



GRADUATE OUTCOMES: A STATISTICAL MEASURE OF THE DESIGN AND NATURE OF WORK

JENNY BERMINGHAM, LEAD STATISTICAL ANALYST
TEJ NATHWANI, PRINCIPAL RESEARCHER (ECONOMIST)
LUKE PERROTT, LEAD STATISTICAL ANALYST

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HESA



HESA
95 Promenade
Cheltenham
GL50 1HZ
E pressoffice@hesa.ac.uk
T +44 (0) 1242 211 120
W www.hesa.ac.uk

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EXECUTIVE SUMMARY

It is recognised that achieving prosperity across the globe requires the establishment of fair and decent work for all. Over the past six years in the UK, this matter has grown in prominence both nationally and within the devolved administrations, leading to increased demand for statistics relating to employment quality. The Measuring Job Quality Working Group – formed following the publication of the Taylor Review – has identified a total of eighteen measures of job quality, which span seven broad dimensions. Data on some of these measures (e.g. career progression) are now being gathered in the UK through the Labour Force Survey, which is overseen by the Office for National Statistics.

One of the seven facets relates to the design of the job and the nature of the work undertaken. This element incorporates aspects such as skill use, progression opportunities and the extent to which one's employment provides a sense of purpose. While higher education is a devolved issue within the UK, all four nations have a shared objective in wanting graduates from all backgrounds to achieve personal fulfilment after qualifying, as well as being able to effectively utilise the skills they acquire through study in the labour market. These policy goals therefore align closely with the aforementioned element of employment quality.

However, the range of quantitative data about the quality of work undertaken by graduates is currently limited. After illustrating why HESA and the Graduate Outcomes survey are well placed to collect this information for the higher education sector, we highlight how three questions in the survey at present fit within the design/nature of work component of job quality and are also in line with the aspirations of UK higher education policy.¹ Following the recommendations of the Measuring Job Quality Working Group, we explore whether a composite variable (relating to the design/nature of work) can be formulated from these three survey questions.

This necessitates the implementation of a data reduction technique, which firstly serves the purpose of identifying whether a single dimension is appropriate to develop from these three questions. If this is found to be the case, it also indicates how the three questions should be weighted in creating this variable. On the basis of this investigation, we observe that a single

¹ These three questions ask respondents to highlight the extent to which they agree or disagree with the following 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

composite measure can be generated, with the statistical analysis highlighting that all three questions contribute almost equally to this dimension.

Given this finding and for simplicity purposes, our preferred approach is to firstly assign a numerical value between 1 and 5 to each of the three likert scale questions, while preserving their natural rank ordering. A mean of these three scores is then taken, as illustrated below.

$$\frac{\textit{Meaningful work score} + \textit{Fits in with future plans score} + \textit{Utilisation of skills in work score}}{3}$$

We conclude by noting next steps in this programme of work.

SECTION 1: INTRODUCTION

The purpose of this paper is twofold. We begin by outlining the rationale for the introduction of a new statistical measure within the higher education sector relating to a specific aspect of employment quality as defined by the Measuring Job Quality Working Group (2018). To do so, we discuss the fair work agenda in the UK, as well as the progress made to date on collecting data on this topic. The overlap between this objective and the aims of higher education policy are then explored. In contrast to the national setting where suitable information is already being gathered through surveys, there currently exists a paucity of data around this matter in higher education. This leads us to making the case for HESA and the Graduate Outcomes survey to play a key role in supplying a new variable that could support key stakeholders in understanding the extent to which the ambitions set out at both a sector and national level are being achieved. We then provide the underlying statistical framework that sits behind the development of this measure.

SECTION 2: THE FAIR WORK AGENDA IN THE UK

2.1. POLICY CONTEXT

In 2015, the United Nations agreed on a new set of Sustainable Development Goals that should be met by 2030. Replacing the targets set back in 2001, this new agenda applied additionally to developed economies such as the UK, with goal 8 in this programme being to ensure that there is decent work for all.²

Since then, the previous government led by Theresa May commissioned the Taylor Review of Modern Working Practices³ in response to the rapid pace of technological change occurring within the labour market. Following its release in 2017, the Conservative administration accepted the vast majority of the recommendations made and subsequently published the Good Work Plan in 2018.⁴ Within this, they highlight a commitment to ensuring that ‘everyone benefits from work that is fair and decent with realistic scope for development and fulfilment’ and that ‘people have the skills they need to enter the labour market and perform effectively at work’. While the incumbent Conservative government is now led by a new Prime Minister in Boris Johnson, the Queen’s Speech in 2019 did reinforce a desire to implement various proposals within the Good Work Plan in the forthcoming

² <https://sdgs.un.org/goals/goal8>

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627671/good-work-taylor-review-modern-working-practices-rg.pdf

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766167/good-work-plan-command-paper.pdf

Employment Bill, which would apply across Great Britain.⁵ More recently, Chancellor Rishi Sunak noted that getting people into decent and well-paid employment remained a key priority.⁶ Focus has thus turned to producing a set of indicators that can help with regularly tracking changes in the quality of employment within the UK labour market, with it being recognised that fair and decent work is a multi-faceted concept. Consequently, the final report by the Measuring Job Quality Working Group (2018) - formed to support the development of relevant statistics - identified a total of eighteen measures of job quality (spanning seven broad dimensions) that should be adopted for measurement by the UK government, which we list below:

- 1) Terms of employment (job security, minimum guaranteed hours, underemployment)
- 2) Pay and benefits (Actual pay, satisfaction with pay)
- 3) Health, safety and psychosocial well-being (Physical injury, mental health)
- 4) Job design and nature of work (Use of skills, control, opportunities for progression, sense of purpose)
- 5) Social support and cohesion (Peer support, line manager relationship)
- 6) Voice and representation (Trade union membership, employee information, employee involvement)
- 7) Work-life balance (Overemployment, paid/unpaid overtime)

Improving the quality of employment is also an important aspect of the policy landscape in the devolved administrations of the UK. Indeed, developments within these nations have helped inform some of the recommendations of the Taylor Review.

For example, the Fair Work Convention - set up by the Scottish Government in 2015 - published a framework in 2016 outlining the importance of fair work in driving prosperity within the economy.⁷ Fair work in Scotland is considered to comprise of five elements (effective voice, security, opportunity, fulfilment and respect), with its promotion sitting within the nation's National Performance Framework⁸ (itself seeking to line up with the Sustainable Development Goals). To monitor progress, existing data sources (such as the Labour Force Survey and Scottish Employers Skills Survey) have been evaluated to identify indicators that can be tracked over time. Meanwhile,

⁵ <https://commonslibrary.parliament.uk/research-briefings/cbp-8817/>

⁶ <https://www.gov.uk/government/speeches/budget-speech-2021>

⁷ <https://www.fairworkconvention.scot/wp-content/uploads/2018/12/Fair-Work-Convention-Framework-PDF-Full-Version.pdf>

⁸ <https://nationalperformance.gov.scot/index.php/national-outcomes/fair-work-and-business>

the 2019 Fair Work Wales report⁹ recommends that the Welsh Government explores how it can use its legislative competence to deliver the fair work agenda. Furthermore, it advocates for greater incorporation of the fair work aspiration into the Well-being of Future Generations Act, which mandates public bodies to conduct their activities with the sustainable development principle in mind (and thereby aligns closely with the United Nations 2030 goals). It too identifies fair work as a multi-dimensional construct and believes it to encompass six characteristics (fair reward, employee voice and collective representation, security and flexibility, opportunity, health and safety and respect for legal rights). The paper advises that a Fair Work Wales Survey is designed to enable employment quality to be assessed over time. In Northern Ireland, outcome 6 of the 2019 Outcomes Delivery Plan - designed to support the objective of improving well-being - states that 'we want more people working in better jobs', with there being an aspiration to develop a 'better jobs index'.¹⁰

Hence, while the provision of fair work is a shared policy objective across the UK, there do exist some differences in how individual nations define and wish to measure fair work, with the national government encouraged to consult all administrations in the formulation of relevant UK statistics.

2.2. MEASURING FAIR WORK

The Measuring Job Quality Working Group (2018) have outlined the case for this data to be collected through a single survey, which should possess the following features:

- 1) A robust methodology
- 2) A sample size that enables analysis at various sub-group levels
- 3) A long-standing survey run, ideally, on an annual basis
- 4) A strong public profile

This has led to the Labour Force Survey, administered by the Office for National Statistics (ONS), being chosen as the most appropriate source for collecting employment quality indicators. New questions around work features such as career progression opportunities and employee representation have now been introduced into the latest iterations of the survey, with the Office for

⁹ <https://gov.wales/sites/default/files/publications/2019-05/fair-work-wales.pdf>

¹⁰ <https://www.executiveoffice-ni.gov.uk/sites/default/files/publications/execoffice/odp-dec-%202019.pdf>

Statistics Regulation (OSR) advising the ONS to gather more data around employment quality, given growing demand.¹¹

SECTION 3: FAIR WORK AND HIGHER EDUCATION

3.1. POLICY CONTEXT

As with the fair work agenda, higher education is a devolved matter across the UK, though there are shared goals among the nations in this area too. Birmingham *et al.* (2020) note one of these mutual objectives to be around ensuring graduates from all backgrounds have the potential to achieve personal fulfilment as a result of their studies. Alongside this, all administrations aspire for higher education to produce graduates that have the skills needed by employers. Indeed, the Office for Students (OfS) in England have declared one of their expected strategic outcomes to be that 'Graduates and postgraduates leave with the knowledge and skills that will contribute to their national and local economies and communities, and drive productivity'.¹² Meanwhile, the Higher Education Funding Council for Wales (HEFCW) highlight that their vision is 'to provide graduates who are able to demonstrate and communicate their value to prospective employers'.¹³ A recent (initial) review of colleges and universities in Scotland has outlined an aspiration to create a new National Outcome and Impact Framework, with the preliminary document released comprising an indicator relating to producing 'work-ready' graduates who are equipped to transition into employment.¹⁴ Furthermore, the 'Graduating to Success' higher education strategy for Northern Ireland details how the sector needs to continue supplying graduates that have the knowledge and attributes required within the economy.¹⁵

Fulfilment and effective skill use are thus two common themes that emerge in both the Good Work Plan and the aims of UK higher education policy. They also form important parts of the fair work agenda in the devolved administrations. In Scotland, the 'fulfilment' dimension encapsulates the ability to use skills and having the opportunity to progress one's career. Fulfilling work should also provide an individual with autonomy and the chance to make a difference – both of which are likely to enhance the sense of purpose that employment provides. Similar points are raised within the

¹¹ <https://osr.statisticsauthority.gov.uk/news/the-office-for-statistics-regulation-encourages-ons-to-enhance-employment-and-jobs-statistics/>

¹² <https://www.officeforstudents.org.uk/about/measures-of-our-success/outcomes-performance-measures/>

¹³ <https://www.hefcw.ac.uk/en/our-responsibilities/skills-and-employability/>

¹⁴

http://www.sfc.ac.uk/web/FILES/corporatepublications_sfccp052020/Review_of_Coherent_Provision_and_Sustainability_Phase_1_Report.pdf

¹⁵ <https://www.economy-ni.gov.uk/sites/default/files/publications/del/graduating-to-success-he-strategy-for-ni.pdf>

‘opportunity’ characteristic of fair work in Wales. Though a ‘better jobs’ index has yet to emerge in Northern Ireland, the country does produce statistics relating to work quality based on questions in the Labour Force Survey around the extent to which individuals find their work meaningful and chances for career progression.¹⁶

While work is being undertaken to produce measures at a national level that align with the recommendations of the Taylor Review (as discussed in the previous section), there is currently no measure of a similar nature in the higher education sector to monitor the extent to which these aims (which also form an aspect of fair work) are being achieved among graduates. We therefore detail below how HESA could develop a suitable variable to meet this need and the reasons behind us carrying out such an activity.

3.2. MEASURING FAIR WORK IN HIGHER EDUCATION

3.2.1. The role of HESA

Our core mission is to collect information about higher education across all nations of the UK and to disseminate this in a manner that helps to advance public knowledge about the sector. In doing so, we aim to support key stakeholders with their decision making. As an official statistics producer, we seek to continuously evaluate the value of our outputs and aim to deploy our expertise in statistics to present data in innovative ways. In light of these ambitions, we have carried out work relating to creating a new measure using the Graduate Outcomes survey that could help stakeholders to understand more about the extent to which graduates believe that their work provides fulfilment and enables them to utilise the skills they possess.

3.2.2. The suitability of the Graduate Outcomes survey

Graduate Outcomes is an annual survey that aims to fulfil the UK-wide requirement for data on the impact of higher education. It is administered by HESA and seeks to capture information from graduates 15 months after they complete their course, with those who qualified in 2017/18 being the first cohort to take part. The questionnaire is sent to almost all graduates of a particular academic year, though participation is voluntary. Furthermore, we believe it to achieve many of the requirements of a survey that collects data on the quality of employment, as set out in the report by the Measuring Job Quality Working Group (2018).

¹⁶ <https://www.nisra.gov.uk/system/files/statistics/work-quality-ni-19j20-additional-analysis.pdf>

Firstly, as Graduate Outcomes is a new collection, our outputs are currently classified as experimental statistics, though we aspire for our publications to become designated as National Statistics over time. In line with the aims set out in our strategy, Graduate Outcomes has now become one of our core statutory collections with data gathered on an annual basis. The response rate in the first two years has been in the region of 50%, leading to a very large sample size. For example, our first statistical bulletin was based on a sample of approximately 389,000. Consequently, there is plenty of scope for sub-group analysis at various levels. The survey also commands a high public profile, with the first suite of publications receiving prominent attention within the media.¹⁷

3.2.3. The survey instrument

Alongside employment and earnings, the survey also includes sections exploring ‘hedonic’ and ‘eudemonic’ concepts. In particular, for the three questions in the Graduate Outcomes survey that are of particular interest to us here, respondents are asked the extent to which they agree or disagree with the following statements based on a five point likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):

- 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

As well as aligning with the fulfilment and skill use aims of higher education policy, these questions are very similar to those for the job design and the nature of work dimension outlined by the Measuring Job Quality Working Group (2018). They also tie in with the ‘opportunity’ and ‘fulfilment’ characteristics of fair work in Wales and Scotland respectively. In communicating information on job quality, one of the recommendations of the Group is to explore the possibility of forming a composite index for each of the seven dimensions, noting that a single overall statistic on job quality would not suffice, given this is determined by a wide range of features of the workplace.

3.2.4. Creating a composite measure for the job design and the nature of work dimension

¹⁷ See, for example, <https://www.timeshighereducation.com/news/gender-and-ethnicity-graduate-gap-outlined-new-uk-data> and <https://www.theguardian.com/society/2020/jun/18/gender-pay-gap-begins-students-straight-after-university-graduate-data-report-uk>

3.2.4.1 Introduction

The following questions must be successively explored when determining whether a composite variable can be created.

Question A: Is there evidence to suggest that the three survey questions are tapping into the same underlying construct (i.e. the design and nature of the work).

Question B: If so, can these three questions be reduced into one variable and what approach should be used in its derivation?

Before tackling these three matters in turn, we firstly provide an outline of the dataset we utilise to conduct our exploration.

3.2.4.2. The dataset

We draw upon the first annual collection of the Graduate Outcomes survey. Our final dataset initially comprises of 182,150 UK domiciled graduates who qualified in the academic year 2017/18 and whose most important activity at the time of the survey was paid UK employment in which the individual was remunerated in pound sterling. We exclude those who responded from further education colleges, as we currently hold little data in our Student record on the characteristics of graduates from these types of institutions and would thus be limited in the extent of onward analysis we can carry out with this group at this stage.¹⁸ However, 22 percent of respondents were either not eligible or chose not to answer all three questions that we investigate here. Those individuals who were conducting more than one activity at the time of completing the questionnaire (i.e. those who select more than just the 'paid work for an employer' option when asked about the activities they were conducting during the census week) will not have been directed to the three statements outlined above. Instead, they will have been routed to the part of the survey which asks respondents whether their activity is/activities are meaningful, in line with their plans and utilising their skills.¹⁹ Given they make no specific reference to employment, using these responses would require making the assumption that they are based solely on their views of work and that their other activities do not influence the way they answer this question. As we have no means of

¹⁸ We are currently undertaking a programme of work designed to enable us to overcome this limitation of our data.

¹⁹ See <https://www.hesa.ac.uk/files/C18071%20Graduate%20Outcomes%20survey%20%28survey%20in%20full%29.pdf> for additional information on this distinction.

ascertaining how realistic this assumption is, we have decided not to incorporate them within this analysis. Consequently, the final sample size available for exploration being 142,840.

We did assess the extent to which this diminished sample was similar to the original one comprising 182,150 observations. This examination included a range of personal characteristics (such as sex and ethnicity), course characteristics (mode, level, subject and institution of study), as well as key variables from the Graduate Outcomes survey itself (including sector and occupation). We found there be to be close resemblance between the two.

3.2.4.3 Question A

The first aspect of our statistical investigation was to use our dataset to assess how closely related these three items are as a group, which can be done using Cronbach's alpha. The formula for calculating this value is:

$$\alpha = \frac{k\bar{c}}{\bar{v} + (k - 1)\bar{c}}$$

Here, k refers to the number of items, \bar{c} is the average inter-item covariance and \bar{v} is the average variance across each of the items.²⁰ Alpha ranges from 0 to 1, with a higher value indicating greater shared covariance between the items. Within our dataset, we observe alpha to be 0.82, with this figure falling should any one of the three variables be dropped. Hence, this provides us with an initial indication that the three questions from the Graduate Outcomes survey specified above are tapping into the same underlying construct.

3.2.4.4. Question B

The three Graduate Outcomes questions are all ordinal, meaning they have a natural rank ordering (strongly disagree < disagree < neither agree nor disagree < agree < strongly agree).²¹ However, the distance between any of these two categories could be argued not to be equal. A similar issue arises in the subjective well-being literature, where individuals are asked to rate their happiness on a scale of 0 to 10 (as they are in the Graduate Outcomes survey). This too is an ordinal variable,

²⁰ <https://stats.idre.ucla.edu/spss/faq/what-does-cronbachs-alpha-mean/>

²¹ This is in contrast to a nominal variable, which has no clear ordering. Examples would include the activity a graduate was undertaking during census week or their main reason for an individual taking a particular job.

where we cannot be sure that the distance between the categories is equivalent. That is, we know that someone who reports a score of 8 is happier than one who gives a score of 4, however we could not conclude that the former respondent is twice as happy.

While there are econometric techniques specifically designed to deal with ordinal data, these have been regarded to be more difficult to present and interpret, leading to researchers of human well-being assuming on many occasions that ordinal data is, in fact, continuous with equal distance between the steps. Examples of published works that have relied upon this presumption include Dynan and Ravina (2007), as well as Hetschko *et al.* (2014). The validity of making such an assumption continues to be contested. For instance, Jamieson (2004) tends to be dismissive about working with ordinal data in this way, though Norman (2010) supplies evidence to the contrary and explains why parametric statistical methods can be applied. Most recently, Schröder and Yitzhaki (2017) argue that there may well be monotonic transformations of a scale that alter the results of such studies and thereby raise into doubt the suitability of this approach.

We would contend, however, that we can assume that the three survey questions are continuous with equal distance between the categories. Our basis for this is the experiments run by Van Praag (1991), which are discussed by Kaiser and Vendrik (2020). In one of these experiments, participants were asked (without being informed about what was being assessed) to assign numeric values between 1 and 1000 to five verbal labels (very bad, bad, not good nor bad, good, very good). 1 represented the very worst in this instance, while 1000 corresponded to the very best. Their key finding was that individuals were treating such labelled sequences in approximately linear fashion – regardless of the person or context involved. Consequently, we attach numeric values ranging from 1 to 5 (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree) to our three survey questions and thus proceed by presuming they are all continuous with equal distance between the categories. It should also be noted that this assumption is also made when producing statistics on UK happiness, which enables the calculation of values such as means.²² As Kaiser and Vendrik (2020) note, the fact that respondents treat such scales in a linear manner makes the reversal of results that concern authors such as Schröder and Yitzhaki (2017) highly unlikely.

²² See, for example, <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/measuringnationalwellbeing/april2018tomarch2019>

We therefore move our attention onto evaluating dimensionality and whether a single composite measure can be derived, which necessitates undertaking factor analysis, whereby we are attempting to reduce a set of observed variables into a smaller number of (unobserved) factors.

In line with the recommendation provided by Acock (2016), we utilise the principal component factor analysis procedure, given our desire to arrive at one composite measure. Through utilising this methodology, we find that the first factor explains 74% of the total variance in the set of items (eigenvalue = 2.22). The other two factors explain 15% and 11% of the total variance respectively, with eigenvalues being below 0.5 in each instance. In determining the number of factors to retain, Acock (2016) notes the Kaiser criterion of keeping those with an eigenvalue of greater than 1 and/or utilising a scree plot to visualise where eigenvalues level off. Based on this and given the dominance of the first factor, it does appear that these survey questions can be reduced into a single dimension. We represent the result through a diagram below, whereby we have arrived at one factor capturing the design and nature of work. Note that the arrows go from our underlying construct to the three questions, rather than the opposite way round. This is because it is the design and nature of the work that is likely to determine the extent to which employment is meaningful, fits in with future plans and utilises one's skills.

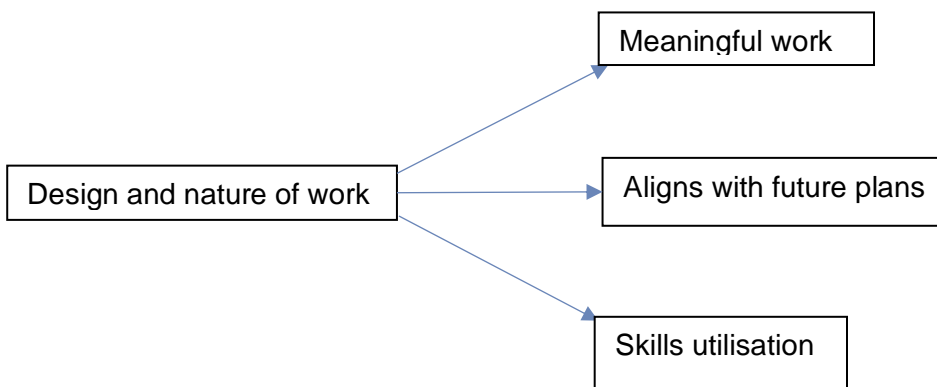


Figure 1: How the factor and observed variables relate

The factor loadings (which inform us about the correlation between the survey questions and the factor) for each of the three items range between 0.83 and 0.88. The single measure is created through a regression based approach, in which the three items will be weighted based on their relationship to the factor. However, with the factor loadings being almost equivalent in value across all three items, the weights assigned are all very similar in magnitude. Consequently, there will be

little difference between the single composite measure developed through factor analysis and one where we simply sum the answers to the three questions and take an average. Indeed, we find the correlation between the single composite measure created through these two different methods to be very high at 0.999.

In constructing a single composite measure of one of the features of fair work, we would recommend following the latter approach, given its greater simplicity. Our final variable therefore ranges from 1 to 5 and is calculated as follows;

$$\frac{\textit{Meaningful work score} + \textit{Fits in with future plans score} + \textit{Utilisation of skills in work score}}{3}$$

SECTION 4: NEXT STEPS

Over the coming months, we will be undertaking a period of engagement with our key stakeholders and data users around this statistical measure, which will assist HESA in determining if and how we incorporate data on this topic into our statistical bulletins and open data publications. Should this be deemed an appropriate way forward, we shall aim to work in a way that is in line with the communication principles set out by the Measuring Job Quality Working Group (2018). These stipulate that the data should be;

- a) Comprehensive, free and publicly available
- b) Understood 'at a glance'
- c) Updated at a consistent point in time
- d) Segmented easily by area of interest
- e) Interactive

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HESA
95 Promenade
Cheltenham
GL50 1HZ
E pressoffice@hesa.ac.uk
T +44 (0) 1242 211 120
W www.hesa.ac.uk

