Graduate Outcomes Survey Quality Report (4th edition)

HESA POLICY AND RESEARCH
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HESA

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Contents

About this report

Version 4.0

This report offers the most comprehensive current assessment of the strengths and weaknesses of the Graduate Outcomes data available currently, as well as providing information on any known specific quality issues.

The primary audience is intended to be data analysts and other users who need more detailed information about the quality characteristics of the Graduate Outcomes data. It also forms part of an advanced user's guide to further information HESA has published on Graduate Outcomes, signposting technical specifications, papers, and reports of interest to analysts. The executive summary offers an overview of the contents, including a digest of the most important points.

Version control

Version	Change description	Reviewer	Published date
v.1.0.0	First published version of the report	Lisa Walkley	2020-06-18
v.1.0.1	Minor edits to correct typographical errors	Dan Cook	N/A
v.2.0.0	Draft of the second published version of the report (year 2 data)	Multiple	N/A
v.2.1.0	Final draft of the second published version of the report (year 2 data)	Simon Kemp	2021-07-20
v.3.0	Updated report for year 3 of the survey	Simon Kemp	2022-06-16
v.4.0	Updated report for year 3 of the survey	Simon Kemp	2023-05-31

Executive summary

Graduate Outcomes is a national survey, now in its fourth year of publication, of students completing courses of higher education (HE). It is conducted across the UK and seeks to survey the entire graduate population. It is the largest annual social survey in the country and is run by the Higher Education Statistics Agency (HESA), now a part of Jisc. In March 2021, we were pleased that the Office for Statistics Regulation (OSR) wrote to us noting a range of features that demonstrate the trustworthiness, quality, and value of the Graduate Outcomes statistics and which may support our application for National Statistics designation[1]. This quality report has been written to help analysts evaluate the quality and coverage of any data they intend to use in the context of the intended application to ensure that it is fit for their purpose. Although we are no longer badging our Graduate Outcomes outputs as experimental statistics, we remain committed to assessing and improving the quality of our survey and the outputs derived from it. We are keen to hear what users think of the products. Contact our Official Statistics team (official.statistics@hesa.ac.uk or (0)1242 388 513 [option 2]) with feedback and suggestions.

Relevance

Graduate Outcomes data has been designed to be **relevant** to a wide range of user needs. The data reflects what we know about the requirements of prospective and current students; graduate employers; the HE sector and its funders and regulators; national, devolved and local governments; the press; and civil society, to have access to an independent and trusted source of information about graduates. It covers longstanding areas of interest in the activities graduates are doing, including whether they are in work or further study, and what their job or course is about. The survey also collects newer data where respondents are asked to reflect on the experience of being a graduate, their subjective wellbeing, and offer information about the characteristics of self-employment.

We undertake regular analysis of user needs. When we identify evidence that supports making a change to the data collected, or to our outputs, we evaluate this through our standard data governance procedures.

Accuracy and reliability

The survey offers information sourced directly from graduates, and this report explores the extent to which this can be relied upon as **accurate**. While no social survey can offer the individual-level precision at scale of an administrative data source, the scope of topics in Graduate Outcomes is much broader than such sources. Graduate Outcomes' sample size and response rate is much larger than for other surveys. We have found the data to be representative of the population for most statistical purposes. Our decision not to weight the data has been based on rigorous research reviewed by our peers, and advice commissioned from leading scholars who are experts in surveys. A full-scale review assessing the need for weighting will take place every five years, though surveillance activity is carried out on an annual basis to see if there is any potential evidence to suggest that this date may need to be brought forward.

Table 1: Overall survey response rates by group (full responses)

Main target group	Target	2017/18 response rate	2018/19 response rate	2019/20 response rate	2020/21 response rate
UK domiciled, full-time	60%	52.3%	53.6%	53.4%	52.0%
UK domiciled, part-time	60%	48.7%	49.5%	51.5%	50.7%
Research funded	65%	58.0%	59.1%	62.1%	57.8%
EU domiciled	45%	46.1%	48.0%	50.9%	49.0%
Non-EU domiciled	25%	29.4%	31.0%	32.5%	14.6%

Many users wish to analyse sub-samples of data about graduates. Sample sizes are important when using disaggregated data. Analysts should consider the sample sizes, and any uncertainty that generates. HESA has published confidence intervals on key data tabulations to assist in understanding how reliable the data is. This quality report also explains sources of known or potential bias we have identified, to help analysts decide how they should use the data, safely. We offer specific advice around using the data for regional or sub-regional geographic analysis. We also describe our survey instrument and processing approach in detail. One such section explains the creation of occupational and industrial classifications, and our high confidence in what has been produced.

Timeliness and punctuality

Through extensive consultation with users and stakeholders, the census week at 15 months after course completion was determined as the best point at which to balance the need to generate meaningful insights into career and other outcomes with the need to deliver good rates of survey response. One implication of this is that our statistics include those who went straight on to postgraduate studies after their bachelor's degree and who may only just have finished at time of survey. Depending on onward use it may not be appropriate or timely to compare those who have spent 15 months in the labour market with those just graduating from a further qualification and graduate responses to the survey may be driven more by the second qualification achieved. Our publications make filtering these individuals from the data easy to achieve. Given our decision to amend the publication date for the Statistical Bulletin, we also comment on the punctuality of production in this section.

Accessibility and clarity

The Graduate Outcomes data is designed to be **accessible**, and users can view the data on our website, and download our data to perform their own analysis and visualisations. Open data is released under a Creative Commons 4.0 CC-BY license. We are also making aggregate and disaggregated survey data available through our data processor, Jisc. To find out more about how Jisc data analytics can help you, see: www.jisc.ac.uk/data-and-analytics. In addition we supply microdata.

The data release is accompanied by a comprehensive range of supporting information. Besides this quality report, users can find a Survey methodology, coding manuals, reports, blogs, and detailed guidance on our website. There is a lot of information available, which can be daunting. We provide **clear** access routes to this information from the publications themselves and for visitors navigating to our website. For more expert analytical and technical users of Graduate Outcomes data, we have developed a user guide. The user guide has been designed to make navigating and accessing the large body of supporting information easier. We particularly welcome feedback on the approach we have taken to presenting the User Guide, to help us improve it.

Coherence and comparability

Graduate Outcomes forms the newest member of a family of exceptionally rich information about the HE sector. It coheres with the HESA Student records (and other data about HE in further education (FE) settings) to which it can be linked. We have begun a study comparing information relating to further study activity collected from respondents to the Graduate Outcomes survey, with similar variables available within the Student records. This work remains underway at the time of writing and a summary of current progress is offered within section 3.5. Further detail will be published in due course.

The Graduate Outcomes survey from which this year's statistical releases have been derived was carried out entirely during the coronavirus pandemic. Following on from last year's research into the impact of the pandemic on the 2018/19 survey data, especially on whether the data is **comparable** over time, we carried on a new programme of analysis of the 2019/20 data . An overview of the results of that research can be found in The impact of the Covid-19 pandemic section, and further detail can be found in the accompanying insight brief covering the impact of the Covid-19 pandemic on Graduate Outcomes 2019/20[2].

Graduate Outcomes survey results can also be used in conjunction with other data HESA collects about HE providers, their staff, finances, estates, and interactions with business and society. This survey replaces the former Destinations of Leavers from Higher Education (DLHE) survey and differs from it significantly in a number of ways that are explored later in this report. Data and statistics drawn from these two surveys are not directly comparable. HESA advises all data users against attempting to directly compare data between Graduate Outcomes and DLHE. Any such comparisons are likely to generate highly questionable results that are open to misinterpretation.

The Graduate Outcomes survey offers a rich and regular source of information collected directly from graduates themselves, offering their perceptions of their outcomes to date, as well as factual information about the kind of work they are doing, their salary and contractual status, or their further study options. This presents a breadth and level of detail about graduate experiences unparalleled in any other data source. It offers context to the tax and benefits data at the core of the Longitudinal Educational Outcomes (LEO) data from the Department for Education. It also complements the Labour Force Survey (LFS) by shining a spotlight on recent graduates and their activities. Our future plans include assessing how **comparable** our data is with similar variables in

these other data sources and over time. This will provide users further understanding of the **quality** of the Graduate Outcomes data, to increase **trust** in our data source and methods, and to demonstrate the **value** the survey offers to our understanding of society.

[1] Mark Pont to Jonathan Waller: Higher Education Graduate Outcomes Data. 2021.

https://osr.statisticsauthority.gov.uk/correspondence/mark-pont-to-jonathan-waller-higher-education-graduate-outcomes-data/

[2] See: https://www.hesa.ac.uk/insight/16-06-2022/impact-covid-19-graduate-outcomes

Introduction

As a producer of official statistics, HESA is under an obligation to demonstrate the quality of its statistical outputs. This obligation is both a formal one, inasmuch as it is specified in Section Q3 of the Code of Practice for Statistics[1], and a more pragmatic one, inasmuch as, by demonstrating the quality of its outputs, we can provide our stakeholders with information which will support them in the use of our statistics.

HESA data is used by a wide variety of stakeholders, and their need for high quality data provides us with further motivation for demonstrating the quality of our statistical products. Data from the Graduate Outcomes survey is used not only by HE providers and prospective students, but also by a wide range of policy makers, researchers, and media outlets, and we strive to meet the needs of this varied group of stakeholders.

The statistics derived from the first two iterations of the Graduates Outcomes survey were published under the 'experimental statistics' label. This indicated that the statistics were undergoing a period of evaluation and development. HESA determined that this process had been successfully completed in 2022 and consequently that the experimental statistics label could be removed from that year's edition onwards. From the 2022 edition this release therefore reverted to being a 'standard' Official Statistics product.

[1] UK Statistics Authority. Code of Practice for Statistics. https://code.statisticsauthority.gov.uk/wp-content/uploads/2018/02/Code-of-Practice-for-Statistics.pdf

[2] See our blog post on this issue for more details https://www.hesa.ac.uk/blog/18-03-2020/true-method-knowledge-experiment-why-graduate-outcomes-statistics-are-experimental

[3] See https://www.hesa.ac.uk/files/Quality_assurance_self_assessment.pdf

Quality methodology

HESA builds the Code of Practice for Statistics into all aspects of its work. At HESA, quality management is an overarching practice that is prioritised in each part of the statistical business process. We operate appropriate quality regimes for each aspect of our work, and although delayed by the pandemic, we are committed to bringing these practices together in a single overarching quality policy. For this quality report, we have taken the following approach.

First, we base our approach on the guidance offered by the National Statistician on survey quality measurement, by structuring our report around the five dimensions of quality outlined in the European Statistical System[1].

Second, we have already created a range of supporting materials, now organised into a single user guide, including a Survey methodology[2], which covers our dissemination policy for Graduate Outcomes. These materials are cross-referenced as needed in this quality report, as they form part of the evidence base for it. Sometimes, for ease of reading, there will be some repetition between this report and others we have published, though we have attempted to keep this to a minimum. Our stated intention was to bring these several resources together in a single user guide for the Graduate Outcomes survey; a goal endorsed by the Office for Statistics Regulation (OSR) in their assessment of the first year of Graduate Outcomes against the Code of Practice for Statistics[3]. We are therefore pleased to present this third edition of the quality report as an integrated section of the new user guide. We are keen to get users' feedback on the user guide, as we expect to develop the approach further in coming years.

Third, our aim and purpose in writing this report is to offer the most up-to-date assessment of the quality characteristics of the Graduate Outcomes survey. In doing so, we have necessarily prioritised our own uses and outputs first, as these take into account the many user requirements we have already elicited. However, at this relatively early stage in the Graduate Outcomes survey's development, a quality report cannot be as comprehensive as one that follows a period of extensive usage by other users. Notably, our own initial uses are mainly for the release of aggregated data, which is filterable by multiple characteristics, but ultimately still a summary of findings. We encourage users of survey microdata to carry out and publish their own quality assessments, especially in areas where our own work does not provide them with the understanding they need to have confidence in the validity of their analysis. This approach will extend and enhance our own work, for the benefit of all users.

Fourth, although this is a technical report about statistics, it follows a narrative format. Our assessments and evaluations of quality characteristics are presented using a predominantly narrative approach, with tabular information included as static data tables to illustrate our findings.

[1] UK Statistics Authority. 2013. Guidelines for Measuring Statistical Output Quality: https://webarchive.nationalarchives.gov.uk/20160106063521/http:/www.ons.gov.uk/ons/guide-method/method-quality/quality/guidelines-for-measuring-statistical-quality/guidelines-for-measuring-statistical-output-quality.pdf

European Statistical System Committee. 2017. European Statistics Code of Practice. https://ec.europa.eu/eurostat/documents/4031688/8971242/KS-02-18-142-EN-N.pdf/e7f85f07-91db-4312-8118-f729c75878c7

[2] Available from: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology

[3] Mark Pont to Jonathan Waller: Higher Education Graduate Outcomes Data. 2021. https://osr.statisticsauthority.gov.uk/correspondence/mark-pont-to-jonathan-waller-higher-education-graduate-outcomes-data/

Quality description

The following subsections detail our assessment of the quality of the survey.

We will be assessing the quality of the survey according to the five dimensions of quality specified in the European Statistical System. These are:

- Relevance
- Accuracy and reliability
- Timeliness and punctuality
- Accessibility and clarity
- Coherence and comparability.

These dimensions, which are recommended for use in measuring survey quality in the National Statistician's guidance, also map onto aspects of quality which must be assured according to section Q3 of the Code of Practice for Statistics. The following sections of this quality report therefore cover each of the dimensions in turn, exploring the quality characteristics of the Graduate Outcomes survey by utilising the relevant quality indicators and measures identified in the guidance.

Relevance

When considered as a dimension of statistical quality, relevance refers to the extent to which statistical outputs meet the current and potential needs of users. In order to assess relevance, it is necessary first to identify likely users of the data and their needs. The data sources and statistical concepts used in the production of a statistical output are also a factor in determining relevance; depending on user needs, different data sources and classification schemes will be appropriate. Finally, it is important to identify any gaps between the statistical output and known user needs and to assess how those gaps may be filled in future.

Users and user needs

As a producer of official statistics, HESA is obligated to consider a number of principles in assessing and reporting on the quality of statistical outputs. One of these principles, originating from the European Statistical System Code of Practice and endorsed by the UK Government Statistical Service, is the assessment of user needs and perceptions[0]

A wide variety of users, in the HE sector and beyond, work with HESA data on graduates. HESA has obligations to a range of statutory customers in all four UK nations, including the funding and regulatory bodies for higher education in each nation; our statutory obligations to these customers require us to provide them with the data which they need to carry out their public functions[1]. As Designated Data Body for England, HESA is further required by law to publish ‘appropriate information relating to registered HE providers and the higher education courses they provide’. According to the Higher Education and Research Act 2017 (HERA), the category of ‘appropriate information’ includes information which may be helpful to students in higher education, potential higher education students, and HE providers; HERA also specifies that the designated data body must provide appropriate information to the Office for Students (OfS), UK Research and Innovation (UKRI), and the Secretary of State for Education[2]. In addition to those users whose needs we are required by law to consider, we also wish to consider the needs of others for whom high quality data on graduates will be useful, including HE funding and regulatory bodies, local and national governmental agencies, graduate employers, and academic researchers[3].

Different users have different needs for the Graduate Outcomes data. Prospective HE students may look to Graduate Outcomes in order to make informed choices about providers and courses, while HE providers may use the data for strategic planning purposes. Funding and regulatory bodies may use Graduate Outcomes data to assess the performance of providers and courses, while government agencies—both local and national—and graduate employers may look to the data to provide information both about the regional supply of graduates with different skills and about the roles played by graduates in society more generally. Since the publication of the first statistical outputs based on the survey, HESA has tracked citations of Graduate Outcomes data, and seen it used a variety of publications, from stories on higher education in the national media, to publications designed to support student choice, to analyses conducted by funding and regulatory bodies[4].

Throughout the design and implementation phases of the Graduate Outcomes survey, HESA has been engaging with the various potential users of the survey data, actively. In the early stages of the NewDLHE review, a Strategic Group and a Working Group were convened; these groups, which were comprised of representatives from a wide variety of HE providers and other sector bodies, were responsible for setting the remit for the review and developing a workplan to pursue this remit[5]. Later in the review, HESA carried out two consultations, the first to determine user needs for the successor to DLHE, and the second to solicit feedback on the draft model for the new survey[6].

Responses to the second consultation suggested a high level of stakeholder approval for the proposed model, giving HESA a mandate from potential survey users to proceed with the implementation of the new survey. The model proposed in the second consultation called for the establishment of the Graduate Outcomes Steering Group; this group, like the earlier Strategic and Working Groups, is designed to reflect the diversity of stakeholders for the Graduate Outcomes survey and is comprised of representatives from HE providers and HESA statutory customers from across the UK. The Steering Group met quarterly during the development and implementation of the survey to advise HESA on all aspects the Graduate Outcomes survey. HESA values the expertise and input which has so far been contributed by the Graduate Outcomes Steering Group, and it is envisaged that the group will continue to operate in an oversight capacity and to help guide further improvements to the survey[7].

In addition to the regular meetings of the Graduate Outcomes Steering Group, HESA continues to solicit feedback from the sector on particular issues. While the charts and tables to be included in the first Graduate Outcomes Statistical Bulletin and open data release were being developed from conceptual designs into logical wireframes, HESA convened a group of sector representatives to ascertain whether the planned outputs met with user needs. This engagement with stakeholders informed the initial publication of Graduate Outcomes data and has continued to guide our decision-making process as we have prepared for subsequent years of outputs[8]. Over the the second and third years of surveying, HESA has invited key users to participate in a review of the survey questionnaire, and has also continued to consider user feedback about the survey and its associated outputs submitted to the Agency via other channels[9].

A second phase of the survey review was launched in April 2022 and is currently ongoing. In addition to a review of user needs surrounding the existing survey questions this second phase of the review will also include a mechanism for identifying potential requirements for new survey topics. Through an ongoing programme of horizon scanning and engagement with relevant policy experts, we aim to ensure that the Graduate Outcomes survey continues to meet the evolving needs of its users.
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[0] Government Statistical Service. 2016: https://gss.civilservice.gov.uk/wp-content/uploads/2016/01/ESS-Dimensions-of-Quality.pdf

[1] A list of the statutory customers who require data from HESA can be found at https://www.hesa.ac.uk/about/what-we-do/statutory-customers

[2] Higher Education and Research Act 2017, sections 64 and 65. http://www.legislation.gov.uk/ukpga/2017/29/section/65/enacted

[3] A list of likely users of graduate outcomes data, based on known users of the DLHE survey, can be found in the Graduate Outcomes Survey methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/understanding-outcomes

[4] See, for example, a BBC article on graduates leaving Wales (https://www.bbc.co.uk/news/uk-wales-57528943), the 2020/21 'What do graduates do?' report from Prospects (https://luminate.prospects.ac.uk/what-do-graduates-do), and proposed use of Graduate Outcomes data in the consultation on regulating student outcomes published by the OfS in January 2022 (https://www.officeforstudents.org.uk/media/c46cb18a-7826-4ed9-9739-1e785e24519a/consultation-on-a-new-approach-to-regulating-student-outcomes-ofs-2022-01.pdf).

[5] The NewDLHE review was a major review of HESA's destinations and outcomes data which ran from July 2015 to June 2017; 'NewDLHE' was the working title for replacement for DLHE, which has since become the Graduate Outcomes survey. For a complete record of the review, see https://www.hesa.ac.uk/innovation/records/reviews/newdlhe
Further detailed information on the NewDLHE Working Group and Steering Group can be found on the HESA website: https://www.hesa.ac.uk/innovation/records/reviews/newdlhe/working-group
https://www.hesa.ac.uk/innovation/records/reviews/newdlhe/strategic-group

[6] Syntheses of responses to the two consultations can likewise be found on the HESA website: https://www.hesa.ac.uk/innovation/records/reviews/newdlhe/consultation
https://www.hesa.ac.uk/innovation/records/reviews/newdlhe/second-consultation

[7] Further information on the remit and composition of the Graduate Outcomes Steering Group: https://www.hesa.ac.uk/innovation/outcomes/about/steering-group

[8] HESA. 2020. How to publish Graduate Outcomes data? Our consultation on open data release. https://www.hesa.ac.uk/blog/15-04-2020/how-publish-graduate-outcomes-data

[9] Users can submit feedback to the Official Statistics, Liaison, and Communications teams; they can also provide feedback on the HESA website, or direct queries to Jisc, HESA's data analytics partner.

Data and statistical concepts

The Graduate Outcomes survey covers all graduates who obtain relevant higher education qualifications during the survey year. The list of graduates who are eligible to be surveyed is generated on the basis of data on qualifiers from the Student and Alternative provider student record along with data from the further education sector supplied by the Department for the Economy, Northern Ireland (DfENI) and the Office for Students (OfS). HE providers and Welsh and Northern Irish further education colleges are then responsible for supplying HESA with valid contact details for their graduates. While the OfS can provide HESA with contact details for graduates of English further education colleges, colleges whose contact details are provided by the OfS can subsequently amend the contact details for their graduates as required[1].

Graduates are divided into four cohorts, based on the time of year at which they obtained their qualification, and they are surveyed, either online or by telephone, approximately 15 months after the completion of their studies[2]. Graduates are asked to respond to the survey with reference to a seven-day census week at the beginning of the sampling period; graduates in cohort A, for example, finished their qualifications from August to October, and are surveyed from December to February, with reference to the first week of December[3]. In the fourth year of surveying, approximately 23% of graduates were surveyed as part of cohort A (having qualified from August to October 2020); 5% were surveyed as part of cohort B (having qualified from November 2020 to January 2021); 4% were surveyed as part of cohort C (having qualified from February to April 2021); and the remaining 68% were surveyed as part of cohort D (having qualified from May to July 2021). All four cohorts are analysed together to produce a single annual dataset, reflecting the fact that most UK higher education operates on a relatively standardised academic year, and the majority of graduates therefore finish their qualifications in early summer (cohort D). The division of the survey year into four cohorts primarily aids data collection and ensures a consistent 15-month gap between course completion and census week.

Graduate activities are one of the main areas of interest in the survey. Graduates are given a list of potential activities and are asked to select all activities from that list which they were undertaking during census week. The following options are available:

- Paid work for an employer[4]
- Self-employment/freelancing
- Running my own business
- Developing a creative, artistic or professional portfolio
- Voluntary/unpaid work for an employer
- Engaged in a course of study, training or research
- Taking time out to travel – this does not include short-term holidays
- Caring for someone (unpaid)
- Retired

- Unemployed and looking for work
- Doing something else.

From the list of activities which they select, graduates are additionally asked to identify the activity which they consider to have been their most important activity during census week. On the basis of the activities which they select, graduates are routed to subsequent survey questions; the order in which they are routed depends on which activity they identify as most important.

Graduate employment is a key area of interest for many users of HESA data on graduates; the OfS' 2022 consultation on the future of the Teaching Excellence and Student Outcomes Framework (TEF), for example, propose the use of Graduate Outcomes data on the percentage of graduates from a given provider who are in full-time professional level employment or further study fifteen months after finishing their qualification[5]. In HESA's analysis of the data, we compile tables that look at graduates in work; for some of these tables we include both those working for an employer and those who are self-employed, running their own business and developing portfolios, while for others we include only those in a certain type of work (e.g., 'work for an employer'). We provide a 'work type marker' filter for tables which cover all graduates in work, to allow users to distinguish between respondents in paid employment, those who are self-employed or running their own businesses, and those in voluntary work. We also provide a 'work population marker' to relevant tables which allows users to view data either based on all graduates who report one or more of these activities, or alternatively to focus on those graduates who state that one of these activities is their most important activity.

Graduates who are engaged in work for an employer (whether paid or unpaid), self-employment, or running their own business, are assigned both a Standard Industrial Classification (SIC) code and a Standard Occupational Classification (SOC) code. Graduates developing a portfolio are assigned a SOC code only. Accurate SIC and SOC coding makes it possible both to provide users with a clear picture of the industries and occupations in which higher education graduates are working and to allow users to compare the outcomes experienced by graduates working in different areas.[6]

The SIC framework categorises businesses in terms of the type of economic activity in which they are engaged[7]. Easily comparable data on the industries in which graduates are working helps users to understand the economic contributions made by higher education graduates.

Whereas SIC data provides information about the sectors of the economy in which graduates are active, the SOC framework provides a system for categorising occupations according to the skill level and type of work entailed by the jobs which graduates do[8].

SOC codes allow jobs to be categorised, in order of increasing specificity, according to major groups, sub-major groups, minor groups, and unit groups; major groups are distinguished by the level of skill and experience required to perform the activities associated with a job, while occupations within each major group are organised according to the type of work performed. In line with the methodology adopted by the Office for National Statistics and the Department for Education, occupations are classified according to their SOC major group as 'high skilled' (groups 1-3), 'medium skilled' (groups 4-6), or 'low skilled' (groups 7-9) for purposes of analysis. These classifications by SOC major group are particularly valuable to users who wish to see a broad overview of the kinds of

jobs done by graduates or to compare the employment outcomes of graduates with different characteristics.

In addition to asking graduates about their activities during census week, the survey asks graduates two sets of questions about how they feel. In the first set of these questions, the 'graduate voice' questions, graduates are asked to reflect upon their activities, and to consider the extent to which those activities fit with their future plans, are meaningful, and allow them to utilise what they learned during their studies. These questions were designed by HESA in response to feedback from sector representatives, who felt that there was a need for qualitative data linking graduates' current experiences with their experiences in HE[9]. Graduates in work are asked these questions with reference to their work, graduates in further study are asked these questions with reference to their current study, and graduates doing something else or engaged in multiple activities are asked these questions with reference to their current activities[10]. Given current policy interest in employment quality, HESA has developed a composite variable, based on the graduate voice questions, which will help users assess the certain aspects of the quality of the jobs held by graduates in work. An initial report on the rationale behind the development of this variable and the proposed methodology was published in June 2021, and, following a programme of user engagement, we have since published a range of analytical insights using this variable[11].

The second set of questions deals with graduates' subjective wellbeing (SWB). SWB is assessed in Graduate Outcomes using a set of four questions (the ONS4), which were developed by the Office for National Statistics (ONS) for use in the Annual Population Survey and have since been used in a large number of social surveys; prior to their use in Graduate Outcomes, the ONS4 were included in the final year of the LDLHE (Longitudinal Destinations of Leavers from Higher Education) survey[12]. In the ONS4, graduates are asked to think about the extent to which they:

- are satisfied with their life
- feel that the things they do are worthwhile
- feel happy
- feel anxious.

Like the 'graduate voice' questions, the section on SWB was added to the Graduate Outcomes survey as an alternative outcome measure, separate from employment and employability. Several possible alternative outcome measures were proposed during the first consultation phase, and the ONS4 SWB questions were added to the core Graduate Outcomes survey in response to feedback from HESA's statutory customers[13].

Finally, the Graduate Outcomes survey includes a number of opt-in question banks, which may be asked after respondents have come to the end of the core survey. Providers are given the option to select a number of additional question banks which will be asked of their graduates. Some of the opt-in question banks are targeted at certain categories of graduates and will therefore not be asked of all graduates from a provider.

The following opt-in question banks are available, depending on the data needs of providers:

- Finding your job
- Net promoter entity
- Graduate choice
- Research students
- Newly qualified teachers
- Careers service.

The addition of these opt-in banks gives providers some scope to tailor the survey to their particular data needs; a provider with a particular desire for data on graduate satisfaction might want its graduates to answer the 'net promoter' question bank, while a provider interested in the effectiveness of its career services provision might want to ask its graduates how they found their current jobs.

[1] Graduate Outcomes Survey Results record 2018/19 - Coverage of the record. https://www.hesa.ac.uk/collection/c18072/coverage

[2] For further details on the sources of the Graduate Outcomes data, see the relevant section of the Graduate Outcomes Survey methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/survey-coverage

[3] For further detail on cohort and census dates, see the Graduate Outcomes Definitions page on the HESA website: https://www.hesa.ac.uk/support/definitions/graduates

[4] From Cohort C of the 2018/19 survey, additional guidance was added instructing graduates who had been furloughed under the Coronavirus Job Retention Scheme to report themselves as undertaking paid work for an employer.

[5] Office for Students. Consultation on the Teaching Excellence Framework TEF). https://www.officeforstudents.org.uk/media/42846a2c-aa90-40a7-9a0c-f207ddb599da/consultation-on-the-tef.pdf. For TEF purposes, employment counts as 'professional level' if the occupation in question has a SOC code in major groups 1-3; see below for HESA's approach to SOC coding (more information is covered in this section, and further information is available below, in the SIC and SOC coding section).

[6] For more detail on the definitions of work and employment used by HESA, see the National and international data standards section.
Future action for HESA to consider includes evaluation of the potential gap between HESA and harmonised national definitions, both through comparison with third-party linked data sources such as LEO/LFS and through evaluation of question wording in the light of this.

[7] Further detail about HESA's use of the SIC coding framework can be found in the National and international data standards section..

[8] For further detail about HESA's use of the nationally recognised SOC framework, see the National and international data standards section.

[9] For more detail about the development of the graduate reflection questions, see the Graduate Outcomes Survey methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/review-topics

[10] Further discussion of the routing of these questions can be found in the Survey instrument error section.

[11] See: https://www.hesa.ac.uk/files/Graduate-Outcomes-statistical-measure-design-nature-of-work-20210608.pdf Subsequent analyses of this composite measure have looked at variation in the design and nature of work by region (https://www.hesa.ac.uk/insight/07-12-2021/regional-variation-design-nature-graduate-work), SOC (https://www.hesa.ac.uk/insight/22-03-2022/time-take-soc-design-nature-work-occupation-01), socio-economic disadvantage (https://www.hesa.ac.uk/insight/24-03-2022/perceptions-of-work-by-socioeconomic-disadvantage), and graduate subjective wellbeing (https://www.hesa.ac.uk/insight/18-10-2022/graduate-wellbeing-design-and-nature-work-life-evaluations-emotions).

[12] HESA. 2021. Regional variation in the design and nature of graduate work: A first look. https://www.hesa.ac.uk/insight/07-12-2021/regional-variation-design-nature-graduate-work

[13] ONS. 2018. Personal well-being user guidance. https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingsurveyuserguide

Assessment of gaps

The Graduate Outcomes survey was designed, as far as possible, to meet likely user needs for data on what graduates do after finishing HE and how they feel about their careers so far. We maintain a watching brief on policy issues that are of relevance to data about graduate outcomes, and report internally on emerging trends. Since the development of this survey was an extended project, however, there may be some gaps between our outputs and user needs. This could be because needs are changing faster than the survey development process, or because there are trends of which HESA is not yet aware. Since the publication of the first year of Graduate Outcomes data, we have been soliciting further feedback from users of the data via a variety of channels, including collecting feedback submitted via the website and conducing an extensive programme of sector engagement, in order to assess how well the initial publication has met user needs. As we collect user feedback, we aim to incorporate it, as appropriate, into any adjustments we make to the survey and resulting statistical outputs. Our approach to evaluation is covered in the Survey methodology[1].

HESA is already aware of some areas in which we are working to make improvements in the data which we collect and publish. Regional employment and skills gaps are important areas of current policy interest; in the spring 2020 budget speech, the government emphasised a policy of 'levelling up' across the UK, aimed at providing opportunities in under-served regions and reducing regional disparities, and the OfS has offered grants to universities to work with local employers to develop graduate jobs[2]. While the Graduate Outcomes survey collects data on location of domicile, HE provider, and place of work (for those graduates in work), the year one statistical outputs for the survey analysed graduate outcomes only by country of provider and in some cases domicile; the data for subsequent years provides more granular geographic detail, including analysis of place of work at the level of Government Office region[3]. We have also worked to create a new graduate mobility marker, which allows us to analyse patterns of graduate mobility beyond the regional level[4]. For the second year of Graduate Outcomes publications, we carried out a review of the base population used for response rates (so as to include for the sake of consistency all seriously ill or deceased graduates) and the salary outlier thresholds.

Additionally, the ongoing data collection process continues to bring to light areas in which adjustments to the survey questionnaire have the potential to improve data quality and our ability to produce outputs which meet user needs. Significant changes to the survey questionnaire require approval from the Graduate Outcomes Steering Group; as we continue to assess the survey and integrate feedback from users, HESA will continue proposing changes to the Steering Group wherever it seems that modifications will enable us to produce data which better serves the needs of our stakeholders. At the end of 2020 we commenced an extensive review of Graduate Outcomes, aimed at identifying improvements to various aspects of the survey such as data collection instruments and survey methodology. Part of this activity involved reviewing the survey questionnaire with the aim of re-establishing data requirements of our users by making sure questions in the survey were still fit for purpose and reducing respondent burden by removing redundant questions. Several changes have already been identified through this process and were subsequently implemented for the 2020/21 collection. A second phase of the survey review began in late spring 2022, involving further assessment of how well existing survey

questions meet user needs. This phase of the review will also include horizon scanning and desk-based policy research, aimed at identifying areas of existing or emerging user need which may require the development of new survey topics.

Starting in the second year of surveying, we have had to consider the impact of COVID-19 on both survey operations and the instruments themselves[5]. On 19 May 2020, we issued an update explaining the issues we had considered and the decisions we had come to with respect to the pandemic[6]. Our focus was on ensuring that graduates could self-administer the survey to accurately reflect their personal situation and that interviewers could support participants sensitively and appropriately. We added a clarification to the list of graduate activities to clarify that furloughed employees should still identify themselves as undertaking paid work for an employer. We also added supportive text to the survey (both on the online and CATI version) signposting participants to mental health and wellbeing organisations across the world (the Samaritans, Befrienders Worldwide and Mind). We also identified other areas where the impact of the pandemic would need to be taken into account either in outputs (as was the case for salary, which is covered in the Reliability of sensitive data section of this report, on the handling of sensitive data) or in the future design of the survey (in particular questions about the location of work, since working locations have been impacted so significantly for many workers). These latter issues are being taken forward in the survey review activity currently being conducted by the Steering Group supported by HESA.

[1] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/evaluation

[2] Rishi Sunak. Budget Speech 2020. 11 March 2020. https://www.gov.uk/government/speeches/budget-speech-2020
OfS. 2020. No place like home – new fund to boost local graduate opportunities. https://www.officeforstudents.org.uk/news-blog-and-events/press-and-media/no-place-like-home/

[3] See the Location of work data - handling free text section for discussion of the work which has been done to improve the quality of data on location of work.

[4] Further detail on the impact of the Covid-19 pandemic on Graduate Outcomes data can be found in The impact of the Covid-19 pandemic section of this report, and in the insight briefs which we have published alongside the 2018/19 and 2019/20 statistical releases: https://www.hesa.ac.uk/insight/20-07-2021/impact-covid-19-graduate-outcomes and https://www.hesa.ac.uk/insight/16-06-2022/impact-covid-19-graduate-outcomes.

[5] For information on our assessment of gaps as a result of the Covid-19 pandemic, see: https://www.hesa.ac.uk/news/coronavirus#acc1

Accuracy and reliability

In this section we evaluate the closeness between the estimated results produced from the survey and the (unknown) true value. The design of Graduate Outcomes minimises the possibility for sampling error, due to the comprehensive approach taken to surveying all cases available to be contacted from the sampling frame. We therefore start by describing the sampling frame, and how we maintain it, also describing the close resemblance of the sample to the sampling frame. We then go on to concentrate on various forms of non-sampling error in the subsequent subsections, including:

- coverage error
- non-response error
- measurement error
- processing error

The sampling frame, and how it is maintained

The Graduate Outcomes survey aims to survey the population of graduates from Higher Education (HE), and the survey employs a dynamic sampling frame that is kept up to date when source data changes. The source data is a list of data about individual graduates drawn from existing administrative census datasets about students. These sources are enriched with contact details sourced from the providers where those graduates studied. Below, we cover these two separate aspects of how the sampling frame is constructed. The Survey methodology section on the sampling frame offers an overview of this area[1]. We present additional information in the following paragraphs.

The sampling frame has been developed utilising the main administrative data sources for HE provision in HE settings across the UK[2], and for college HE in all parts of the UK except Scotland[3]. These data sources each support existing official statistics publications, so our initial assumption is that they are of high quality and fit for their purposes. The sampling frame is drawn from this administrative data, according to the criteria set out in the coverage statement for the Graduate Outcomes Contact Details record[4] which we summarise in the Survey methodology section on survey coverage[5]. The (separate) coverage statement for the Graduate Outcomes Survey Results record explains further detail of this[6]. The following subsection summarises this information, and provides additional commentary, starting with the main processes utilised for all data sourced from HE providers, by HESA. In the subsection after that, we cover how we derive the sampling frame related to college HE settings.

Sampling frame data based on HESA data collections

The majority of data used to determine the sampling frame is collected by HESA. HESA collects individualised data on students in HE providers across the whole UK in its Student record and Student Alternative record (referred to hereinafter as the “Student record(s)”, for brevity). Data from these records is an administrative census: their goal is to enumerate the HE student population and describe their personal and study characteristics. The data on qualifiers contained in the Student records is the most

complete single record of graduates from HE available. The Student records are the primary official record of UK HE, and are principally collected on behalf of the UK Government, the Devolved Administrations, and the Office for Students[7]. HESA collects this data annually, from a constituency of HE providers that is refreshed at least annually – referred to by HESA as 'reporting providers'. This covers all publicly-funded and/or regulated HE providers in the UK. The HESA Student records for the 2018/19 academic year were used in the creation of the sampling frame for the second year of the Graduate Outcomes survey.

The sampling frame comprises all students reported to HESA or the relevant body as obtaining relevant higher education qualifications during the reporting period 01 August to 31 July, and whose study was full-time or part-time (including sandwich students and those writing-up theses). Graduates with awards from dormant status are only included in the target population for postgraduate research students. Graduates with some qualifications are excluded from the sampling frame, principally because their work and study destinations are already captured by other data sources. These include intercalated degrees, awards to visiting students, students on post-registration health and social care courses, and professional qualifications for serving school teachers[8].

Exceptionally, issues may be found in the source administrative data, that, when corrected through the data amendments process (also termed the fixed database facility) have the effect of altering the sampling frame[9]. Up to the dates specified in the coding manual (which overlap with the contact period substantially) changes made to the sampling frame via the fixed database are reflected in the "population file" that is passed to the provider through an online electronic portal for providers (hereinafter, 'the Portal'), so that additional contact details can be gathered. This would be necessary, for example, if the fixed database change increases the sampling frame data for a provider, by inserting previously missing records. Furthermore, the data that is published (including response rates in relation to targets) always reflects the most up-to-date sampling frame available from the fixed database at the time of production. This means that even if over-sampling has occurred (because a fixed database change removes graduates from the sampling frame, in cases where responses have already been gathered, successfully) then these results would also be discarded from the output file.

In order to derive the sample, and to obtain their contact details, information about the sampling frame is passed back to the HE providers, through the Portal. The goal is to maximise the availability of usable contact details for use during data collection. A full data collection process exists to support this activity, and it is specified in detail in the coding manual for the Graduate Outcomes Contact Details record[10]. This document explains the collection schedule and the data items collected, and gives information to support interactions with graduates – an engagement strategy is defined by HESA and roles and responsibilities are shared with HE providers[11]. The coding manual also gives details of the quality assurance regime (automated and manual) along with other guidance and training materials on the systems and processes operated via the Graduate Outcomes provider portal.

In the provider portal, providers are presented with an output file showing graduates from the sampling frame drawn from the providers' own data (collected previously) and are asked to populate and upload an XML file with contact details. Detailed guidance and training is offered on data quality expectations and using the tools provided[12]. The provider portal enables HE providers to act as peers in the quality assurance process, and HESA's system logs show interaction with the Portal has reduced as providers normalise

their use of the tool following initial teething/experimentation. This complements increased use of the web-based update facility (mainly used by smaller providers).

Table 2: Portal usage statistics

Year of survey	Providers attempting upload	File uploads attempted	Providers successfully uploading files	Successful file uploads
Year 1	190	5,437	176	1,462
Year 2	193	3,448	181	1,259
Year 3	191	3,174	181	1,208

On submission, checks are undertaken by HESA to identify any problems with various quality dimensions of the data[13]: validity[14], uniqueness[15], completeness[16], and consistency[17]. Further information about the 51 automated rules applied consistently during the second year of operation is available online in the quality rules directory[18]. While new rules can be added in response to feedback from survey operations, no changes were required during the second year of operation. Version control is applied to all aspects of the coding manual and quality rules, allowing analysts to see which rules were introduced at which points.

The quality regime seeks to maximise the number of usable details available for contact. Where quality rules are triggered, providers must either update the data, or contact HESA to request that the rule be 'switched-off' for that observation. This process is managed by HESA's Liaison team who have oversight of these operational data quality issues. We do not directly assess the accuracy[19] of the contact details – our current checks do not determine if the contact details provided belong to the graduate. Providers must therefore warrant the accuracy of the data and fitness for purpose for use of the contact details, on submission. The head of the provider also affirms compliance with the (supply side) Code of Practice for Data Collection[20]. Providers' interactions with HESA also form part of their internal audit and compliance mechanisms, which are typically overseen by their governing bodies.

At this point, we will summarise the quality characteristics of the contact details. Quality of contact details is measured primarily in terms of coverage or completeness of record and validity. The following table demonstrates that coverage has largely remained constant in every year to date.

Table 3: Quality characteristics of contact details

Type of contact details	% with no contact details	% with email only	% with UK Landline or International number only	% with UK mobile but no email	% of grads with email and number
Year 1	0.2%	2.6%	0.2%	0.8%	95.9%
Year 2	0.2%	5.4%	0.3%	0.8%	93.3%
Year 3	0.2%	4.9%	0.3%	1.0%	93.6%

Based on our evaluation of the quality of contact details over the past two years we recently published a blog aimed at providers with a view to highlight the most common issues and their impact on our ability to make contact with graduates and collect responses[22]. This has led to the introduction of a series of internal checks which are regularly carried out on contact details and the feedback is shared directly with providers who have submitted relatively low-quality contact details compared to the rest of the sector. In practice, some contact details prove unavailable. A few graduates do not keep in touch with their HE providers and accurate contact details held for them can become out of date. Providers are encouraged to stay in touch with their graduates through different means, enabling them to supply good quality contact details in time for the survey 15 months later.

Details of the quality rules we utilized during construction of the elements of the sampling frame that are drawn from the HESA Student records is available within the quality rules directory in the coding manual[23].

During the contact details collection process, HE providers are also able to supply

additional information that allows HESA to exclude graduates from the surveyable population, for example if they have become seriously ill, or have died, since graduating. During the first year of the survey, we had excluded graduates whose providers had told us they were dead or seriously ill from the sample entirely. However, following reflection on the appropriateness of this analytical choice we determined that we should adopt a different approach from the second year. These graduates are in the population of interest and in the sampling frame so we do not wish to ignore them, however we must respect the ethical choice of providers in their decision not to pass on contact details in such circumstances. Nevertheless, providers cannot possess perfect knowledge of the health outcomes of graduates, and we found that we discovered cases where the graduate had died or become seriously ill through surveying. In some cases, we even elicited a response from seriously ill graduates. Given that the rates of serious illness and death among recent graduates appears to be very low, our approach here would be unlikely to have material impacts on our outputs, or on end users. The main impacts would be on the response rates of very small providers, but this is an insufficient argument, and since we anticipate that the distribution of these cases will be random, there is no reason to expect smaller providers to be affected disproportionately. We therefore determined that the appropriate approach would be to simply treat these graduates as a part of the sample, and where no contact details are provided, they are therefore treated as a non-respondent. We are still able to gather information from providers about their reasons for not including contact details in such cases, but the sample has now been aligned with the sampling frame, with the result that the survey is more inclusive and analysis is more straightforward.

Timeliness of the data in the sampling frame is a central consideration. The collection of contact details follows four phases, each aligned to one of the four cohorts (A, B, C, and D). Comprehensive information aimed at HE providers is published about timescales for collection activities[25]. Because the survey takes place approximately 15 months following course completion, allowance has to be made for changes of circumstance following this. Contact details are therefore collected during a period when the provider has had maximum opportunity to ensure they are as up-to-date as possible.

Sampling frame data based on other ingested data

A minority of HE study takes place in further education (FE) settings[26]. We use the term ‘college HE’ to refer to this provision. HESA collects data about college HE students in Wales as part of its Student record (the process for this is the same as for the other data described in the paragraphs following this one). In England, Northern Ireland, and Scotland, college HE data is collected by other bodies[27]. Given the prevalence and success of articulation agreements, graduates from college HE in Scotland are excluded from the survey coverage[28]. HESA ingests data about college HE students from the administrative records collected in England and Northern Ireland. This data, along with, in England, contact details found within these administrative records, is provided to HESA in a timely manner by the relevant bodies, in order to permit these college HE graduates to be contacted during the normal operation of the survey. Where contact details are not provided, or where the FE provider is able to source improved contact details, a Portal-based collection process identical to the one described in the previous section is employed to permit this. We do not describe the quality processes followed in the construction of these administrative records here, but we do provide supporting information for Further Education Colleges (FECs) in England and Northern Ireland[29]. College HE data

collectors tend to see a record for each qualification aim separately, and hence they have to exercise judgement about when a qualification aim is 'nested' within a larger aim, and when it is suitable for driving survey coverage. Such matters are handled by skilled professionals, but they prudently acknowledge that there is a small risk of undercoverage or overcoverage occurring in situations such as unusual personal circumstances of a student, or where a qualification is unfamiliar. Further details should be sought from the data collectors (see footnote [27]).

[1] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/sampling-frame

[2] These are the HESA Student record(s) described in detail further on.
See https://www.hesa.ac.uk/data-and-analysis/students for the data published from these records.

[3] The detail is covered later on, in the Sampling frame data based on other ingested data section.

[4] See https://www.hesa.ac.uk/collection/c18071/coverage

[5] For further information about the survey coverage, see the relevant section in the Survey methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/survey-coverage

[6] See https://www.hesa.ac.uk/collection/c18072/coverage

[7] HESA's Collection Notice for its Student record https://www.hesa.ac.uk/about/regulation/data-protection/notices details the statutory background for this. The coverage statement for the Student record (2019/20) utilised in creating the sampling frame gives details on which students are included in the record: https://www.hesa.ac.uk/collection/c19051/coverage. The equivalent statement for the Student Alternative record is here: https://www.hesa.ac.uk/collection/c19054/coverage

[8] Full details of exclusions are available at: https://www.hesa.ac.uk/collection/c19072/coverage#contents5

[9] For details of the financial impact and regulatory authorisation needed to make a change to the previously-submitted data (to amend the fixed database) see https://www.hesa.ac.uk/support/provider-info/subscription/fees-and-charges

[10] See https://www.hesa.ac.uk/collection/c19071

[11] This engagement plan is detailed in the information provided on the operational management of the survey. See https://www.hesa.ac.uk/definitions/operational-survey-information#engagement-plan
Communications resources are here: https://www.hesa.ac.uk/innovation/outcomes/providers/communications
Roles and responsibilities are

here: https://www.hesa.ac.uk/innovation/outcomes/providers/responsibilities

[12] See https://www.hesa.ac.uk/collection/c19071/contact_details_guidance for an accessible overview. For full information about types of contact details we accept and other best practice see the Portal user guide,
at: https://www.hesa.ac.uk/collection/c19071/portal_user_guide

[13] HESA's approach to data quality management during collection rests partly on the quality dimensions specified in the DAMA DMBOK. See (DAMA UK Working Group on "Data Quality Dimensions", 2013) (For outputs, HESA uses the ESS dimensions.)

[14] E.g. telephone numbers consist of digits.

[15] E.g. identifying graduates with duplicate email addresses or telephone numbers.

[16] E.g. that most graduates in the sampling frame have some contact details.

[17] E.g. that a variety of different contact methods have been given, and they are not all, for example, comprised entirely of the provider's own 'email for life' address (where this exists) for each graduate.

[18] See https://www.hesa.ac.uk/collection/c19071/quality_rules

[19] E.g. Properly-formed contact details could theoretically pass our checks, without necessarily belonging to the respondent we hope to reach.

[20] See https://www.hesa.ac.uk/innovation/data-landscape/Codes-of-practice

[22] See https://www.hesa.ac.uk/blog/05-05-2021/improving-graduate-outcomes-response-rates-why-quality-contact-details-matter

[23] See https://www.hesa.ac.uk/collection/c19071/quality_rules

[25] See https://www.hesa.ac.uk/collection/c19071/data_collection_schedule

[26] To summarise, in 2017/18, FE providers accounted for 0.5% of the UK's total postgraduate enrolments, 1.4% of the UK's total first degree enrolments, and 47.8% of the UK's "other undergraduate" enrolments. For detailed figures and explanatory notes, see https://www.hesa.ac.uk/data-and-analysis/sb255/figure-3b.

[27] In England, the Individualised Learner Record (ILR) is collected by the Education and Skills Funding Agency (ESFA). In Northern Ireland, the Assembly mandates the collection of the Consolidated Data Return (CDR) of which an extract is supplied to HESA by the Department for the Economy (Northern Ireland). In Scotland, the government mandates

the collection of the Further Education Statistics record (FES). However, the college HE activity in Scotland, collected in the FES, is not within coverage for the Graduate Outcomes survey.

[28] See the section on college HE: https://www.hesa.ac.uk/collection/c19072/coverage#contents4.

[29] For FECs in England, see: https://www.hesa.ac.uk/innovation/outcomes/providers/information-english-further-education-colleges
For FECs in Northern Ireland, see: https://www.hesa.ac.uk/innovation/outcomes/providers/information-northern-irish-further-education-colleges FECs in Wales are longer-standing HESA subscribers, and information for them is consistent with the general information sources, here: https://www.hesa.ac.uk/innovation/outcomes/providers and elsewhere.

How does the sampling frame relate to the population?

This section deals with what we know about coverage error. The population of interest is graduates from HE-level courses. The exclusions from this are explicit and intentional (see footnote 8 of the Accuracy and reliability section). The survey does not attempt to contact students who did not graduate – these individuals are counted elsewhere in HESA's Student data. Where students graduate with a different award than that they originally intended at the beginning of studies, they will be included in the sampling frame (except where they fall into the exclusions we list).

The administrative data described in the previous section comprises all publicly-funded and/or regulated HE providers in the UK. There are known instances of duplication of student identifiers between providers within the Individualised Learner Record (ILR)[1] (which does not have a globally unique identifier akin to the HESA unique student identifier, or HUSID) and between the ILR and HESA data (where 'franchise' arrangements exist). The Office for Students is the expert in handling both types of duplication and has isolated and removed these within their dataset prior to sharing data with HESA. Where other administrative data sources are concerned the separation of reporting environments militates against duplications occurring.

One legitimate question is how complete the administrative data is: could there be any under-coverage of HE graduates, because the provider they studied at is not included in the administrative data? In short, our sampling frame represents the overwhelming majority (probably in excess of 99% based on Hunt and Bolliver's figures[2]), but not absolutely all, UK HE students.

While there is no definitive answer to how many are missing, it is known that a small amount of HE-level provision remains outside the formally-regulated sector. Research commissioned over nine years ago by the former Department of Business, Innovation and Skills identified a minimum estimate 'of 674 named privately funded HE providers operating in the UK. […] Most providers identified [were] relatively small in scale; 217 of the 674 had fewer than 100 students. Only 35 providers had over 1000 students, with five of these having over 5000 students.'[3] Subsequently, the Higher Education and Research Act 2017 has had the effect of expanding the sphere of HE regulation in England to include a group of organisations referred to as 'Alternative Providers'[4]. While this terminology is no longer used officially, the providers brought into the regulated sphere under this designation are now included in administrative data returns used to create the sampling frame, and include the majority of larger organisations identified by the literature[5]. In the Graduate Outcomes open data, we provide some information at provider-level, and users can therefore see the list of providers, where data on their graduates is included in our outputs.

Volatility in the segment of the HE marketplace comprising the very smallest providers means that some will not have provided full data for inclusion in the sampling frame, nor would they have shouldered their share of the costs of surveying, having undergone market exit. Further research indicates that there are 'some 813 private providers in operation in the UK – a significant increase on the 732 and 674 recorded in 2014 and 2011 respectively.' Many of these 'are small scale, concentrating on sub-degree or postgraduate qualification across a narrow band of subjects – often characterised as being popular but with low overheads[6].' For the most up-to-date documentation on what is known about the scale and scope of this part of the HE sector, readers are directed to the Hunt and Bolliver paper listed in the references. In HESA's published data no attempt has

yet been made to provide estimates that include this population, as we know too little about the characteristics of students and graduates from this part of the sector.

We therefore estimate that the list of graduates in the sampling frame comprises in excess of 99% of the population of interest, and that the impact of this slight undercoverage is therefore likely to be very slight in England, and negligible in Wales, Scotland, and Northern Ireland[7]. However, we remind users of the discussion about the provenance of contact details collected against the sampling frame. The practical effect of missing contact details, and those found to be unusable or ineffective during fieldwork, reduces the effective size of the sample, and limits the achievable number of responses.

[1] See note 27 of the Accuracy and reliability section.

[2] Hunt & Boliver, 2019, p. 22)

[3] (Department for Business, Innovation and Skills, 2013, pp. 7–8)

[4] HERA 2017. http://www.legislation.gov.uk/ukpga/2017/29/contents/enacted

[5] Current public laws delineate the regulatory regimes in place, but do not compel all HE providers to register with a funder or regulator.

[6] (Hunt & Boliver, 2019, pp. 1–3)

[7] Hunt and Boliver estimate 88% of private HE providers operate only in England.

The sample

Graduate Outcomes is a population-scale survey (or colloquially, a census[1]). Our goal is to contact the entire sampling frame. The sampling frame and the sample are therefore largely synonymous.

A marker was developed to identify the sampling frame from within the HESA Student record(s), and appropriate file(s) were extracted. Similar logic was applied by the suppliers of the college HE data not collected by HESA. The datasets were then combined – no matching or linking was required.

Our 'base population' is the term used to refer to the dataset that comprises the entire sampling frame. This includes all graduates who fall within our coverage statement, but for whom we have inadequate, ineffective, or missing contact details, for whatever reason[2]. Hence, the survey sample is identical to the sampling frame. Graduates who exercise their right to opt out of the survey are also included in the denominator for response rates.

Response rate targets form part of the survey design. These rates are high, to reflect the desire among many users to evaluate smaller sub-samples as a part of their analysis, and thus to minimise the rate of unit non-response. Targets were set in October 2018, and further information on these is available in the Survey methodology[3]. HESA's engagement strategy is the main tool for seeking high response rates[4]. Progress towards these targets (along with updates on the operational management of the survey) have previously been reported in a series of end of cohort reviews, published regularly on the HESA website up until the end of the second year of surveying[5]. Since then a summary of response rates is released at the end of each cohort in the weekly newsletter issued to the entire HE sector. An end of collection infographic is also published at the end of each collection year, containing provisional response rates and operational metrics. Final response rates, by domicile and mode of study, are published in the Statistical Bulletin, with response rates by provider, domicile, level of qualification, and subject of study included in the subsequent Open Data.

We cover issues related to non-response in the next two sections.

[1] Sometimes Graduate Outcomes is referred to as a "census". Strictly, a census enumerates a population, which is the central function of the HESA Student record. We use our pre-existing census data from the Student record(s) to construct a sampling frame for the Graduate Outcomes survey. We make no attempt to gather survey responses from graduates outside the sampling frame. However, there is no standard statistical term to describe a survey of (effectively) a whole population. It is fine to call Graduate Outcomes a census in everyday usage, but the term "population-scale survey" hopefully gets the same point across without falling into error.

[2] Our approach to collecting contact details means we may still manage to contact these graduates, if adequate contact details are supplied during the period of fieldwork.

[3] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/survey-targets

[4] We do not publish the full engagement strategy. Instead, we provide an outline plan for each cohort, updated quarterly here: https://www.hesa.ac.uk/definitions/operational-survey-information#engagement-plan
For an example of a more discursive account of the kinds of activities involved, see this blog post: https://www.hesa.ac.uk/innovation/outcomes/providers/engagement-plan/partial-complete

[5] For a full list of mid-point and end of cohort reviews from the 2018/19 cycle, with infographics, see: https://www.hesa.ac.uk/innovation/outcomes/about/progress

Sampling error and non-response error

Sampling error is the difference between a population value and an estimate based on a sample, and is one of the components of total survey error. It is normal for a quality report on a sample survey to offer a caveat explaining that, in principle, many random samples could be drawn and each would give different results, due to the fact that each sample would be made up of different people, who would give different answers to the questions asked. The spread of these results is the sampling variability. However, sampling error occurs because estimates are based on a sample rather than a census. As we have previously demonstrated, Graduate Outcomes is a population scale survey[1] where the sample is identical with the sampling frame, and the sampling frame resembles the population of interest very closely. While we know that the quality and availability of contact details must affect the response rate we can achieve from the sample, to develop a comprehensive measure of quality is a complex exercise in the absence of a perfect and accessible descriptor of quality. We are however making significant improvements in our understanding of the various facets of quality, as described in the Sampling frame data based on HESA data collections section. We aspire to provide response rates not just as a proportion of the target population but also as a proportion of the contactable population. Therefore, the response rate achieved is itself our present best indicator of the quality of contact details. Hence, our analytical focus in this section is on the extent to which the achieved sample is representative of the population. We therefore focus on non-response error.

This section comprises two subsections, which cover the strategies HESA has followed to limit the practical effects of missing responses. In conducting a survey, one of the main types of non-sampling error that can arise is that resulting from non-response. Whilst a lower level of response causes a reduction in the precision of obtained estimates, the impact of response rates on bias is ambiguous[2]. The two types of error in this category are unit non-response[3] and item non-response[4]. We cover issues related to these in the next two sections.

Unit non-response error

Unit non-response occurs where a graduate does not respond to the survey. A poor response rate will result in less precision in any estimates we generate. Its effect on bias is less certain. Bias is determined by two components[5]. These are the response rate, as well as the variation between respondent and non-respondent values. Hence, a better response rate can be associated with increased bias, if the discrepancy between those who respond to the survey and those who do not grows larger. Consequently, attempting to maximise response rates will not necessarily minimise non-response bias[6].

A number of elements of the survey design are intended to maximise response rates, and an overview is offered in the operational survey information on the HESA website[7]. These include:

- A website aimed at respondents to reinforce the legitimacy and credentials of the survey[8]
- A smartphone-optimised survey

- Allowing the survey to be completed in more than one stage, whether online, at the telephone, or using a mixture of both modes
- Bespoke email invitations and reminders that include the name of the graduate and their provider
- A dynamic engagement strategy informed by best practice and survey paradata
- Using a data collection platform that seamlessly integrates all modes together
- The adoption of a concurrent mixed-mode design (computer-assisted telephone interviewing (CATI) starts a week after the online system opens, and those who start online are not followed up until much later in the field period)
- Increasing the convenience of responding for graduates, by making appointments for telephone interviews at times that suit them
- Collecting proxy responses from half-way through the fieldwork period.

For the rest of this section we cover the specifics of our approach where non-response bias is concerned. Root cause remediation is one of the practices HESA adopts to proactively manage data quality[9]. In this case, our goal was to reduce data quality issues arising during collection. Historically, organisations that have administered surveys have relied upon methods executed after collection (i.e. weighting) to deal with the challenge of non-response. Yet, over the last decade, those working in this area have increasingly looked at whether anything can also be done during the data gathering phase. Work by the Netherlands' official statistics agency[10] points to the advantages in attempting to do this, such as improved precision due to less variable weights. In trying to reduce non-response bias, other authors highlight the potential benefit of developing propensity models and subsequently diverting more attention to those individuals with a lower likelihood of responding in the latter stages of the collection process[11]. An adaptive survey design methodology was therefore designed and implemented from cohort C of the first year of the survey, onwards, which was subject to a quarterly refinement process where opportunities for improvements to the response propensity model were identified and where possible implemented by analysts. Whilst the premise is well established and in theory, could have been effective, subsequent review of case prioritisation indicated to the survey data collection team that our approach to prioritisation was ineffective and burdensome. Further details of the findings from the last three years, and the concerns highlighted as a result, are covered in detail in the section of the Survey methodology covering data collection[12]. Regardless of the steps taken during the data collection stages, the resulting data must be assessed and if necessary, action taken to address bias. This is referred to as "weighting" the survey. The overarching objective of weighting is to enable the sample to be adjusted such that it is more representative of the population[13]. Most surveys are weighted following collection. However, the Graduate Outcomes survey has some unusual features, such as a large sample size, an adaptive survey design, and a concurrent mixed-mode data collection approach. Over the last few years HESA, along with academic partners, have undertaken various investigations into the application of weights to the survey estimates and their impact. The conclusion of every assessment has been the same – there is not evidence of bias relating to mis-match between the achieved sample and graduate population characteristics in any direction at sector level. Indeed, when analysing across a range of demographic and course variables, we found a high level of similarity between the sample

and population distributions. We trialled various weighting methods, and these did not improve the quality of our estimates. Overall, across the breadth of HESA variables analysed, we generally observe close resemblance between the sample and the population, reducing concerns over potential bias. For a summary of our research and the findings, see the Survey methodology section on data analysis[14].

Some statistics published from the Graduate Outcomes survey are at a very granular level, e.g. activity by provider, domicile, level of qualification and mode of qualification. In some cases, the sample size for such statistics may be small. In these cases, the statistics may be subject to high levels of variability and a lack of statistical precision. Confidence intervals on these statistics (ranges within which we have a high level of confidence that the equivalent whole-population parameter would fall, where a narrow range indicates greater precision and a wide range indicates less precision) are, for key tables, published alongside the data.

In addition, for some statistics, it may be necessary to introduce publication thresholds whereby statistics based on very small sample sizes and/or lower response rates are suppressed – this will be explained in any statistical releases where this decision is taken[15].

Research to date therefore indicates there is no evidence of measurable non-response bias in the data. We are fortunate to be able to link to good data on population characteristics to support these assessments. The risk of non-response bias appears to have been minimised by features such as the relatively high response rates. Despite this, it is not easy to quantify the extent to which non-response bias remains a problem. There may be variables that we are not currently measuring that are more strongly correlated with unit nonresponse. The Longitudinal Educational Outcomes data offers a suitable external source for analysis of bias, and undertaking this work forms part of our future plans. Survey paradata may also prove useful in this respect in future. Users of Graduate Outcomes microdata may wish to conduct their own analyses to ensure the Graduate Outcomes data supports their analytical objectives. However, users should be reassured that there is no evidence to suggest that measurable non-response bias is present in the Graduate Outcomes survey data.

Item non-response error

Item non-response occurs where a value for a particular variable is missing for a graduate, in a case where this observation was expected. In our survey, this typically occurs when respondents decline to answer particular questions. No single graduate is expected to answer all available survey questions. A routing structure directs respondents to particular sets of questions that are most relevant to their circumstances[16]. Furthermore, optional questions will not be presented to all respondents. So, some data will not be present, but this does not mean it is missing – it may never have been sought, as it was not relevant to be asked in that case. In HESA's publications, these issues will be made clear in the data and the notes, for example by indicating the sample used to produce a table or chart in its title, and by enumerating the unknown values. Researchers and other microdata users in particular will need to note this feature of the survey.

A derived field (ZRESPSTATUS[20]) describes the status of response to the Graduate Outcomes survey for each graduate for whom some (however minimal) results data has been received. A core set of mandatory questions[21] are required to be completed for a response to be marked as completed. This field classifies responses into categories

denoting various states of completeness. The terms ‘complete’ and ‘full response’[22] are used interchangeably to refer to those cases where all the questions requiring a response have been completed and are populated with an answer. In addition to responses classified as ‘survey completed’,[23] a status of ‘partially completed’[24] has been assigned where some of the core questions are missing but the first two questions have been answered.[25] Although partially completed responses do not contribute to the survey’s response rate targets, partially complete responses are used alongside ‘survey completed’ responses in statistical outputs. Again, data from such responses will appear in published statistics in the following ways: in tables with numbers, unknown values are shown for questions that were not answered. Wherever we display % values, we exclude unknowns from the calculations. The sample used will be clear in the title or accompanying text.

Just as unit non-response has the potential to introduce bias into overall survey results, item non-response can also introduce bias into estimates based on responses to specific questions which experience a relatively high proportion of survey drop-out. Where this non-response is non-randomly distributed for reasons such as question sensitivity and social desirability bias, it is important that patterns of non-response are well understood.[26] This would enable us to implement treatment plans to reduce non-response and therefore the risk of bias.

So far, we have observed a high completion and a very low drop out rate in Graduate Outcomes. Most people (more than 90%) who start responding to the Graduate Outcomes survey tend to complete it. This not only reduces the risk of item non-response, but it also reduces the requirement for interventions. HESA has started a program of work which is aimed at getting a better understanding of the characteristics of and reasons behind unit and item non-response, leading to the development and implementation of treatment plans where necessary and possible.

With regards to item non-response, in year two we prioritised the most sensitive questions in the survey which are prone to higher drop-out rates compared with other questions. For year three we turned our attention to questions which had undergone noticeable change either in the form of question wording, routing or their presentation. As committed to in the report last year, we have also created a comprehensive report on item non-response for the questionnaire. Additionally, we have introduced flags into the survey that will allow us to track item non-response more accurately and are working on improving these flags to ensure that they are reliable for all of the data items. This has aided us in continuing to track item non-response in the fourth year of the survey and has allowed us to put action plans in place to improve response levels to specific questions if needed.

The following table contains response rates for some of the questions assessed using the 2020/21 survey data. Further detail can be found later in later sections of the Survey Quality Report

Table 4: Response rates for revised questions, year three

Question/topic	Response rate	Base description
Job title (employment)	96.8%	Graduates in or due to start employment who answered employment intensity
Employment basis	98.2%	Graduates in or due to start employment who answered job duties
Salary	85.6%	Graduates in employment or self-employment who answered currency as UK £

As indicated by the response rates in the table above, item non-response levels in the survey are generally low, even for the most sensitive questions such as salary and job title. Item non-response to salary appears to be the highest in the table, which is not surprising when considering that it is an optional survey question, and that income is often found to be a particularly sensitive survey topic. Indeed, the levels of item non-response to salary in Graduate Outcomes are lower than the levels often seen in surveys, however, we are always aiming to improve response levels and indeed have seen an improvement from the rate reported last year of 2.8 percentage points. Further detail on this question is laid out in the section on reliability of sensitive data. Item non-response continues to be monitored to aid in determining the impact of existing changes and to identify further interventions that may aid in improving response levels.

[1] See footnote 1 on The sample section.

[2] As Koch and Blohm (2016) note.

[3] This is where we are missing all observations for a case – this would mainly happen in situations where we are unable to elicit any response from a graduate.

[4] This is where we are missing some observations for a case – a common situation might be a graduate who answers the survey, but does not wish to answer some questions in the survey. We explain more about how we handle this sort of issue, in the following section.

[5] As Groves (2004) illustrates.

[6] Keeter et al (2000) and Curtin et al (2000) are examples of previous studies that have demonstrated the phenomenon of achieving both higher response rates and bias.

[7] See https://www.hesa.ac.uk/definitions/operational-survey-information#contact-centre-methodology

[8] See https://www.graduateoutcomes.ac.uk/

[9] Addressing quality issues closest to their source is generally the most efficient approach, and follows established data quality management principles (Data Management Association, 2017, p. 453).

[10] (Schouten & Shlomo, 2017)

[11] See Rosen et al. (2014) for details. The use of this approach has also been applied in a similar fashion by Peytchev et al (2010) and Wagner (2013).

[12] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/data-collection (particularly the section on case prioritisation).

[13] The creation of weights can comprise of several components. First, the base weight refers to the probability that an individual is selected into the sample given the design of the survey. In Graduate Outcomes, we aim to send the survey to everyone in the sampling frame. We have not quantified how many people actually receive the survey. Second, a (unit) non-response weight may be generated, which seeks to account for the fact that participation may vary among different groups. In instances where information is available on the entire population, a final step would be to ensure that the weights can allow the sample data to match known population totals for a chosen set of categories.

[14] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/data-analysis

[15] Where suppression is applied, this will be done in line with the prevailing HESA statistical confidentiality policy (see https://www.hesa.ac.uk/about/regulation/official-statistics/confidentiality) and the associated rounding and suppression approach: https://www.hesa.ac.uk/about/regulation/data-protection/rounding-and-suppression-anonymise-statistics (summarised in the Confidentiality and disclosure control section of this report).

[16] A flow diagram showing the survey response record fields produced given each survey routing, is available in the coding manual: https://www.hesa.ac.uk/collection/c19072/download/GO_SurveyRouting_19072.pdf

[20] See the derived field specification at: https://www.hesa.ac.uk/collection/c19072/derived/zrespstatus

[21] Details of mandatory questions can be found as a PDF download from: https://www.hesa.ac.uk/innovation/outcomes/survey

[22] See https://www.hesa.ac.uk/definitions/glossary#F

[23] ZRESPSTATUS=04

[24] ZRESPSTATUS=03

[25] The observations gathered from the first two survey questions permit the derived field XACTIVITY to be produced – see https://www.hesa.ac.uk/collection/c19072/derived/xactivity . Since ‘activity’ is the Graduate Outcomes survey’s central concept, these responses are often partly usable.

[26] (De Leeuw, Hox and Huisman, 2003)

Proxy responses

A proxy response is a response made on behalf of the sampled graduate by someone other than the graduate. It is an indicator of accuracy as information given by a proxy may be less accurate than information given by the desired respondent. However, if the respondent is unavailable, someone in their household or family (who is therefore likely to know them well) may be able to offer some useful information about their activity. Since our users value high levels of completeness, we viewed the risks to accuracy and reliability as acceptable, if we could seek to minimise them.

Our survey therefore uses the following strategy to minimise proxy responses. During the first half of the field period for each cohort (approximately six or seven weeks) proxy responses are not sought by telephone interviewers. During the second half of the field period, interviewers are advised to collect responses from third parties, where possible, and where a suitable proxy respondent (defined as a partner, relative, carer or close friend) is available. Only the mandatory questions are asked of proxies, and subjective questions are excluded. We do not collect proxy responses from the graduates of English Further Education Colleges as a matter of policy.[1] We also make sure that responses collected from third parties do not exceed 10% of a provider's target population, limiting the impact on data quality.

In the fourth year of surveying, we received a total of 1,290 proxy responses. Proxy responses for by cohort for the second, third and fourth years of the survey are displayed in Table 5 (below):

Table 5: Numbers of proxy responses gathered during years two and three of survey fieldwork

Cohort	Number of proxy responses, year two	Number of proxy responses, year three	Number of proxy responses, year four
A	285	80	115
B	30	20	25
C	25	20	15
D	850	1335	1135

Given how few proxy responses we have obtained, and the controls in place to manage these, as well as a lack of feedback from users, we have not provided information on proxy responses in the published outputs. To further support users' understanding of the likely accuracy or reliability of this data, we would ideally like to provide this information to all users in the microdata. Since we possess the survey paradata required, adding this variable to the derived fields remains a potential target for future improvement. However, feedback from users has not indicated this to be a high priority.

[1] Information on who can answer the survey is available under the privacy notice https://www.graduateoutcomes.ac.uk/privacy-info

Measurement error

Measurement error occurs from failing to collect the true data values from respondents. Potential sources of measurement error in Graduate Outcomes are: the survey instrument(s); the telephone interviewers, and the respondents themselves. This section of the report covers these aspects, in turn. The mode of data collection is also a source of measurement error, and we cover this in more detail in the next section.

Respondent error

The survey takes the following measures to minimise respondent error. We cognitively tested the survey questions prior to launch, and adapted our questionnaire design in the light of the research findings. Information on cognitive testing is available in a technical report[1] and an outcomes report.[2] The implementation of the survey questions in the survey instrument was undertaken with expert input and testing from HESA and our suppliers, in order to pro-actively identify and overcome potential respondent error issues.

The survey instrument is available in both English and Welsh languages. This allows respondents graduating from providers in Wales to use whichever language they prefer. This should reduce respondent error due to language issues.

The instrument is deployed online, and over the telephone, which offers respondents some choice over how to engage. Details about the implementation of the instrument can be found in the Survey methodology sections dealing with the online[3] and telephone[4] based aspects of our approach, and these materials also contain further information about how we seek to minimise respondent error. Online, we use a series of prompts to encourage the respondent to check the accuracy of their responses. Over the telephone, our interviewers' script similarly prompts operatives to elicit accurate responses through checking understanding back with the respondent. (We will from now on refer to the computer-assisted telephone interviewing by its widely-accepted acronym – CATI.)

Some examples of respondent error we believe may occur are:

- Information retrieval may be difficult for those respondents reporting several jobs. They may not remember precisely, or may not have access to, information about, for example, their previous earnings for a job they left months beforehand.
- Brevity or lack of response to free text questions could lead to differences in SOC codes for graduates in similar jobs. This equally applies to other coded free-text data. However, the SOC coding process would be more sensitive to this sort of issue, than, for example, free text country data, as the input data is more extensive, and there is some degree of semantic overlap between the output codes.
- Cases where respondents select unemployed and paid work simultaneously. (During the first year of the survey of the respondents in paid work for an employer, 950 had also indicated they are unemployed. Of these, 270 had said that being unemployed was their most important activity). In the second year of the survey, of the respondents in paid work for an employer, 1,085 had also indicated that they are unemployed. Of these, 330 had said that being unemployed was their most important activity. Comparatively, in year three of the survey 1050 paid work respondents indicated that they were also unemployed, of which 255 indicated being unemployed was their main activity and in the fourth year, 750 graduates selected both paid work for an employer and unemployed, with 200 of these

indicating unemployment was the most important activity.[5]

- Acquiescence bias (sometimes called agreement bias, 'straight-lining', or alternatively referred to as 'yea-saying/nay-saying') is where there is a tendency on the part of respondents to indicate positive (or negative) responses in a routine fashion, perhaps not reflecting their 'true' feelings. HESA is continuously reviewing the impact of survey design on response distribution where there is a potential for such bias and is reported under subsequent sections on Data Quality.
- Social desirability bias occurs where respondents tend to give socially desirable responses instead of choosing responses that are reflective of their 'true' situation. Examples where this could occur might include reporting a higher salary, or a greater sense of subjective wellbeing (SWB). Other studies have indicated that this kind of bias may vary by mode of response.

For details of our investigations into these forms of respondent error, readers are directed to the Reliability of sensitive data section, where we discuss our analysis of the data. While further work is required to investigate the extent of these forms of bias on the survey, we are able to show the current extent of our understanding of their effect.

In the dissemination section of the Graduate Outcomes Survey methodology, details are given about how HESA interprets and publishes responses.[6] In the section of the Survey methodology covering key data concepts and standards, explanations are given around the analysis that has been carried out on a number of key data items. In the section on salary, there is specific information about the approach HESA has taken to handling any potential respondent error. This includes an update to the approach we have taken in trimming the salaries to exclude outliers, and future corrective actions, including improvements to the instrument to reduce the risk of misunderstanding that leads to respondent error.

One limitation on the respondent's ability to correct their own errors is the unavailability of a 'back' button in the online survey. Respondents are therefore unable to go back and change their answers to previous questions. This is done largely for data protection reasons (this is covered at greater length in the section of the Survey methodology on the online survey design);[7] it also reduces the risk of 'orphaned' data occurring, where a respondent enters data that is not required when they subsequently return to an earlier point in the survey to make an alternative choice, which consequently alters their survey routing.

We are aware that more evidence needs to be gathered on whether respondent error represents a significant issue in the survey. For instance, for those who stated in the survey that they were undertaking further study in the UK HE sector, there is the potential to link their response to the HESA student record. This would offer the opportunity to evaluate the extent of measurement error in this part of the survey. Further investigations have been undertaken into this issue, and an interim digest of these is covered in the Graduate Outcomes and the HESA Student record section.

Survey instrument error

Significant effort is invested in reducing opportunities for instrument error, and the first element of this is the choices of platforms, partners, and personnel involved. HESA manages the survey and appoints the suppliers.[8] HESA's procurement and supplier management approaches seek to ensure that suppliers deliver on process quality

requirements imposed by HESA. Forsta (formerly Confirmit) remains HESA's feedback management solution supplier. Forsta's technology is widely used to conduct surveys by leading sector bodies, including the Office for National Statistics, and also in market research contexts. It includes a smartphone compatible online system. HESA's current contact centre provider is IFF research. IFF has worked with many individual providers, previously, in their delivery of Graduate Outcomes predecessor DLHE. IFF was also the survey contractor for all six iterations of the Longitudinal DLHE survey.

The survey instrument is ultimately HESA's responsibility, and HESA is an official statistics producer with a track record in delivering the DLHE and LDLHE (Longitudinal Destinations of Leavers from Higher Education) surveys for over twenty years as well as a successful launch of the Graduate Outcomes survey with 'a range of positive features that demonstrate the trustworthiness, quality and value of the statistics'.[9] HESA's staff are skilled across the range of statistical business processes, including developing the methodologies, procuring survey and coding services, developing and commissioning software systems, data processing and enrichment, quality assurance, conducting and commissioning research, analysis, dissemination, and undertaking reviews. Users can therefore trust that the survey is being delivered by an organisation with experience and skill in appropriate professional domains.

The instrument was tested thoroughly by staff from HESA, IFF, and Forsta prior to deployment. However, the complexity of the survey routing meant that some less likely routing combinations were only tested to a limited extent. All problems discovered during testing were fixed prior to launch. We also note that Forsta nominated HESA the judges' choice in their 'Achievement in Insight and Research' awards in September 2019 in recognition of the high standards, creativity and innovation with which their platform is being used.

HESA demonstrates an evidence-based approach to operational data quality management, backed up by a clear governance approach. A log is kept of all instances of potential instrument error and a process is operated to investigate and assess each issue for the level of its impact. This approach is substantiated by regular progress updates, which explain these same issues to stakeholders.[10]

We summarise the main sources of potential instrument error relating to year two of the survey in the following subsections.

Survey alterations to increase retention and improve data quality

The following changes to the survey were introduced in year three to improve respondent retention (i.e. reduce item and unit non-response) and data quality:

- Introduction of information buttons for hover texts to provide reassurances on sensitive questions in the survey (e.g. employer's name and salary)
- Optimisation of the presentation of Graduate Voice questions
- Simplified wording of the town/city questions to improve comprehension and provision of useable information
- Contextual information added to one of the categories under 'Type of Qualification' to aid understanding
- Additional validation around postcode to encourage respondents to provide partial information instead of a 'don't know' response

Further changes to the survey were made in year four, and included:

- Further refinement of the hover text on employer's name
- The addition of a drop-down list for the town/city question
- Additional information provided for the salary question on the desktop mode for respondents who start to leave to survey. Text will let respondents know that the question is optional, in order to encourage them to continue
- Removal of questions that were deemed to be no longer required for data capture (reduce graduate burden and survey fatigue)

Email and SMS delivery

Where providers have supplied email addresses for graduates on their domain e.g. joe.bloggs@[provider].ac.uk, they are advised to be mindful of the expiry period for these addresses. Some providers allow graduates to keep these addresses for life, others expire them after a fixed period (e.g. six month post-course completion). These email addresses should only be returned as valid graduate contact details for Graduate Outcomes when they are still live accounts on providers' systems. Where providers are satisfied that the provider domain email address will be live at the point of HESA contact, we have suggested that providers allow the relevant email sender address which will be [providername]@graduateoutcomes.ac.uk. This will help ensure these emails are delivered successfully. It is important that provider domain email addresses are still live as this has an impact on HESA's IP address reputation. Should provider domain email addresses be shut down at the start of the survey period, this may lead to our emails bouncing and our IP address being deny-listed. This would put a halt to HESA's email capability thus restricting our surveying to phone or SMS only. Providers are therefore further incentivised to pay attention to this quality factor.

In a summary of our research[11] on the effectiveness of various contact details it was concluded that in order to maximise our chances of contacting graduates we need the following:

- As far as possible a mobile number for every graduate.
- At least one mobile number and email address should be supplied for UK graduates. These should help obtain good online and telephone response rates.
- An ac.uk email address is generally not important and is less likely to perform well. A personal email address for every graduate and as far as possible one must ensure it is the current address for the individual.

- Contact details should be continuously updated during the survey field period to give us the best chance to contact your graduates.

Email delivery rates continue to be extremely high in every round of invitations, above 95%. SMS delivery rates are also high and regularly exceed 80%. Completion via SMS link was responsible for 31% of all the online survey responses received during cohort D.

At the beginning of each cohort HESA conducts a quality assessment on the completeness of the contact details record and identifies providers with the worst set of contact details. These providers are notified via targeted contact and asked to rectify the issues identified. This exercise has mixed outcomes. Some providers are able to provide more and improved contact details while others are unable to do so or do not engage with the process. HESA has undertaken further work during year four to streamline this process and has made the outcomes more visible to statutory organisations. Research has indicated that there is a correlation between low response rates and providers with a low coverage of emails and mobile numbers. Further work is ongoing and includes the implementation of additional quality rules and a continuation of work with providers and statutory organisations.

Call handling

There are numerous indicators suggesting that the telephone interviewing component of Graduate Outcomes and call handling approach described in the previous edition of this report, is now firmly established and delivering successful outcomes for the project. Some of the main highlights of this year's operations were:

- Stable response rates (60% responses are collected over the telephone)
- The continued strength of the collaborative and joined-up partnership between HESA and IFF, which ensured they were able to build on successes in previous years whilst also navigating new challenges.
- Improved sample management, owing to the detailed analysis conducted as part of the Year two review.
- Continued focus on high quality data collection and quality control processes.

Interviewer error

Interviewer error is the effect of a human interviewer on the data gathering process. Graduate Outcomes uses many interviewers concurrently. CATI interviewers undergo training developed especially for the Graduate Outcomes survey, and which focuses on the contextual knowledge interviewers need to perform their roles effectively. They are recruited and trained by IFF according to closely-monitored quality criteria. Quality assurance by monitoring calls is also a part of the standard practice. All interviews are recorded digitally to keep an accurate record of interviews. A minimum of 5% of each interviewers' calls are reviewed in full by a team leader. Quality control reviews are all documented using a series of scores. Should an interviewer have below acceptable scores, this will be discussed with them along with the issue raised, an action plan agreed

and signed, and their work further quality controlled. Information about this is covered in the data collection section of the Survey methodology.[12] Further details are given in the operational survey information section on the contact centre.[13]

CATI operatives utilise an adapted version of the same instrument as online respondents. This allows a further level of data quality checks to be performed, as CATI operatives get similar feedback from the online instrument to online respondents, in addition to having their own quality processes built into the script. This also prevents any 'clash' or data problems occurring due to respondent mode switches. One difference is that a 'back button' is available to CATI operatives, which allows adjustments to be made, if a respondent wishes to change an earlier answer in the light of a later question. This kind of anecdotal feedback could help identify potential sources of respondent error, and HESA and IFF evaluate feedback from CATI operatives regularly, to determine if instrument improvements could offer marginal enhancements to data collection. While human error is always a potential factor, this is likely to be a matter of random variance in keying errors. There is no evidence to suggest that interviewer error has had any significant impact on the conduct of the survey. Rather, CATI operatives are a useful source of quality improvement suggestions, and regular fortnightly meetings occur where performance and survey issues are discussed, and recommendations logged for further assessment and action.

[1] See https://www.hesa.ac.uk/files/Cognitive%20Testing%20Technical%20report.pdf

[2] See https://www.hesa.ac.uk/files/Cognitive%20Testing%20Outcomes%20report.pdf

[3] For online aspects, see: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/online-survey-design

[4] For telephone and contact centre aspects of the instrument, see https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/telephone-survey-design

[5] For details of how HESA reflects this contradictory information in published outputs, see the XACTIVITY specification at: https://www.hesa.ac.uk/collection/c19072/derived/xactivity

[6] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/dissemination

[7] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/online-survey-design

[8] See our press release: https://www.hesa.ac.uk/news/14-11-2018/complete-graduate-outcomes-line-up

[9] See OSR's letter to HESA of 2021-03-18: https://osr.statisticsauthority.gov.uk/correspondence/mark-pont-to-jonathan-waller-higher-education-graduate-outcomes-data/

[10] Readers wishing to understand these issues in detail, and in chronological order, are recommended to read the reviews, which are published at: https://www.hesa.ac.uk/innovation/outcomes/about/progress

[11] See https://www.hesa.ac.uk/blog/05-05-2021/improving-graduate-outcomes-response-rates-why-quality-contact-details-matter

[12] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/data-collection

[13] See https://www.hesa.ac.uk/definitions/operational-survey-information#contact-centre-methodology

Paradata

Overview

Paradata argely comprises system-generated logging data which is, in its own way, as rich as the survey data itself, and offers us insights into the behavioural characteristics of respondents. It requires some complex scripting to access, and, as we learn more about the capabilities of this system, we are extending the catalogue of paradata we wish to extract from the system and utilise. When combined with our data on the population characteristics, it also yields potential insights into non-respondents.

Our current paradata dictionary includes variables for the start mode, partial completion mode, completion mode, various status markers, last question viewed, number of calls made, and a range of variables relating to the sending of emails and SMS messages. We have recently added new variables enabling us to record non-response by question, duration by section and the route a respondent travels through the survey.
Over the last few years we have been using some of this paradata to inform our data collection processes such as identifying the most suitable time for sending emails and SMSs based on completion times, changing subject lines to encourage higher email open and click rates, monitoring interviewer performance using average number of calls, to name a few.

Now that we have a better understanding of what variables we require and utilise, we have obtained a regular import of these variables (from Forsta (formerly Confirmit), the survey data collection platform) in a format that enables us to link this data to other data such as population characteristics, survey completion status and results data. It is therefore vital that a review of every paradata variable is carried out. Checks are carried out at the end of each Cohort to ensure that the paradata is accurate and present for all variables that should contain data.

Paradata available to use in Graduate Outcomes

Background

The Paradata we refer to is the data collected during the administration of the Graduate Outcomes survey. We capture data relating to numerous variables, only some of which we have so far explored in detail. The data we have utilised and how it is used is outlined in more detail in Table 6.

Paradata is collected for all graduates interacting with the survey (accessing the survey link online) and for those receiving calls, so is present for respondents and some non-respondents. Certain items of paradata are monitored with regularity whilst others are yet to be used. For example, paradata relating to completion dates enables us to monitor the operational running of the survey on a daily basis. This helps us to report on how our response rate is progressing versus the same time period during the previous year. In addition, variables relating to survey modes are used to make informed decisions such as identifying the effectiveness of our engagement strategy and highlighting areas for improvement.
Given the widespread collection of paradata in Graduate Outcomes and other surveys, there are many research areas that could emerge from analysis of the data that could

inform both the collection of paradata and how it is used. For instance, in collaboration with our contact centre we also use data about survey interviewers or interviewer observations to monitor progress; identify and address data collection issues. This is not in scope of this report as the focus is largely on the standard data items which relate to all respondents.

How we use the Paradata

In Year 4 we extended the number of paradata variables we have access to and report on. This has helped our operational running of the survey, improved our understanding of how graduates interact with the survey and informed us on how best to contact graduates via our engagement strategy.

The table below summarises how we currently use the paradata information we import daily from the survey data collection platform.

Table 6: How we use the paradata fields and some of the key findings

Paradata	How it is used	Key findings
When and which survey links are accessed	Identifying which survey links are accessed enables us to judge the effectiveness of our online communications	Approximately 70% of online surveys were accessed via email links and 30% via SMS links
Start mode, first question completion mode, partial completion mode, completion mode	Enables us to view how graduates interact with our concurrent mixed mode survey	Around 60% of our surveys are completed via CATI and 40% online
Status markers including whether the graduate has answered part, the minimum requirements or all of the survey	To identify graduates completing only part of the survey.	Survey completion rates are high for those answering the first question (<10% of graduates that start the survey do not reach completion status)
Date and time information	Enables us to track most popular completion times of day/week	Weekdays (particularly midweek) and early evenings are the most popular completion times

Paradata	How it is used	Key findings
Duration	Useful to enable us to keep the survey as short but as comprehensive as possible. Enables us to see how duration differs by mode and identify ways of making efficiency savings.	The survey is significantly quicker online than over the phone with an average duration of <10 minutes
Browser and Device	To ensure our survey is user friendly to what our target audience are using.	Chrome is the most frequently recorded browser used to take the survey
Number and type of contact details we are supplied with	We identify and contact Providers falling below certain thresholds that are likely to impact response rates in the forthcoming cohort	Missing details are rare, approximately 95% of graduates have a phone number supplied and 98% have an email address
Number of good and unobtainable phone numbers called during the cohort	We complete a CATI review post cohort, to analyse how effective the phone contact details were that we were supplied with	Only a small proportion of graduates do not have a valid phone number
Status of calls, for example appointments/answer phones	To track how effective the contact centre was at obtaining useful call outcomes	The presence of a valid phone number does not guarantee response as several calls go unanswered
Number of proxy surveys/web transfers	To judge how effective proxy surveys and web transfers are in boosting responses.	Proxy surveys account for <1% of the completed CATI surveys and successful web transfers only account for

Paradata	How it is used	Key findings
		<1% of the completed online surveys
Number of surveys offered and answered in Welsh	We offer the survey in Welsh and tracking the volume completed is used for invoicing	Only a tiny minority of surveys were completed in Welsh. Even where Welsh was selected as the preferred language by a respondent, several responses are provided in English.
Opt-out rates and reasons for opting out (online)	Helps us understand why graduates do not want to complete the survey and enables us to identify peak times of opting out	Of the options provided the most frequently observed reason for opting out was "I'm not interested in completing the survey"
Seen/Answered flags	These variables enable us to see which questions were seen, and subsequently answered by graduates as they progressed through the survey. From this data we can calculate the Response rate for each question.	For the majority of questions we obtain a RR >95%. It is important to identify those questions with a low rate as this can indicate which questions graduates are reluctant to answer or which arethe reason for survey drop-out.
Section Flow	This variable shows us the order in which the sections of the survey were asked. The ordering is determined by both the activities selected in the first question and which activity was selected as most important.	We have seen that there are differences by mode, with a higher proportion of CATI graduates undertaking section C before section B.

Data quality review

Summary of the data quality checks

Most of the variables appear to be accurate in terms of the coverage (data is present and correct for all graduates that should have paradata present). In some instances, the accuracy of a variable can be judged by comparing it with another similar variable, and where contradictions occur this can indicate an error in one or both fields. Similarly, errors

can be found where data is present in one field but missing in another.

Missing data

A small number of errors were found by comparing data from similar fields. For example, where start mode was missing, but the paradata suggested the first question was answered because partial completion mode was present. As start mode is populated when the graduate first interacts with the survey and it should always be present for those answering the first question.

In addition, scripting changes were identified to change the point at which we collect the hour and day the survey was completed. The two variables hour of completion/day of completion were missing data for those not reaching the end of the survey. This was because the data was collected at the point the survey closed, rather than the point when the graduate had answered thefirst question. The specification for data capture has been revised subsequently.

Dialer issues

There were instances where technical errors with the telephone dialer meant that the call count field needed to be reset for some graduates. This variable had been manually reset back to 0 during the cohort by the survey programmer, so that we could resume calling of the affected records. This meant the number of calls made during the cohort was under recorded in some instances.

Errors due to outliers

The survey duration is recorded in seconds and needs to be calculated only after removing outliers. This is because the data will include instances where a graduate leaves and resumes the survey at a latter point, inflating the survey duration. There are also instances of the survey length being recorded as a shorter time period than would have been possible to complete the survey. For the purpose of analysis, it has been decided that we would remove data relating to anything taking longer than 1 hour (3,600 seconds) or under 1 minute (60 seconds). The average survey durations we calculate by mode closely match our expectations and for CATI closely match the survey durations the call centre have observed.

Survey routing complications

We have spotted some data quality concerns with the Seen/Answered flags, potentially caused by graduates seeing questions they no longer had a requirement to answer. This can occur when going back to a previous section as a result of needing to change their route through the survey. Surveys scripts have been changed to better record the final route the graduates took. This should prevent inconsistencies in the data and quality assessments of the flags will continue.

Future work

We have gradually increased the number of paradata variables we have access to and can analyse the data for. These can deliver important insight into how our survey is operating, as well as how graduates interact with it. Some of the variables we have access to are recent additions, and therefore the focus is now on understanding this new data and how best we can utilise the knowledge to make survey improvements. Below is a list of paradata items we are looking to improve the accuracy for and/or analyse in further detail.

- An accurate call count variable for all graduates is vital in understanding our call management system.. However due to the practical requirement to reset records in response to technical issues, this data item suffers from a degree of under-recording. We are looking at obtaining a more accurate call count variable.
- Survey duration split by section. These variables record the duration in seconds a respondent spent on each section. This enables us to not only use a combined total of the sections to calculate the overall duration, but to see which sections of the Survey are taking the longest and are most burdensome. We can also calculate the average time taken to answer a question in each section because we know which questions they answered.
- Seen/Answered flags. By looking at those who have not completed the survey, we can identify questions that cause survey drop-out. We have spotted some data quality concerns with these flags which also need to be fixed before we can fully utilise this variable.
- Section flow. This variable shows us the order in which the sections of the survey were asked to a graduate. The ordering is determined by both the activities selected in the first question and which activity was selected as most important. We have seen that there are differences by mode, the reasons for which need to be investigated further. We also need to understand why graduates on CATI are selecting more activities than those online.

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Mode effects

A mode effect is a systematic difference that is attributable to the mode of data collection. Analysing the effect of mode on item responses (and aspects of response propensity) is part of our current programme of work.

Mixed-mode surveys are increasingly common. A typical research survey operated in a mixed-mode fashion might survey a sample electronically, and then follow-up with a telephone survey later on, either to provide a more qualitative set of insights into a sub-sample, or to address non-response issues during the initial survey period. There are many possible such designs. The design of the Graduate Outcomes survey was a collaborative exercise that took into account knowledge developed by HESA and the HE sector during the operation of DLHE and LDLHE (Longitudinal Destinations of Leavers from Higher Education), its predecessor surveys. One important factor we took into account was the widely-held perception that telephone surveying from an early stage, combined with online surveying, was likely to be necessary in order to meet user needs for both high response rates and efficiencies generated through an online mode. We therefore sought to retain the best aspects of the previous practices, and these are reflected in making a concurrent mixed-mode design our adopted approach.[1]

Our approach is described in detail in the section of the Survey methodology covering data collection,[2] and in the associated operational survey information.[3] It is underpinned by a single technology solution (Forsta, formerly Confirmit) that links online (mobile and desktop) and telephone-based modes together seamlessly. Survey responses can be saved and picked-up later, in either mode. In practice, this means that respondents may begin the survey in one mode, and end it in another, or even, potentially, change mode several times during the period of time within which they are engaging with the survey. The system logs all events, and these system logs form the basis of HESA's paradata, including modal information.

One of the key considerations in our quality analysis work is the mode of data collection, which must work to maximise the response rate of the survey whilst also allowing high quality data to be collected. The use of multiple modes can increase representativeness but can also lead to measurement error.[4] For instance, telephone interviews are important in increasing response rates, and therefore reducing non-response, but can also increase measurement error,[5] whereas the use of online self-administered surveys can help to reduce respondent burden and increase the likelihood of a graduate disclosing information that may be viewed as sensitive.[6] Self-administration of a survey also makes it easier for a participant to fully process and understand a question, which can make it a more accessible option and improve the quality of answers. However, it can also be more susceptible to behaviours such as satisficing [7].Other factors may also influence responses, for example research suggests that underreporting of sensitive issues is likely to be lower both when it becomes more socially acceptable and when there is less stigma associated with a topic[8].

Our work considering the potential influence of the mode of completion this year has concentrated in the first instance on responses provided to the activity section and the paid/ voluntary work for an employer section of the survey, as the first part of an ongoing quality review of the survey. We therefore present some of this analysis in the following sections, initially with a focus on the more sensitive questions and subsequently, some of the other questions from the activity and employment sections of the survey. However, in summary, differences are visible in some data items depending on the completion mode

utilised by the graduate and the type of question being answered. Job title and duties had higher levels of item non-response in the online mode, whereas salary had higher item non-response in the CATI completion mode. This is more likely to be the case with questions that may be perceived as sensitive, depending on the mode being utilised. Indeed, questions which are less sensitive such as the multiple jobs questions or the employment basis question tend to have much more similar levels of item non-response across modes. We have furthered the analysis of completion mode, but as with previous years, data quality could benefit from the continuation of analysis considering primacy and recency effects and the influence of the mode of completion.[9] Equally, mode analysis could benefit from the inclusion of characteristic data, to check whether effects are influenced by the characteristics of the graduates completing on a certain mode. This will be particularly relevant due to the methodological changes that were made to the way different modes of data collection are used in the survey. These steps will form part of the continual monitoring and improvement of the survey data.

[1] For completeness, we must explain that a separate, paper-based approach is used in a minority of cases where respondents are known not to have access to a telephone or computer. This mode asks the mandatory questions required for a complete response. Only 25 postal responses were received during the first year of surveying. Because these responses are so few, we do not discuss the paper-based mode very much in this report.

[2] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/data-collection

[3] See https://www.hesa.ac.uk/definitions/operational-survey-information

[4] (Kocar and Biddle, 2020)

[5] (Chang and Krosnick, 2010)

[6] (Brown et al., 2008)

[7] (AAPOR, 2010)

[8] (McNeeley, 2012)

[9] (Chang and Krosnick, 2010; Kocar and Biddle, 2020)

Reliability of sensitive data

Introduction and context

Within the Graduate Outcomes survey there are some questions that could be perceived by a respondent as sensitive in nature, and this kind of question in particular can be at risk of reduced data quality in responses as a result, for example through increased item non-response or the misreporting of answers. Many factors can influence the responses provided to potentially sensitive questions including the mode of completion, question wording, presence of third parties whilst completing a survey and assurances about privacy, confidentiality, or use of the data (Tourangeau and Yan, 2007; Ong and Weiss, 2000). For mode of completion, self-administration modes are generally found to increase respondents reporting potentially undesirable behaviours (Tourangeau and Smith, 1996; DeLeeuw, 2018). Confidentiality and privacy assurances have also been found to improve responses to sensitive questions. However, in some cases, these assurances can have the opposite effect, potentially as they bring data usage or privacy concerns to the forefront of a respondent's mind who previously may not have considered it (Acquisti, Brandimarte and Lowenstein, 2015).

There are some questions in the Graduate Outcomes survey that could be viewed as more sensitive by respondents. Income is one such question, and the following section will provide some insight into research that has taken place around this question this year. In previous editions of this report, we have also completed investigations into other areas, such as the subjective wellbeing data (2nd edition of the Graduate Outcomes Survey Quality Report) and employer name and job title (3rd edition of the Graduate Outcomes Survey Quality Report).

Methods and results

The salary and currency questions

Income is commonly considered to be a sensitive topic for a survey question, and it often has higher levels of item non-response associated with it due to the intrusive nature of the question and concerns of disclosure (Tourangeau and Yan, 2007). Since Year 3 of the survey, salary has only been asked of respondents who selected that they are paid in a currency of 'United Kingdom, Pounds, £'. This aided in reducing survey burden and reduced the collection of unnecessary data, but also meant that the order of the questions was switched. In previous years different strategies were used to attempt to increase question coverage, as having an optional currency question after salary was resulting in the collection of unusable data. It was therefore made compulsory to answer currency when salary was populated during the second year of the survey, which heightened the risk of survey drop-out, but ensured currency was provided. The new question order removes the need for a compulsory response in this block, and it was hoped this would reduce drop-out rates and ensure that respondents who provided a salary always have the corresponding currency information available.
As well as these changes, additional hover text was also added for a few questions, including salary, for cohort D of Year 3, in order to reassure graduates about the use of their data. Assessments last year indicated that the change in order and the addition of hover text had increased the response levels to either of the questions. However, it was difficult to determine the actual impact of these changes last year, and item non-response

varies depending on the assessments made. Further detail on past assessments and changes made to the salary question can be found in previous versions of the Survey Quality Report. It was determined that there would be value in investigating item non-response again this year once further data had been collected and the years were more comparable (Table 7). Further to this, in Year 4 itself, further attempts have been made to improve response to the question, with a new system of calculation for typical salary ranges for full-time graduates and the removal of warning limits for part-time work to reduce the number of validation warnings and ensure they are as relevant as possible. Additionally, in order to improve response rates on the Computer Assisted Telephone Interviewing (CATI) mode following the findings in the 3rd edition of the quality report, an action plan to improve response rates was developed and subsequently implemented from cohort C. Equally, a pop-up was added for desktop completion from cohort D which informs graduates who are exiting the survey that the question is optional, in order to try and reduce overall drop-out from the survey as a whole.

Table 7: Item response rates for salary, split by completion mode, and including a base description of restrictions

	Telephone (CATI)		Desktop		Mobile		Base Description
	Y3	Y4	Y3	Y4	Y3	Y4	
Annual Pay	78.7%	82.7%	89.6%	87.7%	90.3%	90.9%	Graduates who were in paid work for an employer or in self-employment/freelancing and have indicated that they receive their salary in UK £ in the previous question.
Currency	98.7%	98.7%	98.8%	98.4%	98.0%	97.5%	Graduates who were in paid work for an employer or in self-employment/freelancing, who answered the last mandatory question in the section they were routed down before being shown currency (routing may vary based on activity selections)

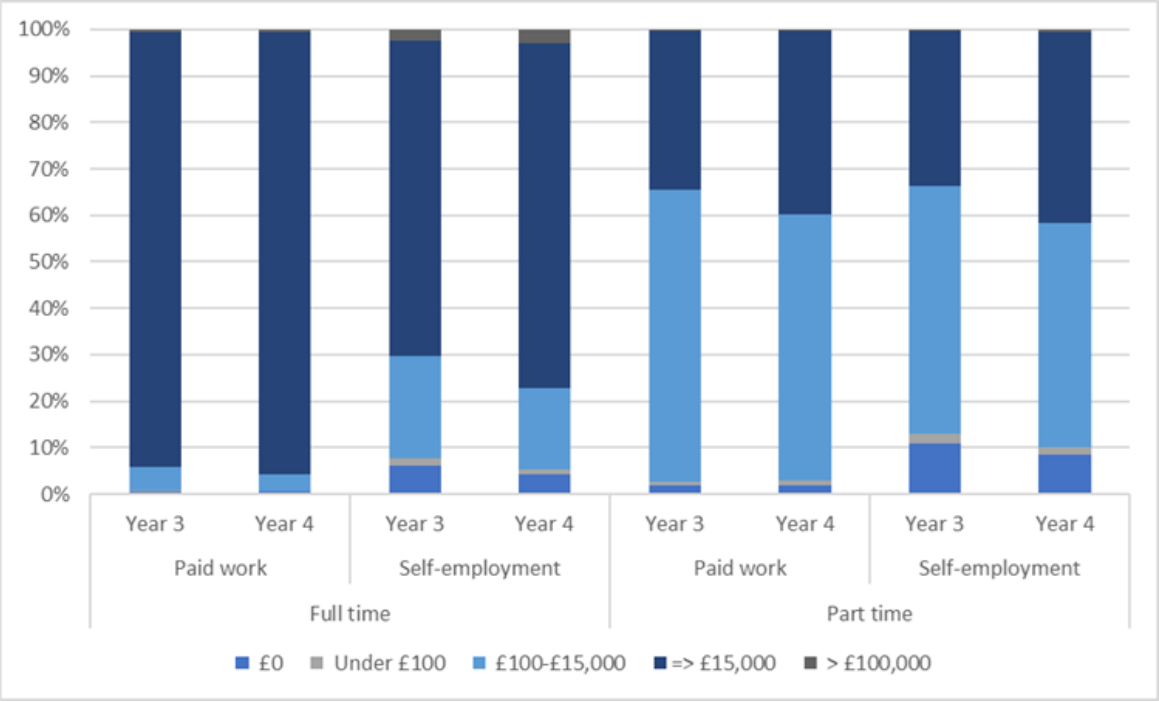
Response to salary has increased from Year 3 to Year 4 overall, and indeed, rates have also risen for both if the most common forms of completion in the chart (CATI and the mobile element of online). This may indicate that the various steps that were put in place, such as the hover text being introduced towards the end of Year 3 and the action plan for the CATI element, have indeed had a positive impact on the response to the question. Whilst item non-response on CATI has lowered, it does unsurprisingly see lower levels of response to salary than the online modes. This is as expected, as self-administration modes are known to increase the likelihood of a graduate disclosing sensitive information (Brown et al., 2008), and we do see that more respondents provide this information on the online completion modes in Graduate Outcomes. Whilst response levels for the desktop element of online completion appear to have dropped slightly, this contributes lower levels

of response to the question. The pop-up was introduced to try and combat these lower levels, which could be due to numerous factors. Further tracking and research will be required over the next year to determine whether the pop-up is having a beneficial effect or should be removed, and predominantly assessments of subsequent questions will aid in determining whether it is helping to reduce overall drop-out from the survey. Generally, questions about income often see much higher levels of item non-response (Tourangeau and Yan, 2007), and in Graduate Outcomes, item non-response is higher for this question than many others in the survey. However, when compared with other surveys and the rates of response you may expect for such a question, levels of response are good. Regardless, this question remains high priority for improvements and for ensuring the information collected is as useful as possible.

Distribution of responses received to salary

Whilst item non-response is useful, it is important to assess data quality in other ways. Another indication of data quality in relation to salary may be reductions in salaries outside the 'expected' range. Previous changes to the question aimed to reduce confusion that may have been causing some graduates to provide one-digit or two-digit salaries, but whilst this seemed effective some particularly low or high salaries remained. Though this cannot be avoided fully, and some may be genuine responses, it is likely that some of these responses are a result of graduates feeling reluctant to provide a genuine response to this question due to the sensitive nature of the question, perhaps leading to measurement error (Tourangeau and Yan, 2007). To aid in determining improvements in the online salary provision as a result of the addition of hover text, distributions of salaries provided in United Kingdom Pounds are split into broad salary groupings for quality analysis purposes and are shown in Figure 1:

Figure 1: Grouped salaries provided by graduates with a currency of UK £ in cohort D of year three and year two



Conclusions

The various interventions that have been put in place to improve response to the salary question seem to have had generally positive impacts on both the response levels to salary and the salaries being provided. Reassurances around the question do not appear to have had a negative impact, which was important to determine as confidentiality reassurances can have different impacts on respondents and can either increase divulgence or reduce it if its inclusion raises privacy concerns that weren't present previously (Acquisti, Brandimarte and Loewenstein, 2015). However, this does not seem to be the case. Equally, interventions on the CATI completion mode appear to have had positive effects on response to salary, which is particularly important given the difficulty in achieving responses to sensitive questions on this mode in comparison to the online self-completion mode.

Acquisti, A., Brandimarte, L. and Loewenstein, G., 2015. Privacy and human behavior in the age of information. Science, 347(6221), pp.509-514.

DeLeeuw, E.D., 2018, August. Mixed-mode: Past, present, and future. In Survey Research Methods (Vol. 12, No. 2, pp. 75-89).

Ong, A.D. and Weiss, D.J., 2000. The impact of anonymity on responses to sensitive questions 1. Journal of Applied Social Psychology, 30(8), pp.1691-1708.

Tourangeau, R., & Smith, T. W., 1996, Asking Sensitive Questions: The Impact of Data Collection Mode, Question Format, and Question Context. The Public Opinion Quarterly, 60(2), 275–304. http://www.jstor.org/stable/2749691

Tourangeau, R. and Yan, T., 2007. Sensitive questions in surveys. Psychological bulletin, 133(5), p.859.

Activity and employment assurance

Introduction

The quality of survey data is a high priority for Graduate Outcomes. At present, there is an ongoing data quality assurance plan being undertaken, with the aim of assessing quality across all survey questions. In the following section, we will present some of the preliminary research that was undertaken on two of the survey sections. This includes the first section in the survey, which includes the questions regarding the activities undertaken by the graduate during census week, and will also cover some of the second section, which is answered by respondents in paid or voluntary/unpaid work for an employer.

This analysis was designed to highlight some of the lines of investigation we may want to take to assess data quality across the Graduate Outcomes survey.

Section A- Activity data

All graduates are asked which activities they were in during the census week, as this is the first question in the survey. The answers provided in this section will determine the route the graduate takes later in the survey, and whether they answer any of the other questions in Section A. This analysis aims to highlight issues such as high item non-response or incorrect entries in the data and aims to identify further areas of investigation.

Individual response rates to the questions in Section A are highlighted in Table 8. Please note that as the ‘all activities’ question is the first in the survey, this will always have a 100% response rate when considering item non-response and drop-out levels of those respondents who started the survey.

Table 8: Response rates to the Section A questions, split by completion mode and year

	Telephone (CATI)		Desktop		Mobile		Base Description
	Y3	Y4	Y3	Y4	Y3	Y4	
All activities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	Answered the activity question
Main activity	99.8%	99.8%	99.9%	99.9%	99.9%	99.9%	Where all activities question was answered
Activity check (same activity)	99.6%	99.8%	99.6%	99.6%	99.0%	99.2%	Where paid work or voluntary/unpaid work for an employer was selected AND self-employed or own business or portfolio was selected and main activity was answered
Home Country	99.2%	99.6%	98.5%	99.6%	96.2%	98.3%	Where only portfolio, caring, retired, unemployed or doing something else was selected, and main activity was answered

As can be seen, the response levels to questions in Section A are generally good and all are above 95% response to the question. When looking at separate completion modes, all are performing on a similar level with only Home Country having lower response rates in online completion modes when compared to CATI. Comparison to the previous year shows an overall slight increase or similar levels of response.

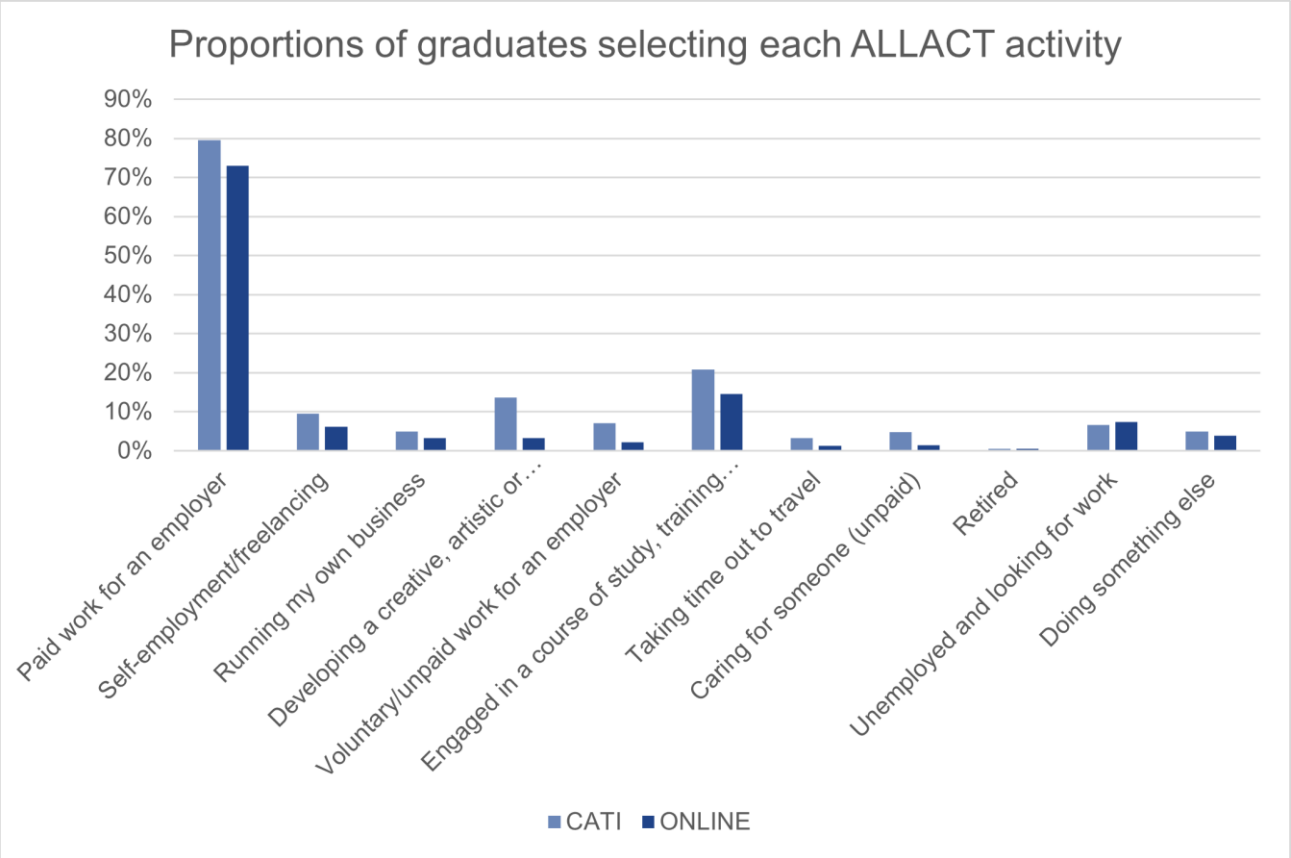
All activities

Proportions of graduates selecting each activity option were split by completion mode. The proportions show the percentages of graduates that have selected each activity option and as such could include the same graduate if they selected more than one option (Table 9/Figure 5). For example, a graduate selecting ‘Paid work for an employer’ and ‘Engaged in a course of study, training or Research’ would be counted towards both. Levels are based on data that has not yet been processed for output purposes.

Table 9: 'All activity' proportions sorted in descending order. The proportions can add up to more than 100% as graduates can select more than one activity.

Telephone (CATI)		Online	
Paid work for an employer	79.57%	Paid work for an employer	73.02%
Engaged in a course of study, training or research	20.88%	Engaged in a course of study, training or research	14.51%
Developing a creative, artistic or professional portfolio	13.61%	Unemployed and looking for work	7.44%
Self-employment/freelancing	9.58%	Self-employment/freelancing	6.20%
Voluntary/unpaid work for an employer	7.09%	Doing something else	3.82%
Unemployed and looking for work ;">	6.67%	Developing a creative, artistic or professional portfolio	3.33%
Running my own business	5.01%	Running my own business	3.29%
Doing something else	4.90%	Voluntary/unpaid work for an employer	2.14%
Caring for someone (unpaid)	4.77%	Caring for someone (unpaid)	1.42%
Taking time out to travel - this does not include short-term holidays	3.21%	Taking time out to travel - this does not include short-term holidays	1.26%
Retired	0.47%	Retired	0.52%

Figure 5: Activity proportions, split by mode. The proportions can add up to more than 100% as graduates can select more than one activity.



Trends show differences between CATI and online survey modes with almost all activity options having higher proportions in the CATI mode when compared to the online mode. Top selections for both the CATI and online modes are “Paid work for an employer” and “Engaged in a course of study, training or research” with the third option differing between the modes (“Developing a creative, artistic or professional portfolio” for CATI and “Unemployed and looking for work” for online).

To investigate the higher proportions of activity selections seen in CATI, the proportions of the number of activities selected by graduates were assessed (Figure 2/Table 2).

Figure 6. Proportions of number of activities selected by graduates.

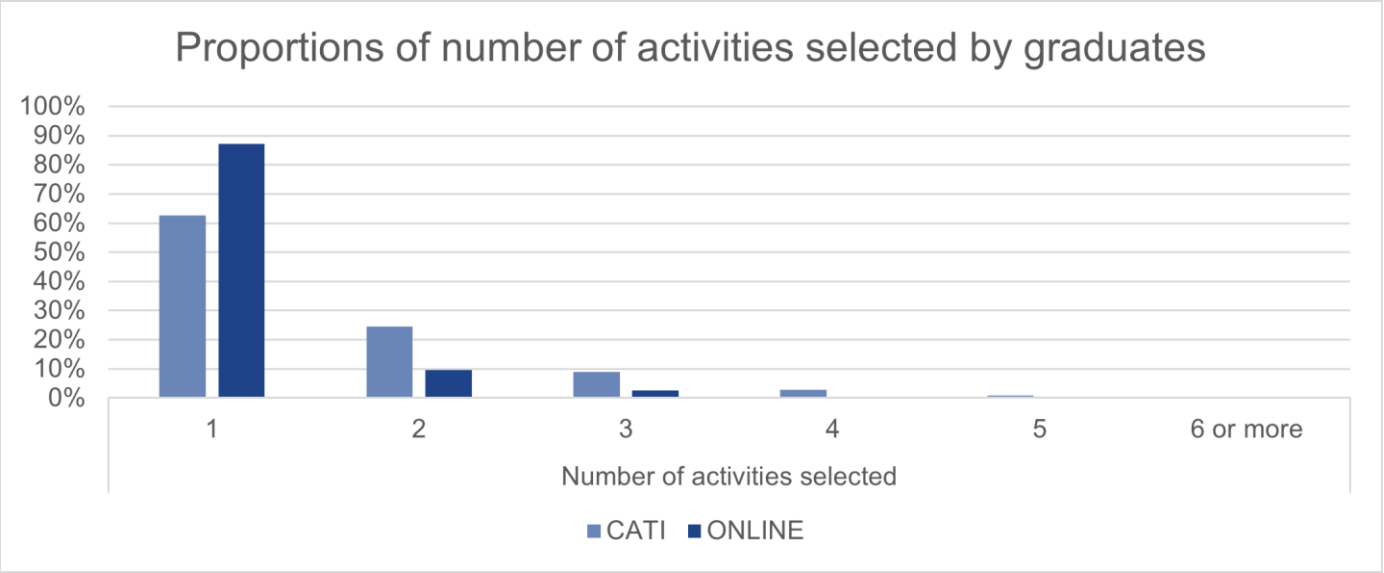


Table 10 : Proportions of number of activities selected by graduates by completion mode.

Completion year	Completion mode	Number of activities selected					
		1	2	3	4	5	6 or more
Year 4	CATI	62.62%	24.46%	8.90%	2.90%	0.85%	0.27%
Year 4	Online	87.15%	9.66%	2.53%	0.52%	0.10%	0.04%
Year 4	Other	57.85%	22.73%	6.61%	9.92%	0.83%	2.07%
Year 3	CATI	61.71%	24.44%	9.29%	> 3.26%	0.97%	0.34%
Year 3	Online	86.07%	10.38%	2.77%	0.59%	0.14%	0.05%
Year 3	Other	77.52%	11.01%	5.28%	3.67%	1.15%	1.38%

By splitting the data by the selected number of activities it was revealed that graduates answering the survey using CATI were more likely to select more than one activity when compared to the online mode. The data provides an important insight into the differences

in graduate behaviour between the two completion modes. It suggests that having an interviewer read through all activity options can lead to the graduate providing more information when compared to online mode where graduates tend to select just one option. This effect has also been observed in the previous year with almost identical proportions. Such mode effect has been observed in a number of studies such as Molenberghs et al. (2010). To further investigate the activity selections and the differences between the completion modes, we looked at the most common activity combinations for each completion mode.

Table 11: Most commonly selected activity combinations split by completion mode. For full details of activities, visit the coding manual.

Number of activities selected	Completion mode	Activities selected	% selecting this combination of activities
2	CATI	Paid work and Studying	31.50%
	Online	Paid work and Studying	34.94%
3	CATI	Paid work and Portfolio and Studying	15.74%
	Online	Paid work and Self-employment and Portfolio	13.05%
4	CATI	Paid work and Self-employment and Own business and Portfolio	14.51%
	Online	Paid work and Self-employment and Own business and Portfolio	14.63%
5	CATI	Paid work and Self-employment and Own business and Portfolio and Studying	12.45%
	Online	Paid work and Self-employment and Own business and Portfolio and Studying	15.03%

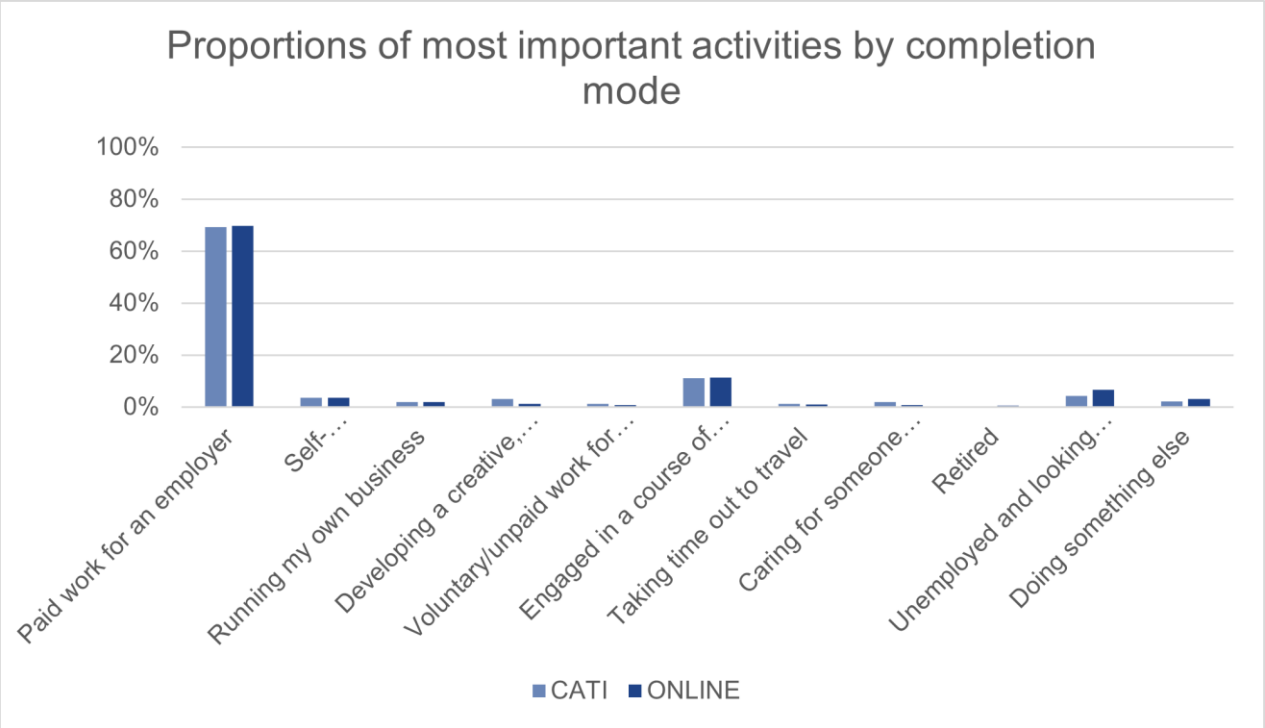
As can be seen from the activity combinations (Table 11), when more than one activity was selected, the most common combinations are almost identical across the two completion modes. Combined with the previous activity data, this leads to a conclusion that the disparity between the CATI and online completion modes is mainly related to the graduates in the online mode having a tendency to only select one option. Unfortunately, it is rather challenging to overcome this effect. Graduates using the online mode are given all the options on one screen and (according to the above data) tend to ignore other

options after selecting their main one. Some solutions have been suggested such as randomising the order of the options presented on the screen which would force the graduates to go through the whole list. However, this introduces additional issues. The list of activity options follows a rational order starting with “Paid work for an employer” and ending with “Unemployed and looking for work” and “Doing something else”. Randomising this order might lead to graduates getting confused and dropping out of the survey. Another possibility is to present each activity on a separate screen. However, this lengthens the survey and can lead to survey fatigue (Weitzer et al., 2004). Nevertheless, we are continuing to work on this question. This is an area that has been highlighted to investigate further and it is also explored further in the next section, which may indicate that on CATI graduates are more likely to be selecting more than one activity which relates to the same role.

Main activity

To investigate the activity selections further, and differences between the completion modes, the most important activity selection were analysed (see Figure 3).

Figure 3. Proportions of most important activities selected by graduates, split by completion mode.

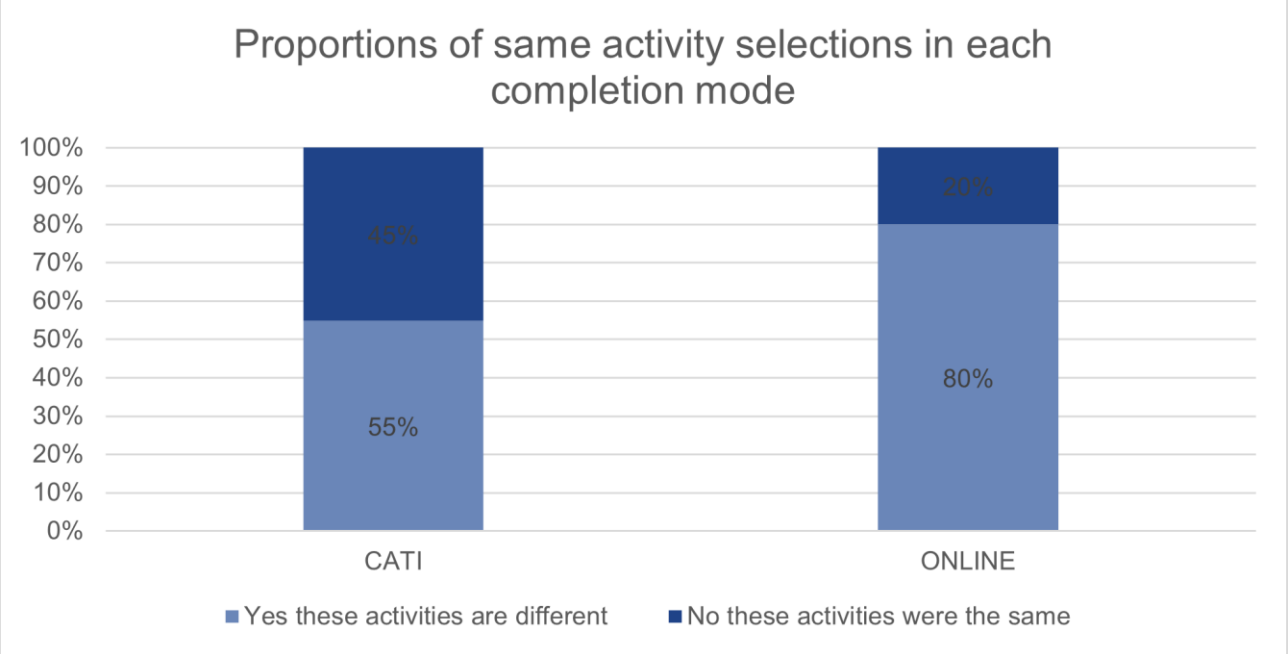


Whilst proportions of initial activity selections are similar but do differ by completion mode, analysis of most important activity highlights very similar proportions across the activities, regardless of completion mode. This reassures us that although graduates may be more likely to select multiple activities, there is not a significant issue with under recording the main activity of the graduate. To investigate this further, activity check is analysed below, which indicates whether the activity was the same or different.

If graduates select “Paid work for an employer” or “Voluntary/unpaid work for an employer” and “Self-employment/freelancing” or “Running my own business” or “Developing a creative, artistic or professional portfolio” they are asked the same activity question. It

asks them to clarify whether these activities were the same, or whether they were two separate activities.

Figure 4:Proportions of selected activity check option in each completion mode.



Splitting the data by completion mode revealed an interesting insight (see Figure 4). Graduates in the Online mode were selecting the "Yes these activities are different" option significantly more often than in CATI. The main explanation for this may relate to the previously discussed data showing that graduates are more likely to select more than one activity option on CATI. It may be that these additional activities are not separate, rather graduates on CATI are more likely to select multiple options that relate to the same activity. It may also be related to the wording of the question and (similarly to the activity question) the possible input from the interviewer. In this case, graduates on the CATI mode may be able to ask for a clarification regarding the question. As it can be seen in the chart, the difference in proportions between "Yes these activities are different" and "No these activities were the same" answers in CATI is significantly lower when compared to the Online mode. While this may indicate that the questions need to be looked at in more detail to ensure the meaning is clear, it also indicates there may not be a loss of granularity in the online mode.

Further investigation was done by looking at the most common activity combinations split by the activity check answer and completion mode (Table 12), to investigate whether this revealed anything further about the differences between the completion modes.

Table 12

ACTCHECK option	Completion mode	Proportion	Combination
"Yes these activities are different"	CATI	24.69%	"Paid work for an employer" and "Developing a creative, artistic or professional portfolio"
	Online	23.44%	"Paid work for an employer" and "Self-employment/freelancing"
"No these activities were the same"	CATI	35.16%	"Paid work for an employer" and "Developing a creative, artistic or professional portfolio"
	Online	24.22%	"Paid work for an employer" and "Self-employment/freelancing"

This investigation has revealed a couple of important points. First of all, graduates were selecting the same activity pairs regardless of the activity check option (“Paid work for an employer” and “Developing a creative, artistic or professional portfolio” in CATI and “Paid work for an employer” and “Self-employment/freelancing” in the online mode). This may support the earlier mentioned explanation that graduates in the online mode might have a difficulty understanding the question and are not able to get it clarified as in CATI. Secondly, the most common same activity combinations differ between the two modes. While the “Paid work for an employer” is present in both modes, the second option is “Developing a creative, artistic or professional portfolio” in CATI and “Self-employment/freelancing” in online completion modes highlighting the difference between the selections by mode. Lastly, Portfolio activity is being selected more commonly in CATI compared to online completion mode which can be seen in Table 12. This, combined with the activity check data might suggest that graduates are more likely to feel they should select more than one activity on CATI, even if this is the same. Equally, it may be linked to the fact that they listen to all options rather than rushing through the question on the CATI mode. They may also be able to get clarification regarding the portfolio option and therefore feel that they are able to select that this also relates to the other activity they are undertaking. Research has shown that receiving clarification regarding survey questions increases response accuracy (e.g. Conrad & Schober, 2000; Schober & Conrad, 1997). In the same activity, or the portfolio case, it is possible that the description is not clear enough and further clarity may benefit the questions which will be investigated further.

Section B- Employment data

This following section presents some of the analysis that has been undertaken in relation to the second section of the survey, known as 'Section B', which graduates may be routed to if they answer that they are in paid work for an employer, or voluntary/unpaid work for an employer. It is one of the most common routes taken by respondents, and this assessment aims to provide an initial view of data quality and to identify certain issues such as high item non-response and missing data, or incorrect data entries. Additionally, the research also aims to identify further areas of investigation, as well as analysis that may benefit from linking to other sections in the survey.

Initially, response levels for five of the questions from Section B are presented in Table 13,split by completion modes and completion year. These response rates will aid in identifying questions with high item non-response and may aid in identifying further lines of investigation. The data presented here only includes graduates who were in paid or unpaid/voluntary work for an employer.

Table 13: Response rates for Year 3 and Year 4 for the first five questions in Section B split by completion modes. The response rates only include graduates who were in paid or unpaid/voluntary work for an employer

	Telephone (CATI)		Desktop		Mobile		Base Description
	Y3	Y4	Y3	Y4	Y3	Y4	
Number of jobs held during the census week (multiple jobs)	99.40%	99.54%	99.19%	99.09%	98.44%	99.10%	Graduates who were only in paid or unpaid/voluntary work for an employer and answered main activity (not including information copied over from same activity)
Employment intensity (Full-time/Part-time)	99.40%	99.56%	99.20%	99.03%	98.32%	98.99%	Graduates who were in paid or unpaid/voluntary work for an employer and answered main activity
Job title	99.17%	99.26%	96.59%	94.68%	92.26%	93.00%	Graduates who answered relevant employment intensity
Job duties	99.15%	99.24%	96.59%	94.67%	92.25%	92.99%	Graduates who answered relevant employment intensity

	Telephone (CATI)		Desktop		Mobile		Base Description
	Y3	Y4	Y3	Y4	Y3	Y4	
Employment basis	99.69%	99.76%	99.81%	99.79%	99.56%	99.70%	Job duties answered (not including information copied over from same activity)

Generally, response levels to questions in the Graduate Outcomes survey are good and as you can see here, all are above 90% response to the question. Sensitive questions can be more susceptible to completion mode effects and reduced level of response, but some further research that has been done on this topic this year can be found in the section on Reliability of Sensitive Data. The levels of response will be discussed within the relevant sections for each question, including the difference in response across completion modes to job title and job duties.

Multiple Jobs (same activity)

Graduates who were only in paid or unpaid/voluntary work for an employer and answered main activity (not including information copied over from same activity) were asked if they were working in one or more than one job during the census week. Looking at the response rates (see Table 14) it can be seen that they were high (>99%) in all the completion modes. When comparing to the previous year, response rates have increased slightly in CATI and mobile completion modes, with a slight decrease in the desktop mode.

Table 14: Proportions for the multiple jobs question.

Year	One job	More than one job
Year 3	92.23%	7.77%
Year 4	92.42%	7.58%

When looking at the proportions of jobs held (one versus more than one), the data is similar between the two years with majority of students (>92%) indicating that they have one job with a slight increase in Year 4.

Employment Intensity

After being asked how many jobs graduates were working in during the census week, the next question was regarding the intensity of the job (full-time or part-time). As in the multiple job question, response rates were high (>98%) in all of the completion modes. As previously, highest response rates were in CATI, followed by desktop, with the lowest

response rates being in the mobile completion modes. When looking at the differences between the years, the patterns follow the previous multiple job question, with rates slightly increasing in CATI and mobile with a slight decrease in desktop completion modes.

Table 15: Full time and Part time proportions split by completion mode.

	CATI		Desktop		Mobile	
Year	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
Year 3	80.60%	19.40%	84.60%	15.40%	86.16%	13.84%
Year 4	82.17%	17.83%	85.78%	14.22%	87.67%	12.33%

Looking at proportions (see Table 15), there have been some fluctuations between years when split by mode. It would be useful to investigate this further split by work type to understand if these differences are likely to be a result of genuine selection or other possible effect.

Job title and job duties

Job title and job duties have the potential to be asked at two points in the survey, depending on the activities selected and the route taken by the graduate. They are mandatory questions that require graduates to provide their job title during the relevant census week for their cohort. Responses are entered in a free-text field, so it is possible for graduates to provide a response that is not accurate, for example by editing their job title or entering random characters to bypass the question due to influences such as privacy concerns or social desirability bias. Job title has previously been identified as a question that some respondents may view as sensitive, and as a result hover text was added to reassure graduates in cohort D of year 3. Previous research was completed on these questions in the 3rd edition of the data quality report, which considered these in the Reliability of Sensitive Data section. It is therefore useful to reassess the item non-response levels to these questions to see if this has improved during the fourth year of the survey.

As can be seen in Table 15, the item non-response levels for both of these questions reduced slightly in Year 4 compared to Year 3 in the CATI and mobile completion modes. However, there was a slight increase in item non-response rates in the desktop mode, although rates of response were still higher than on the mobile completion mode. The only change to the questions was the newly introduced hover text explaining that the job title and job duties information will not be used to identify individuals and no attempts will be made to contact their employers. However, it is difficult to say if this addition was what affected the drop in response on the desktop code. First of all, the hover text was added in

cohort D (last cohort of the year) of Year 3. Secondly, this effect was not observed in the mobile completion mode and in fact the non-response rates decreased. It is important to note that the overall non-response rates are higher in online completion modes when compared to CATI. This could be due to the sensitivity of these questions and the effect of an interviewer in CATI (Conrad & Schober, 2000; Schober & Conrad, 1997) making graduates more likely to provide information. As such, more time and investigation is needed to explore this effect and its causes.

Impact of hover text on SOC coding

Graduate Outcomes employment data is coded using the Office for National Statistics' (ONS) Standard Occupational Classification (SOC). Both the job title and the employer's name provided by the graduate are considered in the coding of records. In some cases, a code cannot be assigned to a graduate, for example if there are no appropriate codes present in the indexes or if information is missing in the survey data returned by the graduate, and in these cases the records are assigned a code of 0001 to indicate that they are uncodable. Although there are a number of factors that can influence coding it could be useful to assess the prevalence of these uncodables in the dataset to ensure that the hover text in job title and employer name did not have a negative impact on the ability to code records. Levels of uncodables are stable this year.

Discussion

The preliminary analysis shows that the activity section (Section A) generally receives good response levels, with all of them being above 95% and with separate completion modes all performing on a similar level. When comparing to the previous year (Year 3), Year 4 shows a slight overall increase or similar levels of response rates to the questions.

The analysis of activity data provides an important insight into graduate behaviour with graduates in online completion modes leaning towards selecting just one activity option when compared to CATI. This effect has also been observed in Year 3. However further analyses when more than one activity was selected indicated that the most common combinations are almost identical across the two completion modes, leading to a conclusion that the disparity between the CATI and online completion modes is mainly related to the graduates in the online mode having a tendency to only select one option. Solutions have been discussed such as randomising the order of the options presented on the screen or presenting the options on separate screens, however that would introduce further problems such as confusion or survey fatigue. As such this area been highlighted for further investigation.

A similar issue was also found in the same/different activity question with graduates in the online mode selecting the "Yes these activities are different" option significantly more often than in CATI. The main explanation for this may relate to the previously discussed effect of graduates in CATI more often selecting more than one activity option, which may in fact relate to the same role. Additionally, it was discussed that this effect might be related to the wording of the question and the possible input from the interviewer. In this case, graduates on the CATI mode may be able to ask for a clarification regarding the question. While the overall data showed that there might not be any loss of granularity in the online mode, further research is needed into the question.

Investigation into activity pairs revealed that graduates were selecting the same similar

activity pairs regardless of the activity check in both completion modes with “Paid work for an employer” being in both but “Developing a creative, artistic or professional portfolio” being more common in CATI. It has been discussed this might be due to graduates in CATI being able to get clarification regarding the portfolio option and therefore feeling more informed. It is possible that the description is not clear enough and further clarity may benefit the questions. However, it may also be related to the fact that graduates select more than one option more frequently on the CATI mode, even if this is the same activity, and that portfolio is the more common selection for this.

With regards to the employment investigation (Section B) so far, response rates are generally looking very positive. For multiple jobs, employment intensity and employment basis, response levels across all completion modes were above 98%. Initial investigations into these questions indicated no major concerns but highlighted other areas to investigate. For example, further analysis split by work type would be useful for some of the questions, such as employment intensity.

Job title and job duties have been assessed in previous years as sensitive questions, with the addition of hover text to reassure graduates in cohort D of Year 3. The online completion mode tends to see lower levels of response for these questions. However, the mobile completion mode and the CATI completion mode have both seen increased response this year. On the other hand, the desktop mode has seen a slight reduction in response, although response rates are still higher than on mobile. An assessment of SOC coding indicated that levels of uncodable records are stable, which is a reassuring indication that the quality of responses being provided has not deteriorated greatly.

Continued assessment would be useful here in order to identify if there are any further changes that may aid in reducing item non-response and drop-out. It may be useful to repeat some of the free-text analysis which has been performed on the question in previous years to support the uncodable analysis.

The assessment is ongoing and will continue to investigate the quality of the survey questions. While there are avenues of research that need to be pursued to improve some of the questions, overall Section A provides good initial data on graduate activities with improving response rates and Section B response levels look good with some further work required on the online mode for job title and job duties.

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Location data

Analysis of Employment location questions – Postcode and town/city

Introduction and context

Graduates in certain types of employment who state that their place of work is in England, Scotland, Wales, or Northern Ireland during the survey are asked to provide the postcode for their place of work. Whilst this is a mandatory question, there is a response option of 'don't know' that is available for graduates to select. However, graduates who select 'don't know' or provide a short postcode will be required to provide the nearest city or town to their place of work in the next question, whereas the town/city question is optional for graduates who provide a full postcode. Respondents to surveys can be reluctant to provide personal information, particularly if they feel that this information may not be kept confidential or if the questions are administered by an interviewer (Tourangeau and Yan, 2007). This may be exacerbated by more people working from home, potentially making this data feel more personal to them. Equally, respondents may not know certain information about their place of work, and this may be a particular problem for postcode in the CATI completion mode if respondents do not have access to this at the time of the call.

In year two, validation was added to the postcode question to check the first two digits of the postcode and to ensure the formatting and length were correct. An assessment of the year two data in the 2nd edition of the Graduate Outcomes Survey Quality Report highlighted very positive improvements in the quality of the data collected, likely as a result of the validation but also potentially other factors such as a change in working patterns. However, there was a slight increase in item non-response and whilst levels of 'don't know' selection clearly reduced many graduates were still selecting this option, so next steps in the report highlighted that consideration would be made to reduce this further. Offering a 'don't know' response option can increase missing data; however, probes have been found to reduce missing data across different survey completion modes without negatively influencing respondent's attitudes about a survey (DeLeeuw, 2018). In Cohort D of year three an additional validation pop-up was added when 'don't know' was selected to try and encourage respondents to provide at least a partial postcode, which appeared to have a positive influence on response to the question in the online mode. Monitoring has continued this year to determine if there have been further improvements as a result of this additional validation.

Once graduates have answered the postcode question, they will then move on to the town/city question. Before year three of the survey the question was worded as follows, with the additional text in italics provided for context:

- "What was the town, city or area in which you worked? *Please type in the town, city or area where your employment was/will be based and not the county. For example, if your employment was/will be based in London, please give the local area e.g. Holborn."*

From year three onwards the question wording was changed to:

- “What is the (nearest) city or town for your place of work?”

The change to the town/city question aimed to make it easier to answer and to provide continuity both in terms of question tensing and for future comparisons as a list of towns and cities was implemented for year four of the survey. It was also aimed at improving the usability of the data and to ensure that areas provided by graduates can be correctly identified for outputs.

As mentioned, a location list was added to the town/city question in the fourth year of the survey (C20072). HESA worked with devolved administrations and existing location information to develop the list, with the aim of improving the usability of the data and the graduate experience of answering the survey. The list has a search function to ensure it is usable. We committed to reviewing and improving the drop-down list, to ensure that it was fit for purpose. In depth assessment of the results from the list were ongoing through the year, to determine additions, removals and clarifications that may be required.

In the report last year, we also highlighted that the CATI completion mode may benefit from some further improvement for the postcode question. We suggested that discussion with the contact centre may aid in reducing ‘don’t know’ selection further, alongside further review of the validation text, as using these probes and messaging correctly can be very effective in reducing the selection of ‘don’t know’ in different ways across modes (DeLeeuw, 2018). As a result, an action plan was put in place for the CATI completion mode during cohort C of Year 4 and the information text was also reassessed to ensure it was clear for interviewers and respondents.

Results of the town/city list assessment will be discussed in this section, alongside the impact of the CATI action plan. Equally, the mapping of employment location will be assessed to determine if the addition of the town/city list has had an impact.

Methods and results

Impact of validation on postcode responses

Assessments of the postcode provided to both employment types are in Figure 7 and Figure 8, split by mode. Last year the assessment focussed on cohort D, as this is when the additional validation to encourage a postcode upon selection of ‘don’t know’ was introduced. Assessments this year instead look across the year to determine if these improvements have had a positive impact. Additionally, last year it was identified that further action may be required on CATI, as the validation was aimed more towards online respondents. As a result, an action plan was put in place to reduce ‘don’t know’ response on CATI, which the following assessments will aid in determining the outcomes of. Graduates included in these tables have answered the question before postcode (related to the country of their place of work) as England, Scotland, Wales or Northern Ireland.

Figure 7: Responses provided to postcode in year three and year four, split by completion mode, when graduates are in paid or voluntary/ unpaid work for an employer.

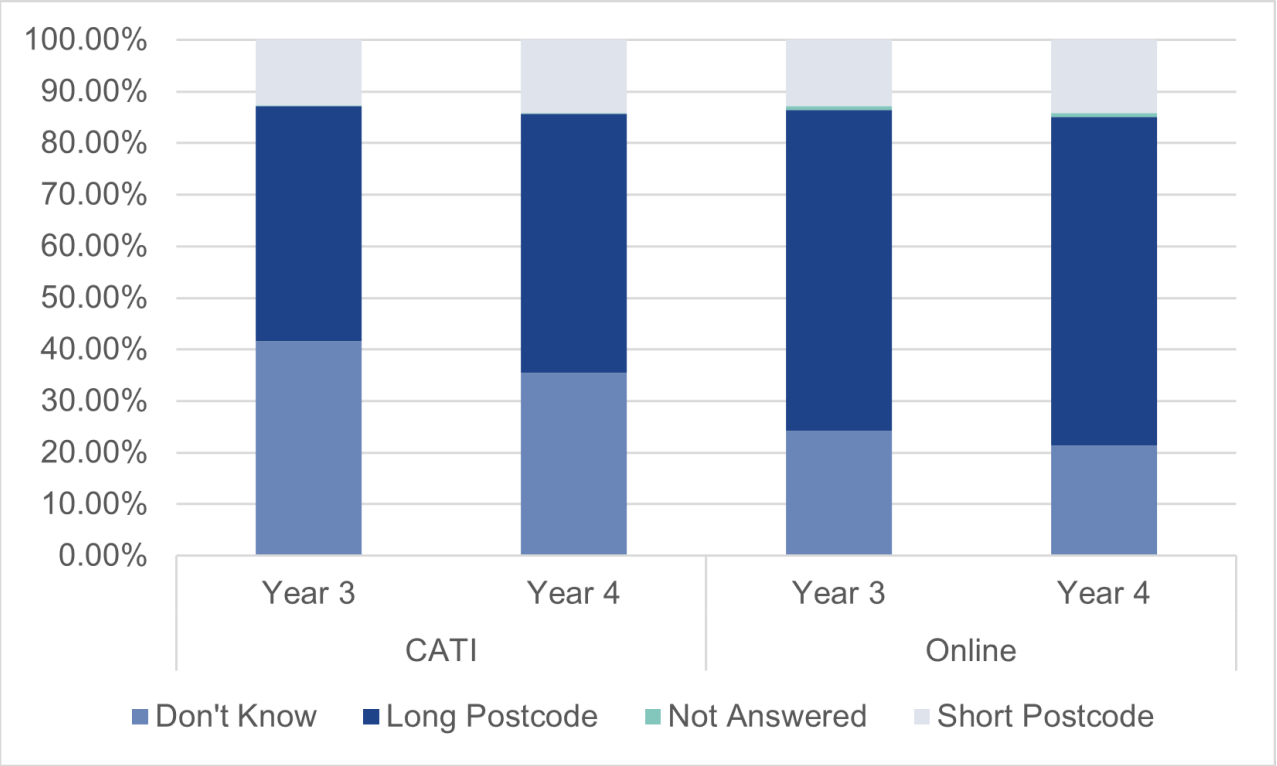
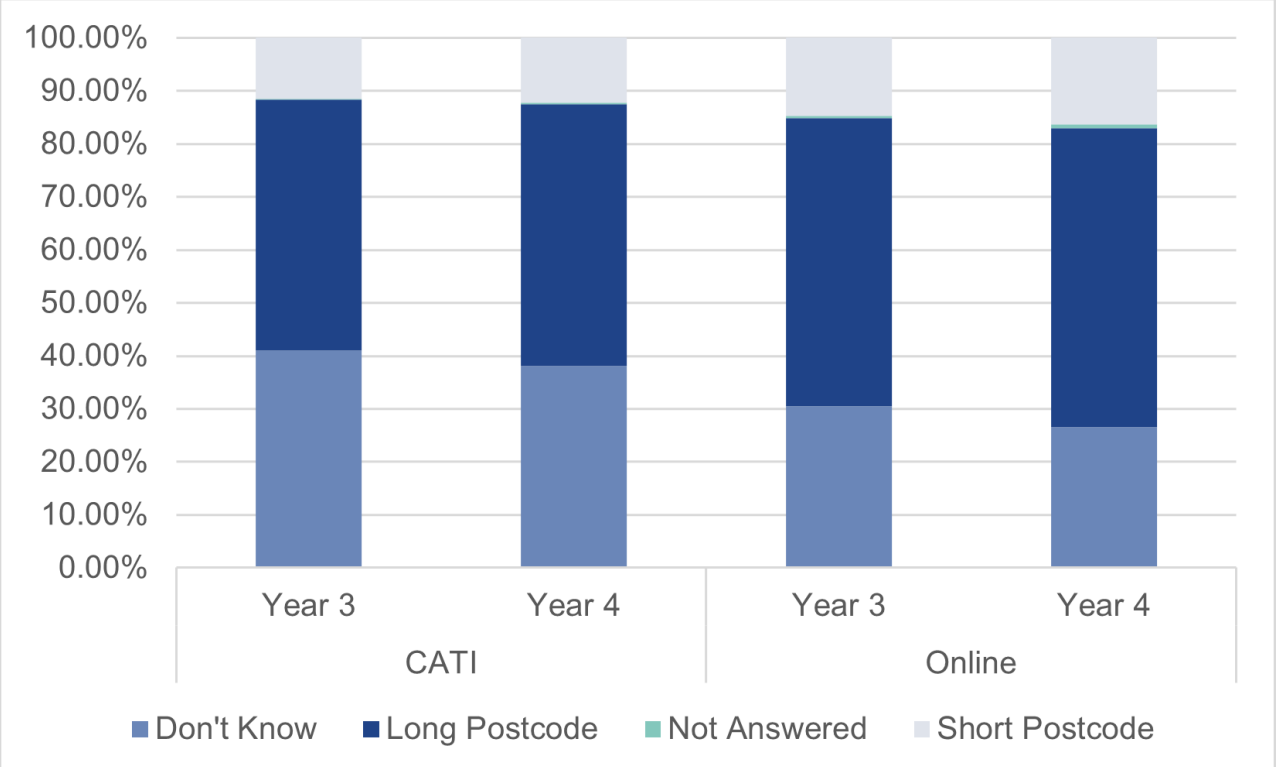


Figure 8: Responses provided to postcode in year three and year four, split by completion mode, when graduates are in self-employment/freelancing or running their own business.



Results are extremely positive this year, with the CATI mode seeing a reduction in the number of 'don't know' selections across both work types, but particularly for the 'work for an employer' group. Indeed, selections of long postcodes have increased the most, and there are also additional short postcodes provided. This indicates that the CATI action plan has led to improvements in the data being collected for the survey. In terms of the online completion mode, it does seem that the additional validation has continued to improve response to the question. Year 4 had the validation for all four cohorts and the online mode has seen decreased selection of 'don't know' for both employment types and increases in selection of long and short postcode provision. Overall, the response to the question has continued to improve.

Improvements to the town/city list so far

As mentioned, we committed to improving the town/city list which was introduced in Year 4. The list underwent a large amount of quality checking during the year, which aided in preparing for Year 5 and identified areas for further investigation. Indeed, since this first round of checking there have been other alterations made during the current ongoing survey (Year 5- C21072) and the review of the list will continue as the year progresses. We are also working with the contact centre on reducing the reliance on 'other' free-text use and are using this data to ensure that the list is fit for purpose.

Whilst a number of areas were reviewed and led to no further changes, there have been numerous alterations to the survey. It is worth noting that these changes were **not** introduced for the fourth year of the survey, however, an overview of some of the changes made for the Year 5 collection have been included for information. Initially, there were 17 new entries for Northern Ireland. Investigations indicated that coverage could be improved, with some areas included that were not used and other largely populated areas not in the list. Where additions created duplicates in the areas covered, entries were removed from the list. There were also changes to a number of the labels presented to graduates to make it clear when these options should be selected. For example, 'Greater London' was replaced with 'London – borough unknown', as investigations indicated confusion around which option to select due to the presence of boroughs in the list, and the option to select Greater London. Clarification was also added to 'City of London' following a review of the options, to ensure that graduates were aware this was not referring to London as a whole. Country was added to an entry and further clarification was added to a village named 'Othery' which seemed to have increased selection, likely as a result of confusion with the option 'other'. 'Greater Manchester' and 'Greater Glasgow' have also been removed, as other areas at this level were not available to respondents, and this will allow more granular mapping. Research into current selection of these options indicated that graduates do have other options to select in the list that are more relevant to their area, and that removal would not have a detrimental impact on data collection.

Impact of the changes to the employment questions on location mapping

As mentioned previously, the town/city list was added to the survey in Year 4. To understand the impact that this may have had, the approach taken to the mapping of the location of employment this year is highlighted in Table 16.

Table 16: Mapping of graduate location in Year 4 following the addition of a town/city list for all graduates who provided location information

Breakdown	Employment	Self-employment / Own business
Valid full postcode	53.6%	49.5%
Valid outward postcode	15.3%	14.3%
Item selected from drop-down	29.3%	33.1%
Free text mapped to LAUA	0.7%	0.9%
Free text mapped to county	0.3%	0.6%
Free text mapped to GOR or country	0.1%	0.3%
Can't be mapped (refused, don't know or remote)	0.6%	1.4%
Total (postcode or area information supplied)	**100.0%**	**100.0%**

As can be seen from the table, over 97% of graduates this year were able to be mapped from a postcode or a drop-down list entry. This is a vast improvement on previous years, where only free-text responses were provided to town/city and has greatly reduced the amount of free-text mapping required. Only a small percentage of graduates were not able to be mapped. This highlights the benefits of introducing a drop-down list. Work on improving the list will continue and focus will also be on reducing the reliance of respondents on the 'other' free-text field that is still present in the survey.

Conclusions

In the online completion mode, the quality of postcode data has continued to improve, likely as a result of the additional validation, with a further reduction in the selection of 'don't know' for both employment types. On the CATI mode, the introduction of the action plan has also led to reductions in 'don't know' selection, highlighting positive results due to the change. This will continue to be tracked. Both modes and work types saw increased selection of long postcodes predominantly, with an increase in short postcodes also present. Total item non-response remained fairly stable, with small changes between years.

When considering the ability to map graduates to an area of the country, improvements are evident as a result of the introduction of the town/city list. Over 97% of graduates were

able to be mapped on a postcode or list selection. We will continue to work on improvements to the list, to improve usability and hopefully attempt to reduce the use of ‘other’ online. We will also continue to work with the contact centre on reducing the use of ‘other' on the CATI completion mode.

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Processing error

Processing error includes processing-related errors in data capture, coding, editing and tabulation of the data. This section describes the processes used and the quality assurance apparatus that is employed to avoid bias in processing, and to limit the incidence of variance. We cover the issues that have arisen, and our estimates of their impact.

HESA's processing practices and quality assurance approach are explained in the Survey methodology section on data processing.[1] It covers data capture, data quality checking, SIC/SOC data coding (where HESA employs a specialist contractor), free text field 'cleaning', and derived fields.

SIC and SOC coding

SIC and SOC codes are applied wherever we have sufficient data to allow this. The data processing section of the Survey methodology explains this further.[2] An experienced external supplier (Oblong[3]) undertakes this coding, and the quality checks they apply are explained in the Survey methodology. Established SIC-coding methodology has proved stable over the long term.[4] A new method had to be developed for SOC coding.

Provisional SOC codes were processed using an agreed method by Oblong. These are then supplied to HE providers (through the Portal) which were invited to quality assure the data for themselves. During the first year of operation this was a semi-structured quality assurance process and relied on the varying resource that providers were able to bring. Although we received feedback from only a sub-set of providers, any changes to SOC coding resulting from this feedback were applied consistently across the entire collection. Since the second year of operations, the process has been streamlined and simplified.

All the provider feedback received is placed into one of the following four categories: Systemic (where the error is widespread and there is a clear pattern of miscoding); Non-systemic (isolated cases); Inconsistent (where multiple records in an occupation group are coded inconsistently with no obvious pattern) or Not actionable (no basis or evidence exists for coding to be changed).

This helped us identify potential processing issues that affected some records in the entire dataset. Non-systemic issues could not be used to improve individual-level data, as this would have been inequitable, and introduce bias through inconsistent application. This exercise has revealed some systemic errors in SOC coding, as well as scrutinising some areas where the coding ultimately met our quality standards. An overview of this process can be found in the data processing section of the operational survey information.[5] Detailed information on the exercise undertaken to review feedback and improve the data processing approach is also available in a detailed briefing, which identifies the impact of the issues identified.[6] It also includes a description of and the outcomes from additional internal checks which were carried out independently on the entire dataset.

The results from this year's assessment highlighted a continued reduction in the number of issues identified as a result of provider feedback. In year one, 66 issues were identified as either inconsistent or systemic, reducing to 42 in year two, 40 in year three and only 10

in year four. The number of systemic issues identified each year has reduced even further, with only two identified this year as a result of provider feedback. As a result of this comprehensive checking exercise, we believe the sources of systematic processing error identified by HE provider and manual quality checks have been removed, and the processing system fixed. There is no evidence that there is any remaining bias in the coding strategy for SOC, and any remaining processing error in year four data is likely to be minimal, and the product of random variation only.

During the second year of surveying we also conducted research into the reliability of our approach to coding, using established methods for this. In addition to the report on internal quality assurance work, on 29 April 2021 we published a second report detailing this independent verification of the reliability of our approach.[7] An exercise was carried out to compare codes returned by the primary coder for Graduate Outcomes with those returned by an independent organisation to validate HESA's approach to coding and the outputs that follow. Independent coding of occupations by the Office for National Statistics found 'almost perfect' alignment between coders at the major-group level
.

Handling free text responses

Most questions in Graduate Outcomes map directly to established lists of values, and details of these are available in the coding manual.[8] However, there is sometomes an "Other" option that permits a free text response. In this subsection and the subsequent ones, we cover the most important issues relating to free text processing, and explain the risks around processing error, giving our estimates for this.

At the end of the collection process, data returned for questions that permit a free-text response goes through a cleansing process, in order to improve data quality. This is usually where the respondent has not chosen a value from the drop-down list provided but has instead selected "other" and typed their own answer.

This cleansing process is undertaken for the town, city or area of employment or self-employment / running own business and prior to the removal of free text boxes from the survey, information relating to home country, country of further study, employment and self-employment / running own business and salary currency was also cleansed in a similar way. Where possible, the free text is mapped to an appropriate value from a dictionary published within the appropriate derived field specification.

We have encountered some specific issues in the processing of UK-based location information, which we turn to next. Later subsections offer comparable quality descriptions of cleansing of further study and home country data.

Location of work data – handling free text

Location of work is collected from graduates who are in paid work for an employer, voluntary or unpaid work. Respondents in employment are asked to tell us where they worked during the census week.[9] From 2020/21, a drop-down list was introduced to reduce the amount of free text data for cleansing. The majority of respondents supplied data that we could process into a structured format, such as their employer's postcode.[10] or an area name from the drop-down list. Where both a valid full or outward postcode and area information have been supplied, the postcode information is used in priority for mapping the data to a county / unitary authority.

From 2019/20, free text boxes relating to home country, country of further study, employment and self-employment / running own business and salary currency were removed due to low usage. From 2020/21, free text boxes relating to provider of further and previous study were also removed.

Across all years, around 7% of those graduates in work during the census week did not provide any location information. These graduates are excluded from the table below. In 2020/21, 0.8% (between 0.5% and 0.6% prior to 2020/21) of graduates who indicated the country in which they were employed did not provide any additional postcode or free text location information. Although difficult to identify precisely, across the years, around 0.8% provided free text information indicating that they refused; didn't want to; were unable to provide more detailed location information or indicated they were remote working or work at various locations. In 2020/21 and with the introduction of the drop-down list, this figure dropped to around 0.6%.

Location of self-employment or own business is collected from graduates who are in self-employment or running their own business during the census week. In 2020/21, of those graduates in self-employment or running their own business during the census week, 10% (9% in 2019/20 & 2018/19; 10% in 2017/18) did not provide any location information. These graduates are also excluded from the table below.

HESA has developed an algorithm for processing free text information; combining with information collected through drop-down menus and mapping postcodes to counties / unitary authorities and regions.

The processing of free text information relating to UK location of work is complex and two-fold. The first iteration was based on the processing fields used to clean area (ZEMPAREA[11], ZBUSAREA[12]) and postcode (ZEMPPCODE, ZBUSPCODE) information. Cleaned postcode information was mapped to county/unitary authority or region and combined with the cleaned area information.

With the enhancement of the derived field mapping process, a large majority of graduates who provided some UK location information could be mapped to county / unitary authority level (derived in XEMPLOCUC / XBUSLOCUC). The matching process is specified in more detail within the derived field documents[10] for XEMPLOCUC, XEMPLOCGR, XBUSLOCUC and XBUSLOCGR.

As a result, from year two, data has been released at a more granular geographic resolution. Users of microdata will also notice improvements in geographical resolution and should assess data quality for uses below regional level. Improving geographical

resolution further remains a priority, as we are aware of strong user demand for high-resolution place-based analysis.

We continue to look to make improvements to the survey instruments and also to the algorithmic approach we utilise in data processing.

Table 17: Location of work, self-employment or own business data - processing free-text responses

Employment in the UK	2017/18		2018/19		2019/20		2020/21	
Postcode information	144450	58.9%	156570	62.7%	158100	64.8%	176590	69.4%
Item selected from drop-down	N/A	N/A	N/A	N/A	N/A	N/A	71475	28.1%
Free text mapped to county / unitary authority	91765	37.4%	84885	34.0%	79030	32.4%	2480	1.0%
Free text mapped to Government office region (England only)	785	0.3%	650	0.3%	105	0.0%	25	0.0%
Mapped to country	8315	3.4%	7560	3.0%	6780	2.8%	3765	1.5%
Total with location info	**245315**	**100.0%**	**249670**	**100.0%**	**244015**	**100.0%**	**254330**	**100.0%**

Self-employment / own business in the UK	2017/18		2018/19		2019/20		2020/21	
Postcode information	15690	54.8%	18350	60.2%	18675	61.6%	19415	64.0%
Item selected from drop-down	N/A	N/A	N/A	N/A	N/A	N/A	9750	32.2%
Free text mapped to county / unitary authority	11515	40.2%	10765	35.3%	10335	34.1%	400	1.3%

Employment in the UK	2017/18		2018/19		2019/20		2020/21	
Free text mapped to Government office region (England only)	130	0.4%	105	0.3%	20	0.1%	5	0.0%
Mapped to country	1305	4.5%	1285	4.2%	1275	4.2%	750	2.5%
Total with location info	**28640**	**100.0%**	**30510**	**100.0%**	**30305**	**100.0%**	**30320**	**100.0%**

[1] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/data-processing

[2] See https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/data-processing#data-coding

[3] Information on our suppliers is here: https://www.hesa.ac.uk/innovation/outcomes/about/our-suppliers

[4] HESA has commissioned Oblong as a SIC code supplier in the past, using DLHE data that was similar to the structure of the relevant parts of Graduate Outcomes data. This longstanding methodology continued to prove robust.

[5] See https://www.hesa.ac.uk/definitions/operational-survey-information#data-classification-sicsoc

[6] See https://www.hesa.ac.uk/files/Graduate_Outcomes_SOC_Review_Summary_20220413.pdf

[7] See: https://www.hesa.ac.uk/files/Graduate-Outcomes-SOC-coding-Independent-verification-analysis-report-20210429.pdf

[8] The Graduate Outcomes survey results coding manual is available here: https://www.hesa.ac.uk/collection/c20072

[9] This data is gathered through various survey questions (dependent on routing) and stored in the fields: EMPPLOC; EMPPCODE; EMPPCODE_UNKNOWN; EMPCOUNTRY; and EMPCITY. We also collect parallel data on self-employed graduates, using the fields: BUSEMPPLOC; BUSEMPPCODE; BUSEMPPCODE_UNKNOWN; BUSEMPCOUNTRY; and BUSEMPCITY. Results for these fields are similar in proportion to those in employment, though the prevalence of self-employment is much lower, and hence we do not offer a detailed analysis on this much smaller group. Detailed metadata on all these fields can be viewed by following links from the data items index in the Graduate Outcomes survey results record coding manual, here: https://www.hesa.ac.uk/collection/c20072/index

[10] Post-processing, location data can be found in the following derived fields: XWRKLOCGR; XWRKLOCN; XWRKLOCUC; XSTULOCGR; XSTULOCN; XSTULOCUC; XEMPLOCGR; XEMPLOCN; XEMPLOCUC; XBUSLOCGR; XBUSLOCN; and XBUSLOCUC. Details of the processing involved in production is described by following the relevant links available from the derived fields specification contents page in the Graduate Outcomes survey results record coding manual, here: https://www.hesa.ac.uk/collection/c20072/derived/contents

[11] See the derived field specification: https://www.hesa.ac.uk/collection/c20072/derived/zemparea

[12] See the derived field specification: https://www.hesa.ac.uk/collection/c20072/derived/zbusarea

Timeliness and punctuality

In this section, we assess the timeliness and punctuality of the collection, analysis, and publication of Graduate Outcomes data.

Timeliness here refers to the gap between the publication of data and the period to which the data refer. Timeliness of data is an important aspect of meeting user needs; where data is going to be used to guide decisions on the part of users, it is important both that users have access to the most current data and that the gap between collection and publication is reduced as much as is compatible with the production of high quality statistical outputs.

Punctuality refers to the publication of statistical outputs according to a pre-announced timetable. In the interests of transparency and fair access to data, it is a requirement of the Code of Practice for Statistics that official statistics outputs should be pre-announced as part of a 12-month release calendar, and that any deviations from planned publication dates should be announced and explained as soon as possible.[1]

Timeliness and user needs

As discussed in the Users and user needs section, HESA data on graduates is of interest to a wide variety of users. For many users, HESA data provides important support for decision making processes; prospective students may use information about what graduates do after completing their qualifications to inform their choices of course and provider, while graduate employers may target their efforts on the basis of outcomes data. For all these users, the ability to make good decisions will depend in part on access to timely data; given the rapidly evolving nature of the graduate labour market, for example, policies which aim to attract graduates with certain skills to a city or region will be less effective if it is based on out-of-date information about where graduates are more likely to do certain kinds of jobs.

The timescale for collecting and publishing Graduate Outcomes data was considered carefully in the design of the new survey. The DLHE survey collected information about graduates six months after the completion of their qualification, and a stratified sample of DLHE respondents were surveyed again three years later for the LDLHE (Longitudinal Destinations of Leavers from Higher Education) survey. The majority of stakeholders who took part in the first NewDLHE consultation believed that the new survey should be carried out at some point between six and thirty-six months after the completion of qualifications. Six months was seen as too early, inasmuch as graduates would not yet have had time to make much progress in their post-HE careers; on the other hand, there was seen to be a risk that it would be difficult to contact enough graduates to provide a suitable dataset thirty-six months after graduation.[2] The 15-month interval between graduation and data collection used in the Graduate Outcomes survey was therefore selected so as to strike a balance between the availability of more useful careers data and the ability to obtain a high response rate.

Once all four cohorts for any given year have been surveyed, HESA aims to move swiftly towards publication, delivering final provider-level data to back to the providers it concerns about three months after the close of the data collection for the final cohort and releasing the Statistical Bulletin and open data about two months later. This timeline ensures that

users of the survey have access to data on what graduates are doing 15 months after graduation while that data is still current.

Production timeline

In accordance with the Code of Practice for Statistics, HESA announces its planned data releases in advance. Upcoming data releases are announced on the HESA website, with their month of publication, at least six months before the planned publication date; National Statistics data releases are also pre-announced on the National Statistics hub.[3] Exact dates for publication are confirmed at least four weeks before each data release.

The first release of Graduate Outcomes data was initially scheduled to take place in spring 2020; In the autumn of 2019, it was announced that both the Statistical Bulletin and the open data release would take place in April 2020. Before a precise publication date could be released, however, HESA staff moved to home-based working in response to the COVID-19 pandemic. As a result both of the challenges of remote working and of capacity issues caused by the pandemic, the publication of the Statistical Bulletin was delayed until 18 June 2020, with the open data released subsequently in two tranches.[4] Although was not possible to adhere to the timeline published before the pandemic, HESA followed the guidance issued by the UK Statistics Authority on the production of statistics during the coronavirus crisis and announced any changes to the publication timeline as far as possible in advance.[5]

The second year of Graduate Outcomes data was originally scheduled to be published in May 2021. Additional preparatory work, however, was required for the second year of publications, including investigations into the effects of the COVID-19 pandemic on 2018/19 data and whether it would be necessary to apply weighting to the results of the survey.[6] Taking into account the time that would be required for these additional investigations, coupled with the ongoing challenges of publishing under pandemic circumstances, we made the decision to delay publication of the 2018/19 data until July 2021, with the Statistical Bulletin scheduled to be released on 20 July 2021, followed by the open data tables shortly afterward.

The third year of Graduate Outcomes saw the Statistical Bulletin and Open Data combined into a single release which was originally scheduled to be published at the end of May 2022. Unfortunately, staffing and sickness issues resulted in delays to the production process. As a result, the release date was pushed back to 16 June 2022.

The fourth year of Graduate Outcomes data was published on 31 May 2023 as a single release.

Frequency of production

From its inception, the Graduate Outcomes survey was designed to be published, like DLHE, as an annual data release. The Higher Education and Research Act 2017 specifies that data relating to HE providers in England and their courses must be published at least once a year, and an annual timetable reflects the fact that most UK higher education activities are organised around the academic year, which runs from early autumn to early summer.[7]

Not all graduates, however, complete their qualification at the same point in the academic year, and collecting data in quarterly cohorts allows us to make sure that we obtain data from all graduates about their activities 15 months after completion, regardless of when they completed their qualification. If all graduates finishing their degrees in the 2018/19 academic year (August 2018 to July 2019) had been surveyed with reference to a single census week in September 2020, for example, we would have data from twenty five months after completion for those students who had completed their qualifications in August 2018, but only fourteen months after completion for those who had finished in July 2019; such a discrepancy in timescale would make it difficult to compare outcomes for graduates finishing their qualifications at different points in the academic year.

The first three years of publication have been shaped by the COVID-19 pandemic and the resulting changes in our ways of working at HESA. In the future it is hoped that HESA will be able to move gradually towards the collection and publication timetable initially established for year one, with data collection for cohort D closing at the end of November and statistical releases being published annually in the late spring or early summer.

[1] Code of Practice for Statistics, Sections T3.1 and T3.2. https://code.statisticsauthority.gov.uk/wp-content/uploads/2018/02/Code-of-Practice-for-Statistics.pdf

[2] HESA. 2016. 'Synthesis of Consultation Responses.' https://www.hesa.ac.uk/files/NewDLHE_consultation-synthesis.pdf

[3] HESA. Upcoming data releases. https://www.hesa.ac.uk/data-and-analysis/upcoming

For upcoming National Statistics releases, see also https://www.gov.uk/search/research-and-statistics?content_store_document_type=upcoming_statistics

[4] HESA. 2020. Coronavirus update. https://www.hesa.ac.uk/news/coronavirus

For the final publication timetable for Graduate Outcomes, see https://www.hesa.ac.uk/data-and-analysis/upcoming

[5] Office for Statistics Regulation. 2020. Regulatory guidance: Guidance on statistical practice for statistics producers during the coronavirus crisis. UK Statistics Authority. https://osr.statisticsauthority.gov.uk/wp-content/uploads/2020/07/Regulatory-guidance_changing-methods_Coronavirus.pdf

[6] HESA. 2021. Graduate Outcomes 2018/19 data delivery. https://www.hesa.ac.uk/news/29-03-2021/graduate-outcomes-201819-data-delivery

[7] Higher Education and Research Act 2017, section 65.

Accessibility and clarity

In this section, we discuss issues of accessibility and clarity relating to the Graduate Outcomes dataset and the statistical outputs which are based upon it. In assessing statistical quality, accessibility refers to the ease with which users are able to obtain the data, including the format or formats in which the data is available and any supporting information which may be needed. Clarity refers to the availability and comprehensibility of any metadata which its users may need to understand the statistical data fully.

Confidentiality and disclosure control

Given that the Graduate Outcomes survey requires the collection of contact details and other personal information about respondents, issues of data protection, confidentiality, and disclosure control have been important throughout the design and implementation phases of the survey.

HESA receives contact details for most graduates from providers.[1] Students are informed that their contact details will be passed on to HESA via HESA's Student Collection Notice, which informs students that, after graduation, providers will pass graduate contact details on to HESA and any organisations contracted by HESA to enable the collection of Graduate Outcomes data. The Student Collection Notice further informs students of the legal basis for the processing of their contact details for use in Graduate Outcomes, stating that contact details obtained from providers will be processed by HESA on the grounds that such processing is necessary for the performance of a task carried out in the public interest and for research and statistical purposes.[2]

Data protection policies and privacy notices available both on the HESA website and on the separate Graduate Outcomes website inform both providers and respondents of the uses which will be made of graduate data. Providers and respondents are informed that graduates may opt out of completing the survey, but that responses to the survey will be processed in accordance with GDPR on the basis of public interest, not consent.[3] Respondents are informed that their survey responses will be passed on to their HE provider, but that, unless they explicitly agree to be contacted by their provider about their survey responses, providers will only use survey responses for statistical and research purposes; while providers receive SWB data, they do not receive SWB responses for individual graduates, but instead receive aggregated statistical information about all their graduates' responses. Similarly, while Graduate Outcomes responses are passed on to a variety of other public and private bodies (including HE funding and regulatory bodies, public authorities, and others who have a legitimate interest in using the data for research and statistical purposes), survey responses are not used to make decisions about individuals. Where Graduate Outcomes data is passed on to third parties for use in research about higher education and the student population, the data is supplied under contracts which ensure that individuals cannot be identified from the data.[4]

When Graduate Outcomes data – or any other HESA data about people – is used in statistics published by HESA or any other users of HESA data, the data is subject to HESA's rounding and suppression strategy, which aims to reduce the risk of identifying individuals from published statistics. There are three main aspects to HESA's rounding strategy, each of which contributes to the protection of individual data: first, all counts of people are rounded to the nearest multiple of five; second, percentages based on fewer

than 22.5 people are suppressed, and, third, averages are not published if they are based on seven or fewer individuals. Rounding counts of people prevents the use of multiple tables to identify small numbers of individuals, while the suppression of percentages based on fewer than 22.5 individuals and averages based on fewer than seven individuals prevents users from working back from an average or a percentage in order to obtain individual data.[5]

HESA's rounding strategy is designed to protect personal data, while still enabling HESA and other users of HESA data concerning individuals to publish useful statistics. In this vein, to prevent the compounding of inaccuracy which would occur if calculations were based on rounded figures, the rounding strategy is applied to the data only after any calculations have been carried out. Likewise, the specific thresholds applied in the rounding strategy represent an attempt to strike a balance between disclosure control and the production of detailed statistics; while rounding to multiples of 50, for example, would make it even harder to identify individuals, such a strategy would reduce the usefulness of the statistics which could be published.

Statistical products and supporting information

As has been discussed in the Production timeline and Frequency of production sections, data for the fourth year of the Graduate Outcomes survey was published in May 2023, with subsequent data releases occurring annually in late spring or early summer. Like other HESA statistical releases, Graduate Outcomes data is not subject to scheduled revision; revisions to statistical releases are only carried out in the event of errors in HESA's data collection and production processes.[6]

Historically HESA produced two main statistical outputs based on the Graduate Outcomes data. The first, a Statistical Bulletin, which contains a range of tables, charts, and summary analysis of headline figures drawn from the data and the second, a release of open data, published about a week after the Statistical Bulletin, containing a wider range of tables and charts, including provider-level for some variables. Both the Statistical Bulletin and the Open Data are available for free on the HESA website, and each chart is accompanied by a freely available data download, allowing users to conduct their own analysis of the data.[7] From 2022, HESA produces an annual single combined release of Graduate Outcomes. This combined release consists of summary statistics and detailed information, including by provider, in the Graduate Outcomes open data repository.

In addition to the Graduate Outcomes data release, HESA has also published a variety of outputs, including this quality report, designed to help users understand the Graduate Outcomes survey and the statistical outputs derived from it. In March 2020, HESA published a Survey methodology concerning the Graduate Outcomes survey, along with an accompanying blog post explaining the main points covered in each part.[8] The Survey methodology outlines the predecessors to the Graduate Outcomes survey, DLHE and LDLHE, the need for a new survey, and the process by which the new survey was developed. It then goes on to discuss in detail the most important aspects of the design and implementation of the survey, with sections on survey coverage, survey design, data collection, data processing and analysis, data dissemination, sector engagement, and the evaluation of the survey.[9] The Survey methodology has been updated to reflect changes which have taken place since the initial publication; the revised version of the Survey methodology was released alongside the 2018/19 data. In May 2020, HESA published a dissemination policy for the Graduate Outcomes survey, setting out HESA's policy,

approaches, and standards for the dissemination of Graduate Outcomes data; for 2022 an updated version of this document was integrated into the Survey methodology, and was published along with the year three data. The dissemination section of the Survey methodology 4 (which applies both to HESA's publications and to those which may be produced by other users) includes sections on key users and uses of the data, legal and ethical considerations, and HESA's policy on misrepresentation of data; it also contains sections on HESA's statistical outputs based on the survey and supporting information for users of the data.[10] Supplementary information on our approach to data concepts and standards can be found in the following section of this report on coherence and comparability.

HESA also makes a range of other metadata available to users of the survey. The Graduate Outcomes section of the HESA website includes general information about the project and the survey, a link to the information page for students and graduates, a link to the information page for providers, and links to the Graduate Outcomes coding manuals; the survey results coding manual contains a variety of detailed metadata, including information on survey coverage, survey routing, and the variables used in the dataset.[11] The information page for providers includes a variety of resources, including detailed operational survey information; the operational survey information page includes detail on how the survey is being carried out, as well answers to FAQs about survey operation, response rates, and the delivery of data to providers.[12] In April 2021, HESA published a summary of the work done to quality assure the SOC coding of year two data; alongside that summary report, HESA also published a separate report on the results of an independent verification exercise in which SOC codes returned by the primary coder for Graduate Outcomes were compared with those returned by the Office for National Statistics.[13]

Further information about HESA's data can also be found on the 'Definitions and data standards' page of the HESA website. This page includes a glossary which defines terms and acronyms frequently used in HESA outputs; information about the coding of subjects, disciplines, industries, and occupations; data intelligence notes which describe specific issues in the HESA data; and lists of definitions relevant to each HESA data stream.[14] The 'Definitions and data standards' page also includes answers to a number of FAQs which are relevant to multiple HESA collections, including a specific page covering Graduate Outcomes.

To help users navigate the range of supporting materials available, HESA has developed a single user guide bringing together all the materials described above, as well as this quality report. From the second year of Graduate Outcomes publication, this user guide has taken the form of a detailed table of contents, which will inform users about the various resources available to them and what is contained in each of those resources. In subsequent years, we aim to act on user feedback on the presentation of supporting documentation, and we will adapt the user guide as necessary to meet user needs.

Access and use

The Graduate Outcomes data release is freely available and downloadable on the HESA website under a Creative Commons Attribution 4.0 (CC BY 4.0) license.[15] Users of the data are free to copy, use, share, or adapt it for any purpose, provided that they give appropriate credit to HESA, provide a link to the Creative Commons license, and indicate if any changes have been made to the data.[16]

Since Graduate Outcomes data is freely available for public use, HESA cannot be responsible for the uses made of its data by external parties; HESA neither has the resources to police external uses of its data nor desires to be an arbiter of truth in the domains in which it publishes data. At the same time, HESA is aware that use of its data to support invalid conclusions or interpretations could entail a risk to the perceived trustworthiness, quality, and value of HESA's statistical outputs. With this risk in mind, the dissemination section of the Graduate Outcomes methodology includes HESA's policy on potential misrepresentations of the Graduate Outcomes data, outlining the steps which HESA may take if a factual misrepresentation is perceived to have taken place.[17]

In addition to the Graduate Outcomes data which is available on the HESA website as open data, other datasets relating to the Graduate Outcomes survey are available to certain categories of users. HESA's statutory customers receive quality-assured microdata covering HE providers in their constituencies and a range of data fields aligned with their statutory powers and public functions; individual providers also receive microdata for their own graduates on an individual basis, except for the SWB data, which is released to providers only in aggregated form.

Tailored datasets are also available for users who have data needs which are not met by the Graduate Outcomes open data. Datasets are provided under licence for a fee and can be commissioned through the Jisc Tailored Datasets service.[18] Graduate Outcomes data will be available for use in tailored datasets as soon as possible after the release of the open data.[19]

Further information about Graduate Outcomes data and publications is available from HESA's Official Statistics team (official.statistics@hesa.ac.uk or (0)1242 388 513 [option 2])

[1] As discussed in the Data and statistical concepts section, contact details for graduates of English further education colleges can be supplied to HESA by the OfS.

[2] HESA. 2020. Student Collection Notice. Available at: https://www.hesa.ac.uk/about/regulation/data-protection/notices

The legal basis for processing contact details for the collection of Graduate Outcomes data refers to GDPR Articles 6(1)(e) and 89.

[3] Information for providers: HESA. Data protection guidance: Lawfulness of processing. https://www.hesa.ac.uk/innovation/outcomes/providers/data-protection

Information for graduates: HESA. Graduate Outcomes: Privacy Information. https://www.graduateoutcomes.ac.uk/privacy-info

[4] HESA. Graduate Outcomes: Privacy Information. https://www.graduateoutcomes.ac.uk/privacy-info

[5] The full rounding methodology and rationale for the rounding strategy is available on the HESA website: https://www.hesa.ac.uk/about/regulation/data-protection/rounding-and-

suppression-anonymise-statistics

[6] HESA. Revisions policy. https://www.hesa.ac.uk/about/regulation/official-statistics/revisions

[7] Further detail about the format and contents of the Statistical Bulletin and the open data release can be found in the dissemination section of the Graduate Outcomes methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/dissemination

[8] Blog post: 'The ultimate guide to Graduate Outcomes.' https://www.hesa.ac.uk/blog/16-04-2020/ultimate-guide-graduate-outcomes-hesa-publishes-survey-methodology-statement

[9] Graduate Outcomes Survey methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology

[10] See: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/dissemination

[11] The main HESA Graduate Outcomes site: https://www.hesa.ac.uk/innovation/outcomes;

Graduate Outcomes survey results coding manual: https://www.hesa.ac.uk/collection/c19072

Index of data items: https://www.hesa.ac.uk/collection/c19072/index

[12] HESA. 2020. Operational survey information. https://www.hesa.ac.uk/definitions/operational-survey-information

[13] A summary and links to both reports can be found here: https://www.hesa.ac.uk/news/29-04-2021/occupational-coding-accuracy-graduate-outcomes

[14] HESA. General Definitions and data standards are here: https://www.hesa.ac.uk/support/definitions

The list of definitions relevant specifically to the Graduate Outcomes survey can be found here: https://www.hesa.ac.uk/support/definitions/graduates

[15] Creative Commons. https://creativecommons.org/licenses/by/4.0/

[16] HESA. Open data and official statistics. https://www.hesa.ac.uk/data-and-analysis

[17] For more detail on HESA's policy concerning misrepresentation of the Graduate Outcomes data, see the dissemination section of the Graduate Outcomes Survey methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/dissemination

[18] For further information on tailored datasets, see the Jisc website: https://www.jisc.ac.uk/tailored-datasets

[19] Graduate Outcomes Survey methodology (dissemination section): https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/dissemination

Coherence and comparability

In this section, we discuss the coherence and comparability of the Graduate Outcomes data. Coherence here refers to the degree to which the Graduate Outcomes survey uses the same processes and harmonised methods which are used in other investigations of the same or similar domains; under the category of coherence we will be discussing both the uses of and deviations from national and international standard definitions in the Graduate Outcomes data and the relationship between Graduate Outcomes data and other datasets which may be available on the post-university careers of graduates. Comparability refers to the degree to which data can be compared over time; under this heading, we will be discussing the relationship of Graduate Outcomes with the DLHE survey, and the impact of the COVID-19 pandemic on the second and subsequent years of Graduate Outcomes.

National and international data standards

Several of the domains covered in the Graduate Outcomes survey are domains to which established data standards apply. Work and employment, occupation, industry, and subjective wellbeing have all been the subject of considerable previous study, and, as a result of that study, standardised conceptual frameworks and definitions have been developed to facilitate their discussion and analysis. Where possible, HESA aims to conform to these accepted data standards to enable comparisons between HESA data and other datasets and analyses relating to the same concepts, but it is important to discuss any areas in which we adapt internationally recognised standards to suit our analytical needs.

Where Graduate Outcomes data refers to work or employment, HESA aims to conform to standard definitions wherever practical. The UK Office for National Statistics (ONS) has developed a standard framework, based on the concepts of labour supply and demand, for labour market statistics, which includes definitions for important concepts such as employment. This approach to labour market statistics is broadly compatible with the approaches taken by other international bodies, and the ONS definitions of key terms align closely with those used by the International Labour Organization (ILO).[1]

HESA for the most part follows the definitions of work and employment used by the ONS and the ILO. The ILO defines work as ‘an activity performed by persons of any age and sex to produce goods or to provide services for use by others or for own use’, while employment is a sub-category of work referring to those who are ‘engaged in any activity to produce goods or provide services for pay or profit’.[2] Thus graduates who identify their most important activity as being engaged in unpaid or voluntary work for an employer are classified by HESA as in work, but not in employment. Although caring for someone else meets the ILO definition of work, however, graduates whose main activity is caring for someone else on an unpaid basis are classified as neither in work nor employment, and are included for analysis in the group of graduates undertaking ‘any other activity’. With this discrepancy in mind, we are continuing to review how best to align our data with ILO definitions of work and employment.

On the basis of Graduate Outcomes data, it is possible to identify those graduates who fit the ILO definitions of work or employment.[3] Identifying those who are unemployed according to the ILO definition, however, is less straightforward. The ILO defines ‘persons

in unemployment' as 'those of working age who were not in employment, carried out activities to seek employment during a specified recent period and were currently available to take up employment given a job opportunity'; the ONS further specifies that, in order to be classified as in unemployment, people must be available to start a job within the next two weeks.[4] While the list of possible activities offered to respondents includes 'unemployed and looking for work', graduates who select this option are not asked how soon they would be able to take up work, and it is therefore not possible to identify them as unemployed according to national or international standards. Users wishing to compare the percentage of graduates who are not in work or further study with the unemployment rate in the wider population – a figure derived using the ONS definition of unemployment – should therefore use caution, since the relevant concepts are not directly comparable.

Graduates who are engaged in work for an employer (whether paid or unpaid), self-employment, running their own business, or developing a portfolio, are assigned both a Standard Industrial Classification (SIC) code and a Standard Occupational Classification (SOC) code. SIC codes for Graduate Outcomes are assigned using the SIC 2007 framework, which is the current industrial classification system maintained by the ONS; SIC 2007 is based on NACE (originally an acronym for Nomenclature générale des activités économiques dans les Communautés européennes), the European Community classification of economic activities, but with the addition of a fifth digit where it has been found necessary.[5] While SOC, like SIC, is a UK-based classification system administered by the ONS, the two most recent versions of SOC have both been broadly aligned with the International Standard Classification of Occupations 2008 (ISCO-08) so as to allow for comparison between UK and international employment roles.[6]

SOC codes for the first year of Graduate Outcomes were initially assigned using SOC 2010 (DLHE), a fifth-digit expansion of the four-digit ONS SOC 2010 framework. SOC 2010 (DLHE) was developed for use with the DLHE survey in order to provide more detail about certain jobs often favoured by graduates, particularly those in areas where graduates were closely associated with a proliferation of new roles in rapidly-developing parts of the economy.[7] Although SOC 2010 (DLHE) is a bespoke framework, the first four digits of any SOC 2010 (DLHE) code map directly onto the appropriate four-digit SOC 2010 unit group, which enables comparisons with SOC data from other national datasets.

A new UK SOC coding framework, SOC 2020, was published in February 2020, shortly prior to publication of the year one data. After analysing the SOC 2020 coding frame and determining that it would be suitable for use in our processing, we decided to adopt the new framework for use in Graduate Outcomes from year two of the survey. In parallel with the coding of 2018/19 data, 2017/18 SOC data (originally coded using SOC 2010(DLHE)) was recoded to SOC 2020 to enable time series comparisons between year one and subsequent years of the Graduate Outcomes survey.

The use of nationally and internationally recognised standards to classify the industries and occupations in which graduates work enables comparison between HESA data on graduates in the workforce and other studies of employment which include data on industry and occupation. The move to SOC 2020 further facilitates such comparisons by ensuring that graduates are classified according to the system which most closely reflects the current state of the labour market. The training requirements for occupations can change over time, and occupations may therefore move between SOC major groups when the SOC framework is revised; thus some occupations, including higher level

teaching assistants and veterinary nurses, have moved from major group 6 (‘Caring, leisure and other service occupations’) in SOC 2010 to major group 3 (‘Associate professional occupations’) in SOC 2020.

HESA published the recoded 2017/18 SOC data in an ad hoc statistical bulletin on 20 May 2021.[8] The recoded data revealed a small increase in the proportion of graduates in occupations classified as ‘high skilled’. Under the old classification, 75.9% of graduates working in the UK were in highly skilled occupations, compared with 76.4% under SOC 2020. In particular, over 2,000 survey respondents were in occupations such as those described above which the new coding framework places in the high skilled category as ‘Associate professional occupations’ (major group 3), which were previously placed by SOC 2010 in the medium skilled category as ‘Caring, leisure and other service occupations’ (major group 6). The proportion of graduates in occupations classified as low skilled remained the same after the coding change at 9.9%.

Nationally accepted data standards are also relevant to the Graduate Outcomes SWB data. Graduate Outcomes measures SWB using a set of four questions (the ONS4) which were originally designed for the ONS as a harmonised standard of personal wellbeing; the ONS4 were first added by the ONS to the 2011 Annual Population Survey, and they have since been included in a range of other social surveys, including the Labour Force Survey (LFS).[9] HESA follows the ONS guidance on use of the SWB questions; the four questions are used verbatim in the Graduate Outcomes survey, and respondents are asked to give their answers to each question on a scale of 0 to 10, as specified by the ONS. HESA has also adopted the ONS’ bracketing methodology in outputs based on the SWB data. The adoption of a widely used set of SWB measures in Graduate Outcomes enables comparisons between graduate wellbeing data and wellbeing data collected in other social surveys; although it will be important to take potentially confounding factors into account in any analysis, the SWB measures themselves will be comparable.

[1] Office for National Statistics. 2020. ‘Introduction’, in A guide to labour market statistics. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/aguidetolabourmarketstatistics#introduction

[2] International Conference of Labour Statisticians. 2013. Resolution I: Resolution concerning statistics of work, employment and labour underutilization. ILO Department of Statistics (ILOSTAT). http://www.ilo.ch/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_230304.pdf

[3] While graduates who report that their main activity is caring for someone else on an unpaid basis are not included in HESA’s tables of graduates in work, those graduates can still be identified as a belonging to a category which fits under the ILO definition of work.

[4] Definitions of unemployment are available on the ILO ‘Concepts and definitions’ webpage (https://ilostat.ilo.org/resources/concepts-and-definitions/) as well as the ONS publication, A guide to labour market statistics (https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/aguidetolabourmarketstatistics#unemployment)

[5] Office for National Statistics. 2009. UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007): Structure and explanatory

notes. https://www.ons.gov.uk/methodology/classificationsandstandards/ukstandardindustrialclassificationofeconomicactivities/uksic2007

[6] Office for National Statistics. Classifying the Standard Occupational Classification 2020 (SOC 2020) to the International Standard Classification of Occupations (ISCO-08). https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2020/classifyingthestandardoccupationalclassification2020soc2020totheinternationalstandardclassificationofoccupationsisco08

[7] Elias, P. and R. Ellison. 2012. 'Standard Occupational Classification (2010) for the Destinations of Leavers from Higher Education: SOC 2010 (DLHE)'. https://www.hesa.ac.uk/collection/c14018/download/soc2010dlhe.pdf

[8] HESA's ad-hoc statistical bulletin Graduate Outcomes SOC 2020 update: UK, 2017/18 includes updated versions of relevant occupation tables previously published using the SOC 2010 classification, as well as comparisons of the results under the old and new SOC classifications. See: https://www.hesa.ac.uk/news/20-05-2021/graduate-outcomes-soc-2020-update

[9] Office for National Statistics. Personal well-being user guidance. https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingsurveyuserguide

Graduate Outcomes and other data on graduates

While Graduate Outcomes is the only national survey designed specifically to provide insight into the experiences of higher education graduates, the domains of several other datasets overlap to an extent with the domain of the Graduate Outcomes survey. Graduates in further study at UK higher education providers will be recorded in the HESA Student Record, and linking the two datasets can provide further information about the quality of Graduate Outcomes data. Beyond HESA, both the Longitudinal Educational Outcomes (LEO) study and the Labour Force Survey (LFS) collect data on education and salary, with the LFS also including detailed information on employment and occupation. While the Graduate Outcomes, LEO, and the LFS can provide complementary views of graduates in the workforce, it is important to understand key differences between the three data sources.

Graduate Outcomes and the HESA Student record

In Spring 2021, HESA analysts carried out a quality assurance investigation based on linked data from the HESA Student record and the 2017/18 Graduate Outcomes dataset. A linked dataset was constructed linking all graduates in the 2017/18 target population with the Student records from 2017/18 to 2019/20, and fuzzy matching of data items contained in both Student and Graduate Outcomes was used to identify those members of the Graduate Outcomes population who appeared to be in further study according to the Student record during the relevant Graduate Outcomes census week. By investigating the characteristics of graduates who appeared to be in further study in both datasets, those who recorded themselves in Graduate Outcomes as engaged in a course of further study or training but could not be found in the Student record, and those who appeared to be in further study in the Student record but not in the Graduate Outcomes dataset, we hoped to evaluate the extent to which data on further study in the two datasets is consistent and comparable.

Our initial investigation of linked Graduate Outcomes and Student data in 2021 suggested that, where individuals can be found in both datasets, the two datasets match quite closely, which in turn suggests that the Graduate Outcomes data is generally robust. The areas of mismatch between the two datasets formed the basis for a set of research questions which we began to investigate in Spring 2022, this time linking data from all three years of Graduate Outcomes data to the HESA Student Record.

For those graduates who reported themselves to be in further study in Graduate Outcomes who could also be found in further study in the Student record, we set out to investigate the alignment of the two datasets; for those who could not be found in the Student record, we looked to identify any variation by cohort, patterns in the type of qualification reported, and clusters at particular providers. For those who reported no further study, we set out to investigate how many could nevertheless be found in the HESA student data in census week, how many could be found in the HESA data to have completed interim study, and how close to the census week were the start and end dates of their current or interim study. Turning to those graduates who reported that they were not in study during census week but that they had undertaken some interim study since completing their initial qualification, we looked to see what proportion of that interim study could be found in the linked Student data and how well aligned the Student data was with self-reported data on interim study in terms of provider, level, and mode of study.

The results of our 2022 investigation into linked Graduate Outcomes and Student data were published in June 2022, following the 2019/20 Graduate Outcomes statistical release[0]. While survey responses on the level and mode of further study generally aligned closely to the Student record, there seemed to be some confusion on the part of graduates regarding the level of vocationally oriented qualifications, with some graduates saying they were studying for professional qualifications where administrative data indicated that they were on taught postgraduate courses. We also found some discrepancies regarding the start and end dates of further study, with some graduates reporting that they were enrolled on qualifications which appeared in the Student record either to end shortly before or to commence shortly after the census week.

When we looked at interim study, most reported interim study could be found in the linked Student data, with a relatively high degree of alignment between the two datasets, although we did see some apparent confusion relating to level of study, particularly where graduates were enrolled on postgraduate taught courses prior to commencing postgraduate research degrees. We also saw some graduates apparently answering the survey questions on interim study with regard to the qualification they had completed fifteen months ago.

On the basis of our investigation, we made several recommendations. We recommended that HESA should continue to monitor discrepancies between Graduate Outcomes and Student data with regard to level of study and course start and end dates, as well as monitoring the extent to which the interim study questions appear to be completed about the course completed fifteen months ago. On the basis of further investigation into the issues around level of study, we also suggested some minor changes to the survey wording in order to make it clearer which qualifications count as professional qualifications and which count as taught postgraduate; this wording has been implemented for the fifth year of surveying. Ongoing exploration of these areas will help us continue to identify opportunities for improvement of the survey and associated guidance.

Graduate Outcomes and external data on graduates

The LEO dataset, which was first published in 2017, brings together education data from the Department for Education (DfE) along with employment, earnings, and benefits data from the Department for Work and Pensions (DWP) and Her Majesty's Revenue and Customs (HMRC). Using these sources, LEO provides earnings and benefits information for graduates one, three, five, and ten years after completion of their qualifications; it also includes data on personal characteristics (gender, ethnicity, and age), university attended, subject studied, qualification achieved, and graduate movement between home region, provider region, and current region.[1]

Unlike Graduate Outcomes, which, as a survey, depends on the individual responses of graduates, the LEO dataset is drawn from administrative data and includes information on all graduates from English providers in paid work in the UK; since LEO earnings data comes directly from HMRC, it is free of some of the risks of inaccuracy inherent in self-reported salary data. LEO does not, however, include data on hours worked, so it is not possible to distinguish between graduates who are in full-time work and those who are working part-time; this can be a particular issue for data on female graduates, who are more likely to be working part-time than their male counterparts.[2] LEO also does not include data on graduates doing voluntary or unpaid work, and, because the LEO

earnings data does not include self-assessment earnings, LEO data on graduates in self-employment cannot be entirely representative.[3] LEO includes data on industry of employment, but it does not include more detailed information about occupation; the LEO record tells us what graduates earn and in what industries they are employed, but it gives us only limited information about what graduates do.[4]

Graduate Outcomes and LEO thus provide different pictures of the graduate population in the UK. One of the goals in the design of the Graduate Outcomes survey was to provide statistical outputs which could contextualise data on graduates from other sources, such as LEO, and this goal is reflected in the breadth of information collected in the Graduate Outcomes survey.[5] While the LEO dataset provides data on a small number of variables for most graduates in the UK, and while it, moreover, tracks changes in earnings over time, the Graduate Outcomes survey provides a more detailed picture of each annual cohort at a single point in their post-university careers. The LEO dataset measures graduate outcomes only in terms of whether graduates are in paid employment and, if so, how much they are earning in what industry, while the Graduate Outcomes survey collects a broader range of information about what graduates are doing and how they feel about it.

While LEO is specifically geared towards collecting data about employment outcomes for higher education graduates, the LFS is a household survey designed to collect data about the employment circumstances of the UK population as a whole. It was first run in 1973 as a biennial survey and shifted to an annual survey in 1984; since 1992, the LFS has been collected quarterly, with a switch from seasonal to calendar quarters in 2006. Households participating in the LFS are surveyed for five consecutive quarters, with a fifth of the overall sample being replaced each quarter. Where LEO collects administrative data on all graduates in employment in the UK, the LFS is administered to a systematic sample of approximately 35,000 households in Great Britain, plus approximately 2,500 households from Northern Ireland; conclusions about overall patterns in employment circumstances are thus drawn from a relatively small portion of the UK population.[6]

Unlike the LFS, which is concerned with the entire UK labour force, Graduate Outcomes is concerned only with those who have completed HE qualifications in a given year, and, while there will inevitably be some level of non-response, Graduate Outcomes aims to collect data from the entire target population. With 361,215 responses in the first year 380,980 in the second, 374,885 in the third, and 355,165 in the fourth, the Graduate Outcomes sample is thus much larger than the annual sample collected by the LFS, despite the narrower focus of the Graduate Outcomes survey.[7]

Although both Graduate Outcomes and the LFS include questions about employment and education, the focuses of the two surveys are different. The LFS is primarily focused on employment, but participants are also asked to respond to the ONS4 SWB questions and to a series of questions about their educational attainment.[8] Since not all LFS respondents have the same educational qualifications, the educational information collected in the survey allows for some comparison of outcomes between people with different educational histories. All Graduate Outcomes respondents, on the other hand, are higher education graduates, so different comparisons are possible; rather than encouraging comparisons between graduates and non-graduates, Graduate Outcomes encourages comparisons between different categories of graduates.

Respondents to the LFS can be at any stage in their careers; for those who have higher education qualifications, this means that they may be selected to participate in the LFS shortly after finishing their qualifications, or they may be selected many years later. Even

within the subset of LFS respondents with higher education qualifications, there will therefore be a wider variation in experiences and possible outcomes than is likely to be visible in Graduate Outcomes, where graduates are deliberately surveyed at the same point in their post-university careers. While Graduate Outcomes provides a cross-section of the experiences of higher education graduates 15 months after finishing their qualifications, the LFS can provide glimpses into what their lives may be like at a variety of different points.

If we are looking for a complete picture of what happens to higher education graduates in the UK, Graduate Outcomes, LEO, and the LFS all fill in different pieces of the puzzle. Although the datasets could fruitfully be used in conjunction with each other – the use of the same set of SWB questions in Graduate Outcomes and the LFS might, for example, allow for some research into the comparative SWB of graduates and non-graduates – in making any comparison between the three data sources, it will be important to recognise the differences in methodology and coverage between the sources. To return to the example of SWB comparisons, although LFS and Graduate Outcomes respondents answer the same four questions about SWB, they are faced with those questions at different points in their careers, and differences in SWB may depend on a range of factors not necessarily connected to education.

In addition to enabling careful comparisons between graduates and the population as a whole or between different stages in graduates' careers, the existence of other datasets with overlapping domains is likely to be important in the future development of Graduate Outcomes. When LEO data was first published, the DfE conducted a comparison between the LEO and DLHE datasets; HESA has in the past carried out similar comparisons in order to check the quality of DLHE salary data, and a further, detailed comparison of LEO and Graduate Outcomes would provide useful information about the respective strengths and weaknesses of the two datasets.[9] HESA also hopes in future years to explore the possibility of linking the Graduate Outcomes record with other relevant datasets, including LEO salary data.[10] Doing so will not only allow us to streamline our collection processes, but also, and perhaps more importantly, it will allow us to provide a fuller view of the trajectories of graduates after they leave higher education.

[1] Department for Education. 2021. Tax Year 2018/19. Graduate Outcomes (LEO). https://explore-education-statistics.service.gov.uk/find-statistics/graduate-outcomes-leo/2018-19

[2] Due to the limitations of LEO as a representative measure of female earnings, researchers from the Institute for Fiscal Studies chose to focus on the earnings of sons in their recent report for the Social Mobility Commission, The Long Shadow of Deprivation: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/923623/SMC_Long_shadow_of_deprivation_MAIN_REPORT_Accessible.pdf

[3] Department for Education. 2017. Employment and earnings outcomes for higher education graduates by subject and institution: experimental statistics using the Longitudinal Educational Outcomes (LEO) data. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718225/SFR_18_2017_LEO_mainText.pdf

[4] Office for Statistics Regulation. 2019. Exploring the public value of statistics about post-16 education and skills in England. Office for Statistical Regulation Systematic Review Programme. https://www.statisticsauthority.gov.uk/publication/exploring-the-public-value-of-statistics-about-post-16-education-and-skills-in-england/

5] Further discussion of the goals which shaped the design of the of the survey can be found in relevant sections of the Graduate Outcomes Survey methodology; see https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/understanding-outcomes and https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/review-topics

[6] Office for National Statistics. 2018. Labour Force Survey User Guide, Volume 1: LFS Background and Methodology. Available from: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/labourforcesurveyuserguidance

[7] HESA 2021. Graduate Outcomes Cohort D Review: C18071 2018/19. https://www.hesa.ac.uk/files/End%20of%20cohort%20D%20report%20C18071.pdf

HESA. 2020. Graduate Outcomes Cohort D Review: C17071 2017/18. https://www.hesa.ac.uk/files/End%20of%20cohort%20D%20report.pdf

[8] Office for National Statistics. 2020. Labour Force Survey User Guide, Volume 2: User guide to the LFS questionnaire. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/labourforcesurveyuserguidance

[9] Department for Education. 2016. Employment and earnings outcomes for higher education graduates: experimental statistics using the Longitudinal Educational Outcomes (LEO) data. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/543794/SFR36-2016_main_text_LEO.pdf

[10] HESA. Key principles of Graduate Outcomes. https://www.hesa.ac.uk/innovation/outcomes/about/principles

Comparability and time series

Graduate Outcomes and DLHE

When the new Graduate Outcomes survey was being designed, the outputs developed from the DLHE data were seen to have value, and it was therefore decided to begin iterating from the DLHE approach in designing the new survey.[1] Nevertheless, Graduate Outcomes is an entirely new survey, and important differences in timescale, methodology, and survey questions between Graduate Outcomes and DLHE make it impossible for direct comparisons to be made between data from the two surveys.

For the DLHE survey, graduates were contacted six months after the completion of their qualifications; Graduate Outcomes surveys graduates 15 months after the completion of their qualifications, that is, nine months later than they would have been surveyed for DLHE. Graduates surveyed for Graduate Outcomes are therefore at a very different stage in their post-HE careers than those who were surveyed for DLHE, which means that comparing the outcomes of respondents to the two surveys will not be a like-for-like comparison.

Methodological differences between DLHE and Graduate Outcomes are another reason to avoid direct comparisons between the two surveys. Where DLHE was administered by providers who then returned data to HESA for processing and analysis, Graduate Outcomes is administered centrally to graduates. For DLHE, SOC coding was done by providers, whereas SIC and SOC coding for Graduate Outcomes is outsourced to the business data services company Oblong.[2] The central administration of both the Graduate Outcomes survey itself and its SIC and SOC coding ensures a greater degree of consistency than was possible with the DLHE survey.

Finally, although the two surveys cover similar ground, the specific questions asked by the two surveys are different. The list of activities which can be selected by respondents to Graduate Outcomes is different from the list available to DLHE respondents; the Graduate Outcomes survey gives respondents more options and, in particular, allows graduates who are in work to be more specific about the type of work they are doing. In addition to asking for more detail about areas which received less emphasis in the DLHE survey, Graduate Outcomes also includes new questions, such as the graduate voice questions, which reflect the new survey's emphasis on providing metrics for graduate success beyond employment and salary; similarly, the SWB questions, which were previously used in the final iteration of LDLHE, have been made part of the core Graduate Outcomes survey. Given these differences in survey design, much of the Graduate Outcomes data will have no direct equivalent in DLHE.

Having decided to replace DLHE with a new and fundamentally different survey, HESA has taken the decision not to undertake, publish, or otherwise disseminate any comparisons of data between the Graduate Outcomes survey and the DLHE survey. We likewise advise all users of the two surveys to avoid making any direct comparisons between the two datasets. The two surveys are not directly comparable and any attempts to make direct comparisons are likely to lead to questionable results which are open to misinterpretation.[3]

The impact of the Covid-19 pandemic

The first UK cases of COVID-19 were confirmed at the end of January 2020, about two thirds of the way through the Cohort A survey period for year two of Graduate Outcomes. The World Health Organization declared that the outbreak of COVID-19 was a pandemic on 11 March 2020, shortly after the end of the Cohort B census week. The first UK lockdown, which was agreed in all four nations, was announced on 23 March, and, despite some easing during summer 2020, different levels of pandemic-related restrictions remained in force throughout the rest of the second year of Graduate Outcomes surveying. Given the far-reaching effects of the COVID-19 pandemic on all aspects of daily life in the UK and around the globe, including employment and study, HESA endeavoured to respond appropriately to the pandemic in its handling of the Graduate Outcomes survey and publications.

Although no changes could be made to the survey for Cohort B, Cohort C offered an opportunity to consider whether any changes could be made which would improve the quality of data collected under pandemic circumstances. From the start of Cohort C, two changes were made to the survey with the goals of allowing interviewers to support respondents and helping respondents describe their current circumstances accurately. First, supportive text was added to the wellbeing questions, signposting mental health and wellbeing organisations around the world. Second, additional guidance was added to the activity questions, instructing furloughed graduates to select the option ‘paid work for an employer’. Changes to the place of work and salary questions were also considered, given the shift to remote working and the possibility of furloughed graduates reporting lower salaries, but it was decided that changing these questions in the short term would be likely to introduce additional uncertainty rather than adding clarity; these questions, however, are currently undergoing a process of fundamental review.

After the second year of Graduate Outcomes data was received, HESA undertook a programme of analysis to determine the impact of the pandemic on data quality. We compared year two response rates to those from year one, both overall and for graduates with different characteristics, in order to determine whether the circumstances of the pandemic seem to have made some groups less likely to respond to the survey. Since the effects of the pandemic were likely to have been more pronounced for the later cohorts of year two, we also looked at response rates by cohort, comparing year two cohorts with the equivalent cohorts from year one.

Our analysis showed that the year two Graduate Outcomes data remained robust despite the changing circumstances under which it was collected. Response rates for year two remained for the most either stable or slightly higher than equivalent rates for year one; this was true both overall and when response rates were broken down by personal characteristics. Although there were some differences by cohort, these differences for the most part matched the cohort-level differences which were visible in year one. While there were some changes in graduate activities between year 1 and year 2, including a 1.5 percentage point rise in graduates in reporting themselves as unemployed and a 47% decrease in the percentage of graduates taking time out to travel, these changes are likely to reflect real changes in what graduates were doing during the pandemic rather than problems with the quality of the Graduate Outcomes data.

The 2019/20 Graduate Outcomes survey was also conducted under pandemic

circumstances, with each survey cohort finishing their studies and being surveyed at a different point in the pandemic. While cohorts A and B finished their higher education courses before the start of the pandemic, the COVID-19 outbreak was declared a pandemic on 11 March 2020, as cohort C was finishing their studies; cohort D completed their higher education courses between May and July 2020, during the gradual easing of the first national lockdown. Conversely, cohorts A and B were surveyed between December 2020 and May 2021, while Covid restrictions of one sort or another were in place across the UK. Cohort C was surveyed as restrictions were gradually phased out, while cohort D was surveyed against a backdrop of rising case numbers but few legal restrictions on activity.

Given the changing pandemic circumstances of the 2019/20 survey year, we conducted a further programme of analysis to identify any effects of the pandemic on the year three survey data. As we found in year 2, response rates for year 3 remained steady or increased slightly in year 3, both overall and for graduates with different personal characteristics. In general, we saw fewer and smaller changes in graduate activity between 2018/19 and 2019/20 than we had seen between 2017/18 and 2018/19. We saw a decrease of about 1 percentage point in the rate of graduates reporting themselves as unemployed, which aligns with data from the ONS suggesting that the labour market in 2021 was beginning to recover following increases in unemployment early in the pandemic. While we expanded our analysis of the possible effects of the pandemic on the 2019/20 data to include occupational classification, industry of employment, and the relationship between industry of employment and responses to the subjective wellbeing and graduate voice questions, we saw no notable year-on-year changes in any of these areas.

The pandemic context of the 2020/21 survey year was different; although some restrictions remained in place as graduates in cohorts A and B finished their qualifications, most formal restrictions (except for some around international travel) had been lifted by the time surveying began in December 2021. Given both the decreasing magnitude of changes which might be related to the pandemic in the 2019/20 data and the increasing difficulty of distinguishing between potential pandemic effects and the effects of other factors, we took the decision that we would carry out one final programme of analysis focusing on potential pandemic impacts, but that in subsequent years we would simply include COVID-19 amongst a range of contextual factors which may have an impact on our data.

Our final investigation of the impact of the pandemic, as expected, showed few changes which could be attributed to the pandemic. While we did see a change in response rates between 2019/20 and 2020/21, that change stemmed not from the pandemic, but from the cessation of international calling. Where we saw changes in graduate activities, these changes continued the 2019/20 trend towards recovery; in particular, the percentage of 2020/21 graduates in full-time employment was the highest since the start of surveying for the 2017/18 academic year. We saw very little overall change in graduates' reflections on their activities; graduate subjective wellbeing, after a dip in the first year of the pandemic, has remained stable since the second year of surveying.

Fuller discussions of the results of our investigations into the effects of the COVID-19 pandemic on Graduate Outcomes can be found in three insight briefs, published on the HESA website alongside the 2018/19, 2019/20, and 2020/21 Graduate Outcomes statistical releases.[4]

[1] See the section of the Graduate Outcomes Survey methodology on the review of the data items collected in DLHE and LDLHE: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/review-topics

[2] For more detail on SIC and SOC coding methodology, see https://www.hesa.ac.uk/definitions/operational-survey-information#data-classification-sicsoc

[3] See the dissemination section of the Graduate Outcomes Survey methodology: https://www.hesa.ac.uk/data-and-analysis/graduates/methodology/dissemination

[4] https://www.hesa.ac.uk/insight/16-06-2022/impact-covid-19-graduate-outcomes

Respondent burden

As the organisation responsible for conducting Graduate Outcomes survey, we are expected to reflect on the data collection burden on respondents under the Code of Practice for Statistics. Based on the methodology outlined by the Government Statistical Service[1], respondent burden has been calculated using the following parameters:

- Number of complete survey responses[2]
- Median time taken to complete the survey
- Mode of data collection (online or telephone)

Compliance cost (online) = 944,910.60 minutes

Compliance cost (telephone) = 2,570,504.50 minutes

Through the ongoing review of the survey we have identified efficiencies in data collection by reducing the length of the questionnaire, following a thorough review of user needs; as a result of this exercise, we were able to remove a few questions from the fourth iteration of this survey. We have also improved our survey duration metrics through improved collection of this data. Consequently, this has reduced respondent burden.

[1] https://gss.civilservice.gov.uk/policy-store/monitoring-and-reducing-respondent-burden-2/

[2] Given the limitations of paradata collected on Graduate Outcomes, it has not been possible to include partial survey responses in this assessment. Also excluded are a small number of records with errors in the recording of start and end time or which had unusually large or small survey durations.

Conclusion

The Code of Practice for Statistics is based on three pillars: trustworthiness, quality, and value.[1] In order to comply fully with the Code of Practice, producers of statistics must ensure that the statistics they produce reflect these three attributes. While this report has been primarily concerned with assessing the Graduate Outcomes survey in terms of quality, the mutually supportive nature of the three pillars means that any assessment of statistical quality will also, of necessity, have implications for the trustworthiness and value of the statistics in question.

Statistical trustworthiness depends on the conditions of statistical production. If statistics are to be trustworthy, there must be a high degree of public confidence in the people and organisations responsible for producing them. This confidence must extend to the honesty and integrity of statistical producers, to their independence, to their commitment to the orderly release of statistics, to the transparency of their operating processes, to their professional capability, and to their standards of data governance.

In producing this report on the Graduate Outcomes survey and the statistical outputs derived from it, we hope to have shed some additional light on the processes underlying the design and implementation of the survey, the processing of survey data, and the production of statistical outputs. In so doing, we have contributed to the transparency of HESA's operations, as required in section T4 of the Code of Practice; we hope that increased transparency will give users the information they need to have confidence also in the other elements which contribute to statistical trustworthiness. By explaining the processes by which we assess the accuracy and reliability of our data, for example, we hope to give users of the Graduate Outcomes survey confidence in the professional capability of HESA, Jisc and the partner organisations involved in survey administration and data processing; similarly, by discussing the efforts we have taken to protect personal information, we hope to give users confidence in our data governance practices.

Statistical quality is a characteristic of the statistical products themselves. It is not sufficient for statistical products to be produced in a trustworthy fashion; instead, the Code of Practice for Statistics stipulates that 'the statistics must be the best available estimate of what they aim to measure'.[2] Producing high quality statistical outputs depends on collecting data from suitable sources, on employing sound methodology in the collection, processing, and analysis of data, and on being able to provide users with clear information about how the quality of data and statistics has been assured.

Over the course of this quality report, we have guided users of the Graduate Outcomes survey through the processes used by HESA and Jisc to assess the quality of the survey and the resulting statistical outputs. At each stage in the development and implementation of Graduate Outcomes HESA considered how best to ensure that Graduate Outcomes would be a high quality survey, leading to high quality official statistics outputs. The survey was designed both to capture relevant data about the experiences of graduates after course completion and to reach as many members of our target population as possible. Rigorous quality assurance processes were built into our data collection and processing systems, and we have continued to take user feedback onboard and refine our methodology at each stage of the process.

Since the completion of first full cycle of collection, processing, and publication, HESA and Jisc have continued to work to improve the quality of our data. In addition to our routine

quality assurance work, we have also embarked on a complete post-implementation review of the Graduate Outcomes survey. For the last six months, a number of work streams have been involved in developing recommendations for the Graduate Outcomes Steering Group with the goal of ensuring that future iterations of the survey yield data which remains as relevant, reliable, accessible, timely, and coherent as possible.

The final pillar of the Code of Practice for Statistics is value. While trustworthiness and quality refer to how statistics are produced and the nature of the statistics themselves, statistical value depends on whether statistical products are fit for purpose. As is stated in the opening sentence of the introduction to the Code of Practice, 'official statistics are an essential public asset.'[3] Official statistics thus exist for the benefit of their users, and neither the quality of outputs nor the trustworthiness of their production can make up for a failure to consider user needs for statistics that contribute usefully to issues of public concern.

HE providers have collected information on the destinations of their graduates since at least the 19th century; as participation in higher education has expanded and debates about the value of higher education have grown increasingly prominent, the appetite for data on graduates has increased. In designing and implementing the new Graduate Outcomes survey, HESA and Jisc have worked to iterate from and improve upon previous graduate destination surveys; we have retained questions which were deemed to have value, but we have also refined old questions and added new questions to provide additional insight. Having worked with key users to design a survey that collects data on the most relevant questions about the outcomes of graduates, HESA aims to produce statistical outputs which present that data as clearly and accessibly as possible. The Graduate Outcomes data releases and supporting materials affirm our commitment to the principles of open data, and, even more importantly, they also ensure that all of our users have access to statistical outputs designed to meet their needs.

[1] Code of Practice for Statistics. https://code.statisticsauthority.gov.uk/wp-content/uploads/2022/05/Code-of-Practice-for-Statistics-REVISED.pdf

[2] Code of Practice for Statistics. Introduction, Section xiv. https://code.statisticsauthority.gov.uk/wp-content/uploads/2018/02/Code-of-Practice-for-Statistics.pdf

[3] Code of Practice for Statistics, Introduction. https://code.statisticsauthority.gov.uk/wp-content/uploads/2018/02/Code-of-Practice-for-Statistics.pdf

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