellbeing. As noted in the introduction to the paper, one would expect job quality variables to be associated with worker wellbeing. Our survey on early career graduates therefore provides us with the unique opportunity to examine how earnings and our composite measure correlate with wellbeing.

Figure 1 below illustrates the correlation between earnings and wellbeing (salary information is trimmed at both the top and bottom of the distribution to remove outliers/values that are likely to have been misreported). The first thing we observe is that a positive association between earnings and wellbeing is only seen until we reach an annual salary of approximately £24,000. Thereafter, the relationship flatlines.

In his study on income and wellbeing around the world, Deaton (2007) illustrates how the relationship between GDP per capita and life satisfaction changes when a log transformation is applied to the former variable. That is, a linear association exists between the logarithm of GDP per capita and life satisfaction, while a concave function emerges in the scenario where we utilise the original GDP information. One of the potential criticisms of Figure 1 therefore is that we are looking at income in absolute terms rather than concentrating on percentage changes (Deaton and Kahneman, 2010). Yet, in our data, regardless of whether it is in its logarithmic form or not, income only appears to be positively related with happiness and the extent to which life is worthwhile/satisfying to a certain point before further increases are no longer associated with additional changes to wellbeing (Figure 2).

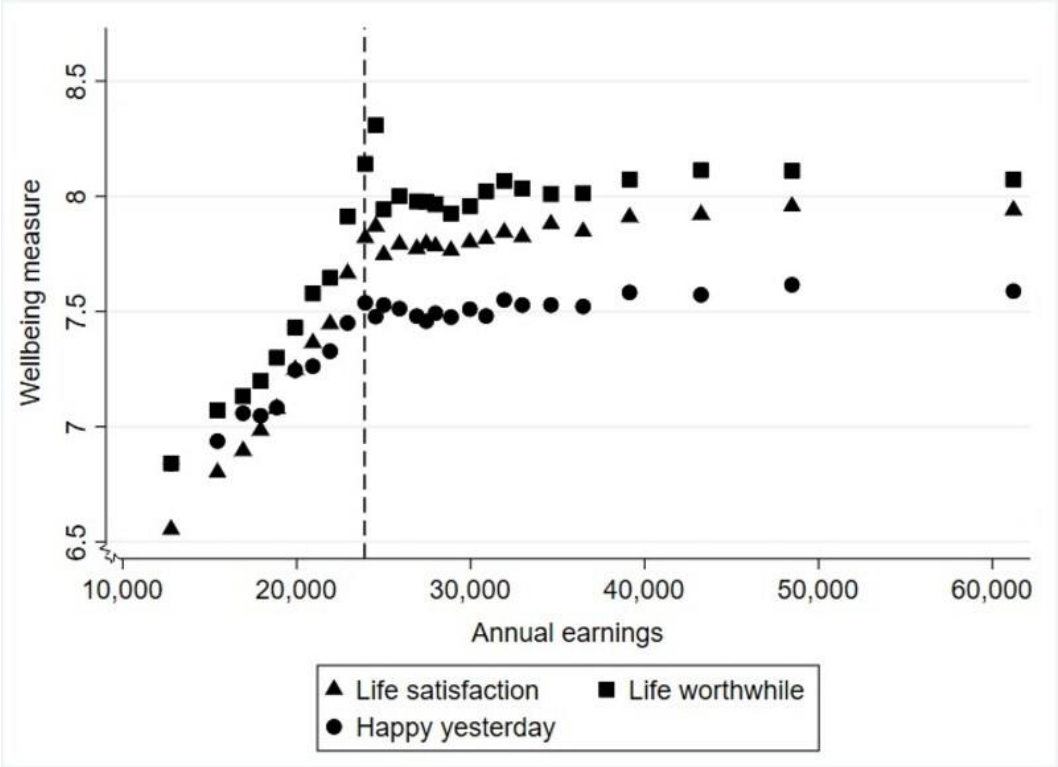

Figure 1: The association between annual earnings in pounds sterling and wellbeing among our graduate sample.

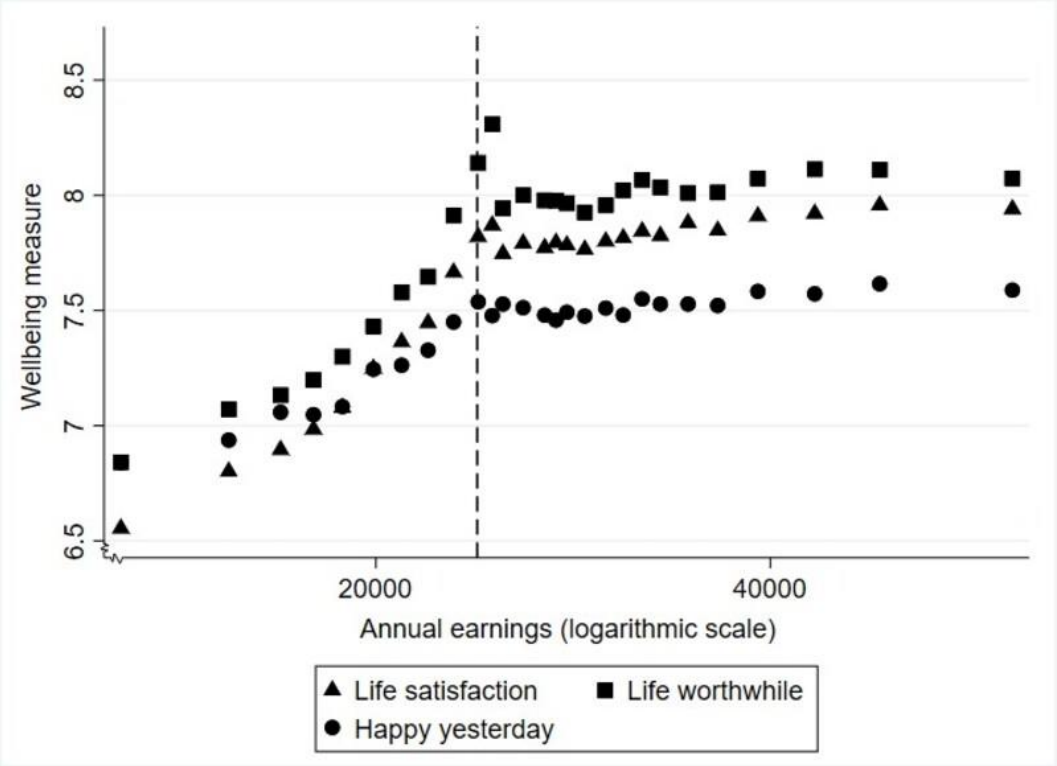

Figure 2: The association between annual earnings in pounds sterling (logarithmic scale) and wellbeing among our graduate sample.

Given the conclusions of Deaton and Kahneman (2010) that 'high income buys life satisfaction', the results we present here may seem puzzling. However, Cheung and Lucas (2015) examine whether the link between these two variables may vary by age and note that the relationship is weaker among younger adults. As most individuals in the UK enter higher education between the ages of 18 and 25 (hence generally qualifying while they are still in their twenties), our sample predominantly comprises of those in this age range. This could therefore potentially explain the results we observe between income and wellbeing, with the examination of this association at a later point in the careers of graduates being a potentially fruitful area for future research. Based on the evidence presented here though, the lack of a clear correlation between income and wellbeing beyond a certain earnings threshold does suggest that it would be valuable to consider a broader set of indicators for graduates. Annual earnings alone will not necessarily proxy for their non-monetary outcomes, which are increasingly recognised as being important to study when evaluating societal and individual progress (Stiglitz *et al.* 2009).

Figure 3 highlights the association between our design and nature of work dimension (a non-monetary measure) and subjective wellbeing. Here, a linear and positive pattern is seen between this component of job quality and three wellbeing measures. Helliwell and Wang (2011) state that our life evaluations (e.g. our satisfaction with life and the extent to which we believe it is worthwhile) are more likely to be influenced by our wider social and economic circumstances, while emotions (e.g. happiness) have a higher probability of being determined by the short-term conditions we experience (e.g. whether it is a weekend or weekday). The graph shows that a steeper gradient exists for the life evaluation variables when compared with happiness, which provides support to this view, since work forms a fundamental part of our lives.

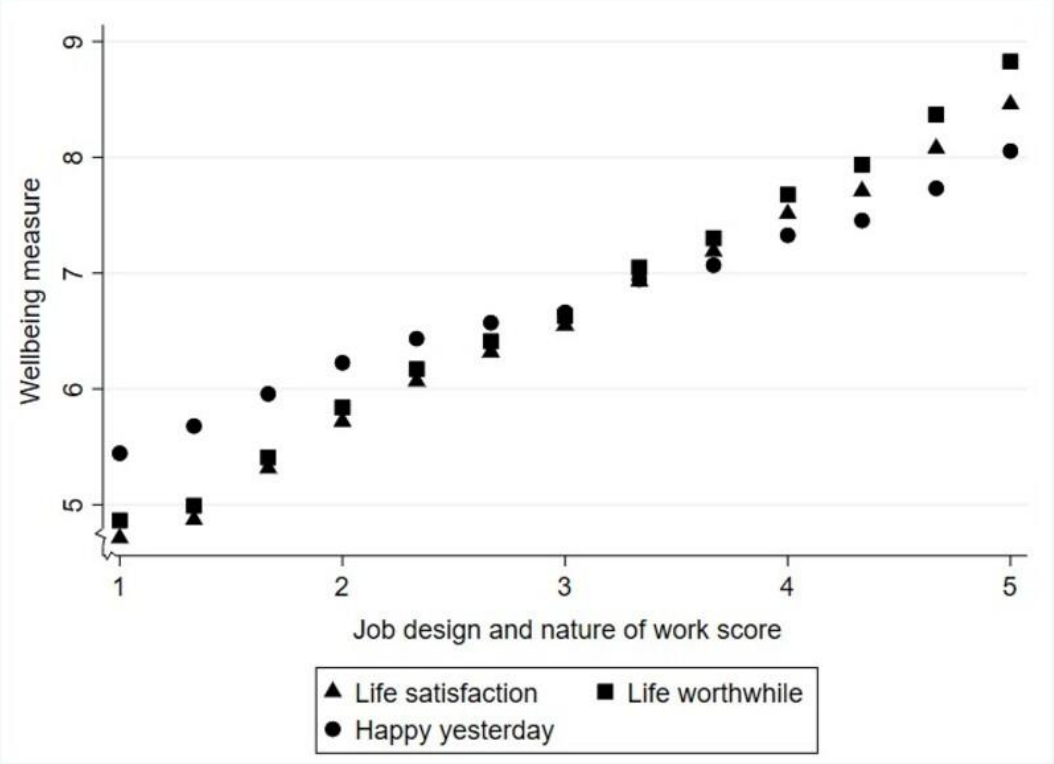

Figure 3: The association between our job design and nature of work composite measure and wellbeing among the graduate sample.

In the final piece of this section, we look at how our design and nature of work measure is related to occupation type. Although not an indicator of job quality as defined by the MJQWG, one of the other key metrics used in assessing graduate outcomes is whether or not they move into 'highly skilled' employment, which is defined as being an occupation that sits within one of three groups (managers, directors and senior officials; professional occupations; associate professional occupations) of the UK 2020 Standard Occupational Classification (SOC). As Blyth and Cleminson (2016) note, the reason for this is that it is

assumed these occupations require the skills attained through higher education and are also likely to align with graduate career aspirations (i.e. they, in effect, proxy for aspects of the design and nature of work component). We have the opportunity here to explore the degree to which such a presumption holds.

In Figure 4, we see that it is mostly the case that the three occupation categories listed above are associated with higher design and nature of work scores and life evaluations, though jobs within caring, leisure and other service occupations display a value more similar to that observed for managerial and associate professional roles (note that this and the last figure in this section do not display any confidence intervals, as the sample sizes we are working with are large and thus have enabled precise estimates to be produced).

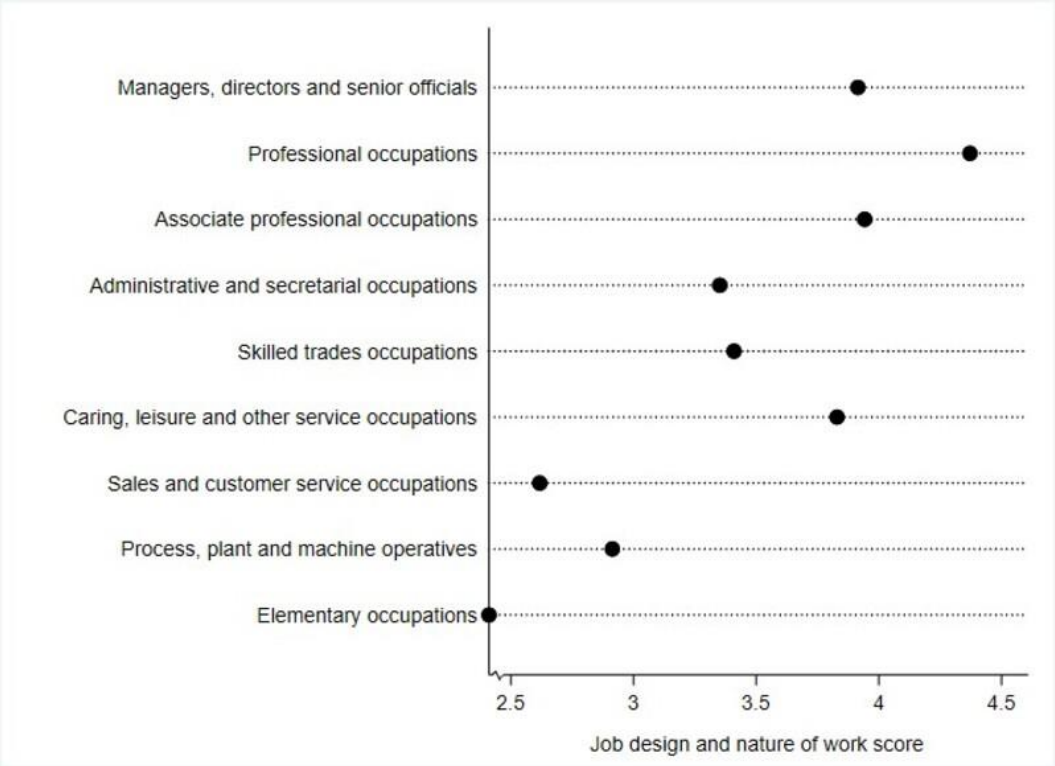

Figure 4: The association between SOC 2020 group (major) and the job design and nature of work composite measure among our graduate sample.

Boccuzzo and Gianecchini (2015) point out that educational and skills mismatch are different concepts. The former relates to an instance where qualifications and job requirements do not match, while the latter is to do with whether skills and abilities are applied within the role. It is also worth noting that educational mismatch is not an indicator of job quality as defined by the MJQWG (underemployment is seen as the difference between actual hours worked and the number of hours an individual would ideally like to work),

though skills use is regarded a marker of employment quality. However, previous research by Allen and de Weert (2007) has illustrated that, for UK graduates, the two tend to be related. That is, graduates are more likely to be applying their skills in those jobs where the qualification was deemed necessary or valuable.

The Graduate Outcomes survey asks respondents to indicate whether they believe their qualification was required or an advantage for their role (i.e. the extent of educational mismatch). In the appendix, Table A1 shows how the answer to this question varies by SOC group. Although the general trend is for educational mismatch to be greater for graduates in positions that would not be considered to be 'highly skilled', there are a sizeable proportion of jobs (almost 40%) in the managers, directors and senior officials category for which graduates state their qualification was neither needed nor an advantage. Furthermore, a considerable fraction of roles in administrative and secretarial occupations, skilled trades occupations, as well as caring, leisure and other service occupations either required a higher education qualification or benefitted from having one (the percentage is near the 50% mark in all three categories).

Given the findings reported by Allen and de Weert (2007) on the relationship between educational and skills mismatch, alongside what we see in Table A1, we can further the exploration in Figure 4 by separating the analysis based on whether graduates indicated that their qualification was either a formal requirement or an advantage for the role.

When assessing the association between occupation type and the design and nature of work by educational mismatch (Figure 5), we see far less difference between the nine SOC groups among graduates for whom their qualification was a requirement or advantage. In fact, design and nature of work scores are quite similar for those in four SOC categories in particular (managers, directors and senior officials; associate professional occupations; skilled trades occupations; caring, leisure and other service occupations). We also note that among graduates in managerial or associate professional occupations who report an educational mismatch, scores are lower when compared with those in administrative and secretarial occupations, skilled trades occupations or caring, leisure and other service occupations who state their qualification was needed or beneficial.

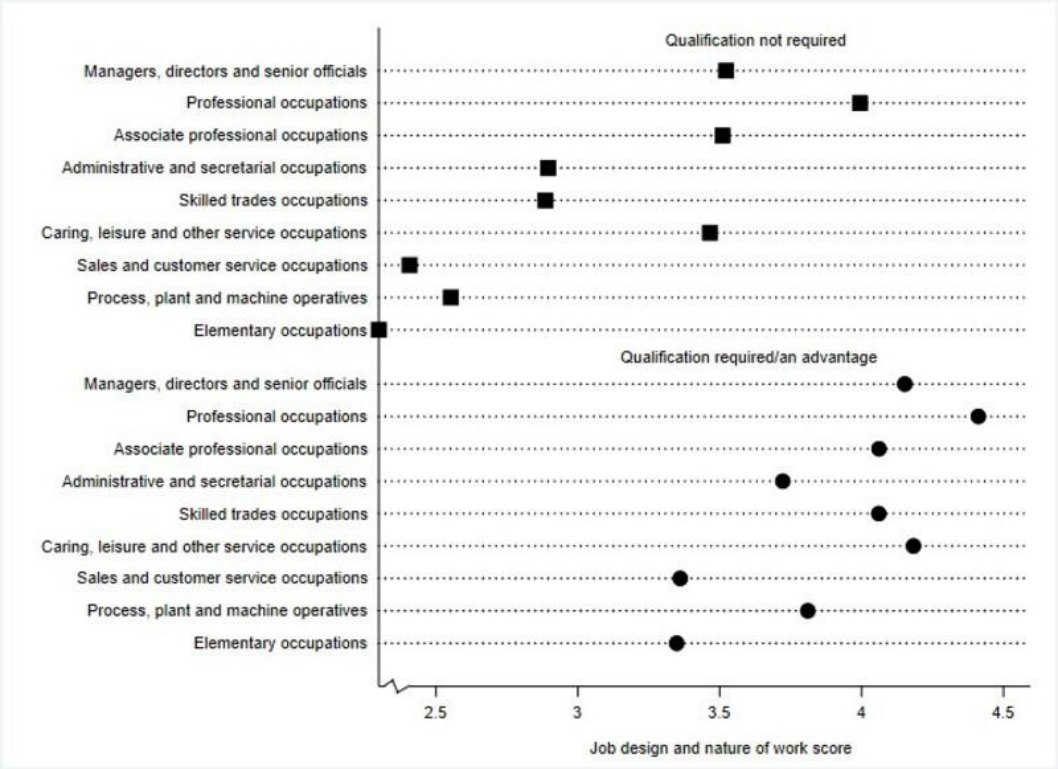

Figure 5: The association between SOC 2020 group (major) and the job design and nature of work composite measure among our graduate sample by whether or not the qualification was required or an advantage in the role.

It has historically been the case that employment outcomes of graduates are analysed from the perspective of earnings (an indicator of job quality as defined by the MJQWG). Nationally, as measures of progress begin to look at subjective and wider social outcomes (rather than only remuneration), the finding that early career earnings and wellbeing do not display a clear positive correlation among recent qualifiers from higher education suggests a need to go beyond investigating graduate pay data. Furthermore, though not an indicator of job quality in itself, public debate on graduate outcomes has also looked at whether they attain 'highly skilled' work – based solely on the SOC group of their job. While it has been assumed that these 'highly skilled' roles are likely to align with their career goals and utilise their skills, analysis of our composite measure shows that there are occupations that would be classified as not being 'highly skilled' where graduates do report a high design and nature of work score. This is particularly the case when the qualification was found to be required or an advantage in the job (i.e. there was an educational match). Consequently, these positions do utilise their skills, provide a sense of purpose and align with their career ambitions. Examples can be found in, for instance, teaching and childcare support occupations, as well as caring personal services - both of which fall into caring, leisure and other service occupations. On the other hand, there are also forms of employment deemed to be 'highly skilled' where graduates indicate a low

value for our composite measure, such as managerial positions in retail and hospitality where the qualification undertaken was not considered as being needed or helpful.

In combination, these results provide evidence in favour of the use of a composite measure on the design and nature of work in the public domain that could support policymakers in better understanding how graduates are faring in the labour market.

Section 5: Decent work for all?

In Irvine *et al.* (2018), the MJQWG pointed out the importance of examining job quality information by demographic characteristics 'in order to understand inequalities in the labour market and target policy interventions where there is need'. Indeed, such work is necessary if the UK wishes to meet the United Nations Sustainable Development Goal of decent work for all. Among graduates, previous research by Zwysen and Longhi (2018) utilising the DLHE survey has established that once controlling for factors such as family background, university choices and work characteristics, there are minimal earnings differences by ethnicity six months after graduation. However, Clark *et al.* (2021) found that the gaps in 'full earnings' (which takes into account non-pecuniary aspects of the job) by ethnicity were greater than the differential when considering only monetary rewards. Given the results of Clark *et al.* (2021), we focus in this section on exploring whether disparities by ethnicity do emerge for graduates when focusing on our composite measure.

In our sample, the mean score for the job design and nature of work variable was 4.00, with the standard deviation being 0.975. Using ordinary least squares, we estimate the equation below, where Y_i is the composite measure score, while Ψ_i represents our set of controls and cover personal, study and employment characteristics. We use the white group as our reference category for ethnicity. Sex, age on entry, parental education (a proxy for family background/socioeconomic disadvantage), disability and qualifications held prior to beginning the course all form part of the personal attributes we control for. Study factors accounted for include mode/level of course, class of degree, as well as subject area and type of provider attended. Finally, employment-related variables utilised in the model are mode/type of contract, industry (Standard Industrial Classification 2007), occupation category (SOC 2020 major group), employer size and annual earnings. We also incorporated a marker indicating the extent to which the graduate had moved location for work and a categorical field highlighting whether their qualification was needed or advantageous in the role they were performing.

$$Y_i = \alpha + \beta_1 indian_i + \beta_2 pakistani_i + \beta_3 bangladeshi_i + \beta_4 chinese_i + \beta_5 black\_african_i + \beta_6 black\_caribbean_i + \beta_7 other_i + \Psi_i' \beta_8 + \varepsilon_i \quad \textbf{(Equation 1)}$$

Table 1 provides our results and illustrates how the coefficients on the ethnicity dummies change as we successively add specific groups of covariates (those with an unknown ethnicity are not reported in the table below). Prior to the inclusion of any controls, we see that all ethnic minority groups report lower job design and nature of work scores, with the differences being statistically significant at the 1 per cent level. The addition of demographic characteristics tends to reduce the extent of the disparities we observe, though the coefficients for the Black African and Black Caribbean groups do not follow this trend. The

reason this occurs is that these two ethnic groups tend to enter higher education at a later age (Connor *et al.* 2004), with older graduates reporting higher scores for our composite measure (see Table A2 in the appendix for further summary statistics on how our measure is associated with the independent variables utilised in our regression model). The inclusion of study variables leads to wider gaps emerging among all ethnicities within the Asian category (Indian, Pakistani, Bangladeshi and Chinese) and this seems to be driven by the variation in subject choices, with Asian students opting for fields that are associated with higher job design and nature of work scores. One of the key reasons why the differences become smaller for the Black African and Black Caribbean groups on inclusion of study characteristics is the class of degree variable. These two groups are less likely to be awarded a first or upper second class degree (Roberts and Bolton 2020), with higher attainment being associated with larger scores for our composite job quality indicator. Finally, the presence of employment factors generally leads to declining gaps by ethnicity (the Indian group is an exception) with this particularly being the case for the Pakistani and Bangladeshi graduates. That is, those from ethnic minority groups are more likely to be based in occupations and industries that score lower with regards to the design and nature of work measure.

Table 1: Ordinary Least Squares estimates of equation 1

The dependent variable is the job design and nature of work score. Only ethnicity coefficients are reported. Standard errors are in parentheses. *** indicates significance at 1 per cent level.

Ethnicity	Control characteristics included			
	None	Personal	Personal, Study	Personal, Study, Job
Indian	-0.0414***	-0.00540	-0.0645***	-0.0645***
	(0.0102)	(0.0100)	(0.00957)	(0.00785)
Pakistani	-0.108***	-0.0445***	-0.107***	-0.0387***
	(0.0122)	(0.0119)	(0.0114)	(0.00936)
Bangladeshi	-0.211***	-0.125***	-0.146***	-0.0802***
	(0.0168)	(0.0165)	(0.0157)	(0.0129)
Chinese	-0.120***	-0.117***	-0.147***	-0.113***
	(0.0209)	(0.0204)	(0.0194)	(0.0159)
Black African	-0.111***	-0.168***	-0.150***	-0.123***
	(0.00925)	(0.00910)	(0.00875)	(0.00720)
Black Caribbean	-0.185***	-0.216***	-0.159***	-0.127***
	(0.0169)	(0.0165)	(0.0158)	(0.0129)
Other	-0.128***	-0.117***	-0.115***	-0.0864***
	(0.00771)	(0.00754)	(0.00720)	(0.00591)
R-squared	0.00262	0.0484	0.138	0.424
Sample size	286,240	286,240	286,240	286,240

Within the UK, there has been a lot of debate in recent years as to whether ethnicity pay gap reporting should become mandatory for employers. Yet, no such attention has been given to whether we need to also monitor other aspects of job quality by ethnicity. We see that when it comes to the design and nature of work, graduates from all ethnic minorities report lower scores than their White counterparts. This is true even after controlling for a variety of personal, study and employment characteristics. Our results, along with those of Clark *et al.* (2021), thus illustrate the need for policymakers and employers to look beyond earnings and also assess inequalities in the non-monetary components of jobs undertaken by workers.

Section 6: Concluding remarks

It is increasingly recognised across the globe that societal progress cannot be judged purely on monetary terms. Consequently, policymakers are giving greater consideration to the quality of work available to citizens of a nation, including within developed economies. Job quality is a multi-faceted concept that covers those features of employment that are associated with individual wellbeing. Historically, studies on this topic have tended not to focus a great deal on graduates, given it has been assumed that they are likely to be in good quality jobs. However, there is growing evidence of this no longer being always the case.

In the UK, the MJQWG has highlighted eighteen job quality variables that sit within seven broad dimensions. Yet, only one of these indicators (earnings) is consistently reported on among graduates, despite students stating that they do not view higher pay as the only benefit of completing a degree. The other key metric utilised (whether a graduate is in 'highly skilled' employment based on their SOC category) is not in itself a variable relating to job quality. Rather, it is presumed that these are the types of jobs that enable graduates to use their skills and that align with their career aspirations – both of which are indicators of job quality as defined by the MJQWG. Given the provision of decent work for all is one of the United Nations Sustainable Development Goals and with graduates of more recent years experiencing greater difficulties in the labour market, there is a need for data on graduate employment outcomes in the UK to go beyond the current concentration on salary. This must be done while being mindful of the fact that introducing several indicators can also make it more difficult for policymakers and the general public to identify key trends.

We tackle this challenge by using an annual survey on graduates that contains three job quality indicators relating to the design and nature of work. In line with the advice given by the MJQWG and the broader literature in this field, we begin by exploring whether a single composite measure that would be particularly useful in communications around the quality of work in the public domain can be created from these three variables. Our empirical investigation confirms that this is indeed possible. Given the definition of job quality, we subsequently highlight the positive correlation between this composite measure and subjective wellbeing, while also illustrating that there is no clear trend between income and wellbeing among graduates beyond a certain threshold. The conclusion from this is that looking at earnings alone will not offer a good proxy for understanding whether graduates also enjoy favourable non-monetary outcomes too, which are seen as important when examining individual progress within a nation.

We also illustrate that the current presumption that the 'highly skilled' employment marker can be used as a way of understanding whether graduates are in work that uses their skills and lines up with their

ambitions does not always hold. Rather, there are jobs that would not be classified as ‘highly skilled’ where graduates do report high design and nature of work scores. These roles therefore do appear to utilise their skills and align with their career aims, as well as providing a sense of purpose to them. Additionally, there are positions that are deemed to be ‘highly skilled’ where the value for the composite measure is low.

Finally, we show that the introduction of a composite measure of job quality could also be valuable in highlighting inequalities in the labour market and hence where there is a need for policy intervention to ensure all have access to good work. We do so by noting that while differences in earnings by ethnicity for early career graduates are minimal, there are disparities by ethnic group when we look at our composite measure and these remain even after controlling for personal, study and employment characteristics. Future research examining inequalities in the workplace utilising our composite measure on the design and nature of employment may wish to extend the work we have presented here by carrying out an intersectional analysis that introduces other demographic characteristics such as sex or socioeconomic background, alongside ethnicity.

Collectively, these findings lead us to the key conclusion to take from this paper, which is that the job design and nature of work variable we have constructed can be a useful addition to current statistical publications in the public domain on graduates. Such outputs may help employers and policymakers better understand their experiences in the labour market, as well as where there are inequalities that need to be addressed.

To the best of our knowledge, the Graduate Outcomes survey is currently the only questionnaire to include three indicators of job quality that relate to the design and nature of work dimension. Introducing these questions to surveys that cover the broader UK population (i.e. non-graduates too) would be a useful addition to the work carried out here. This would potentially allow a similar composite measure to be formed to the one we have generated and help policymakers build a greater understanding of inequalities in access to quality work more widely within society.

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Appendix

Table A1: Educational mismatch by SOC 2020 group (NR - Not required, R - Required/Advantage).

SOC 2020 group	NR (%)	R (%)	Not known (%)	Sample size
Managers, directors and senior officials	37.4	61.9	0.8	10,295
Professional occupations	9.1	90.2	0.7	159,115
Associate professional occupations	21.1	77.8	1.1	54,315
Administrative and secretarial occupations	44.5	54.1	1.4	18,820
Skilled trades occupations	55.0	44.2	0.8	3,240
Caring, leisure and other service occupations	48.6	50.2	1.2	14,015
Sales and customer service occupations	77.6	21.4	1.0	14,405
Process, plant and machine operatives	71.0	27.8	1.2	1,350
Elementary occupations	89.0	10.4	0.6	10,180
Not known	42.9	49.4	7.7	505

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Table A2: Summary statistics illustrating the association between the job design and nature of work score and the control variables included in our Ordinary Least Squares model. SD is the standard deviation.

	Mean	SD	Sample size
Ethnicity			
White	4.02	0.98	228,570
Indian	3.98	0.90	9,470
Pakistani	3.92	0.94	6,585
Bangladeshi	3.81	0.98	3,410
Chinese	3.90	0.85	2,200
Black African	3.91	0.99	11,650
Black Caribbean	3.84	1.04	3,370
Other	3.90	0.98	17,140
Not known	4.09	0.90	3,840
Sex			
Female	4.06	0.97	175,070
Male	3.92	0.98	111,015
Other	3.72	1.09	145
Unknown	4.15	0.87	10
Age on entry			
18 or under	3.84	1.01	95,705
19 to 23	3.95	1.00	103,595
24 or over	4.24	0.85	86,930
Unknown	4.58	0.39	10
Parental education			
Yes	3.99	0.97	110,895
No	3.97	1.01	103,725
Don't know	3.93	1.00	16,190
Information refused	4.19	0.85	23,910
No response given	4.07	0.93	31,520
Disability marker			
Known disability	3.91	1.04	39,270
No known disability	4.02	0.96	246,970
Qualifications on entry			
CCC or above in A levels (or equivalent)	3.90	0.98	86,865
Below CCC in A levels (or equivalent)	3.77	1.07	35,670
BTEC	3.73	1.09	28,375

Access and Foundation	4.17	0.99	7,840
HE qualification	4.21	0.86	110,810
Other/Unknown qualifications	4.03	0.93	16,680
Level of study			
First degree	3.90	1.02	184,055
Other undergraduate	3.98	0.97	17,525
Postgraduate research	4.32	0.76	9,535
Postgraduate taught	4.23	0.83	75,120
Mode of study			
Full-time	3.96	1.00	237,025
Part-time	4.19	0.81	49,210
Class of degree			
First class	4.05	0.92	56,810
Upper second	3.81	1.04	85,810
Lower second	3.65	1.10	26,045
Third	3.61	1.09	4,420
Unclassified/Not applicable	4.22	0.85	113,150
Subject area of study			
Agriculture & related subjects	3.96	0.99	2,710
Architecture, building and planning	4.17	0.79	6,730
Biological sciences	3.80	1.06	25,900
Business & administrative studies	3.85	0.91	30,790
Combined	3.74	0.99	1,160
Computer science	3.98	0.91	10,970
Creative arts & design	3.44	1.17	13,295
Economics	3.78	0.88	3,800
Education	4.43	0.73	35,300
Engineering & technology	3.97	0.88	17,025
Historical & philosophical studies	3.60	1.07	8,270
Languages	3.61	1.03	8,350
Law	3.97	0.99	10,285
Mass communications & documentation	3.62	1.10	5,000
Mathematical sciences	3.83	0.91	4,290
Medicine & dentistry	4.60	0.58	8,740
Physical sciences	3.79	1.01	11,805
Social studies	3.88	1.04	21,470
Subjects allied to medicine	4.42	0.74	40,725
Veterinary science	4.54	0.57	875
Multiple subject areas studied	3.77	1.01	18,740

Provider type			
Not a Russell Group	3.99	1.00	208,535
Russell Group	4.04	0.92	77,700
Employment mode/type			
Full-time permanent	4.08	0.89	199,525
Full-time fixed term (more than 1 year)	4.26	0.79	38,550
Full-time fixed term (less than 1 year)	3.87	1.01	9,305
Full-time other	3.72	1.09	5,785
Part-time permanent	3.38	1.26	17,615
Part-time fixed term (more than 1 year)	3.85	1.09	2,645
Part-time fixed term (less than 1 year)	3.53	1.19	1,595
Part-time other	3.44	1.19	2,005
Zero hours contract	2.85	1.18	8,120
Not applicable/Not known	3.50	1.15	1,090
Standard Industrial Classification (2007)			
Accommodation and food service activities	2.66	1.11	9,285
Activities of extraterritorial organisations and bodies	4.23	0.69	40
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	3.79	1.13	230
Administrative and support service activities	3.46	1.05	9,245
Agriculture, forestry and fishing	3.94	0.92	655
Arts, entertainment and recreation	3.61	1.10	5,550
Construction	3.99	0.85	5,390
Education	4.38	0.74	55,335
Electricity, gas, steam and air conditioning supply	3.79	0.96	1,380
Financial and insurance activities	3.67	0.94	12,555
Human health and social work activities	4.37	0.75	61,160
Information and communication	3.92	0.84	18,395
Manufacturing	3.95	0.87	15,330
Mining and quarrying	4.04	0.78	1,070
Not known	3.64	1.05	950
Other service activities	3.95	0.92	2,770
Professional, scientific and technical activities	4.08	0.79	35,695
Public administration and defence; compulsory social security	4.16	0.79	20,900
Real estate activities	3.82	0.93	3,385
Transportation and storage	3.52	1.04	3,160
Water supply; sewerage, waste management and remediation activities	3.89	0.89	1,080
Wholesale and retail trade; repair of motor vehicles and motorcycles	3.10	1.20	22,680

Standard Occupational Classification (2020)			
Managers, directors and senior officials	3.91	0.92	10,295
Professional occupations	4.37	0.69	159,115
Associate professional occupations	3.94	0.83	54,315
Administrative and secretarial occupations	3.35	1.00	18,820
Skilled trades occupations	3.41	1.08	3,240
Caring, leisure and other service occupations	3.83	0.92	14,015
Sales and customer service occupations	2.62	1.04	14,405
Process, plant and machine operatives	2.91	1.16	1,350
Elementary occupations	2.41	1.03	10,180
Not known/Not applicable	3.44	1.14	505
Whether qualification was needed/beneficial for the role			
Qualification not required	3.16	1.14	68,130
Qualification required or an advantage	4.27	0.74	215,640
Unknown	3.80	0.88	2,470
Graduate geographical mobility marker			
Stays in same region for study and finds work in same LAUA as original location of residence	3.97	1.06	52,150
Returns to the same LAUA for work as original location of residence, having left region/country for study	3.67	1.15	22,955
Stays in same region for study, but finds work in different LAUA (in the same region) to original location of residence	4.08	0.94	77,825
Returns to a different LAUA (of the same region) for work when compared with original location of residence, having moved region/country for study	3.95	0.95	39,685
Moved region/country for work, but did not move region for study	4.14	0.85	22,445
Moved region/country for study, but did not then move region/country again for work	4.02	0.96	30,210
Moved region/country for study and then moved region/country again for work (with the region/country being different to their original region/country of residence)	4.07	0.84	34,425
Not known	3.96	0.97	6,535
Employer size			
1 to 9	3.73	1.05	5,115
10 to 49	4.04	0.95	11,760
50 to 99	4.10	0.90	14,680
100 to 249	4.11	0.90	13,185
250 to 499	3.97	0.92	12,480
500 to 999	3.97	0.92	13,125
Over 1000	4.05	0.99	144,270

Not known/Not applicable	3.89	0.98	71,625
Annual earnings			
£17,600 or less	3.36	1.17	24,760
£17,601 to £20,000	3.69	1.02	33,050
£20,001 to £22,000	3.95	0.91	21,420
£22,001 to £24,000	4.27	0.80	34,955
£24,001 to £25,000	4.28	0.78	20,335
£25,001 to £27,000	4.26	0.75	20,220
£27,001 to £29,250	4.25	0.75	18,390
£29,251 to £32,000	4.29	0.73	25,945
£32,001 to £39,000	4.32	0.71	24,380
£39,001 or above	4.30	0.69	23,855
Unknown	3.50	1.19	38,930