

# Evaluation of new Data Science and Artificial Intelligence conversion Masters courses

Second interim report

## For the Office for Students

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# Executive summary

This is an interim summary report of an evaluation being undertaken by CRAC of a programme of new data science and artificial intelligence postgraduate conversion courses that launched in September 2020. Commissioned by the Office for Students, the evaluation is based on a mixed-methods approach involving dialogue and roundtables with provider project teams, systematic collection of student data and student surveys. The report is positioned as the funding for the programme comes to an end in March 2023 and aims to provide an update on the key data and findings following a previous interim report published in June 2022.<sup>1</sup>

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<sup>1</sup> See <https://www.officeforstudents.org.uk/publications/evaluation-of-data-science-and-ai-pg-conversion-courses/>

# 1 Introduction

## 1.1 Background

This is a summary of data and findings emerging from an evaluation being undertaken by the Careers Research and Advisory Centre (CRAC) of the artificial intelligence (AI) and data science postgraduate conversion courses programme, commissioned by the Office for Students. The programme provided funding to 28 English higher education providers to develop conversion courses and to award 1000 scholarships to key groups of students, which had the aim of enhancing the diversity of the student cohort and consequently of skilled graduates entering the AI and data science workforce in the UK. Scholarship eligibility was based primarily on gender (female), ethnicity (black) and disabled status, and a range of other under-represented characteristics.<sup>2</sup>

This interim report, in the third and final year of the programme, provides a snapshot of data indicating progress in the programme and observable summative outcomes at this point.

## 1.2 Evaluation approach and evidence base

A mixed-methods approach has been implemented for the evaluation, broadly comprising:

- Regular dialogues with funded project teams to monitor course development, identify challenges and establish sustained data collection;
- Systematic collection of data about students enrolled on courses and obtaining scholarships, including key student profile characteristics;
- Programme-wide surveys of students during and following completion of courses, implemented to target all main course intakes;
- Eliciting and sharing learning through dialogues with each provider and programme round-tables/workshops.

Statistics about student enrolments and scholarship holders were derived from our collation of student-level data that funded providers provide about the students enrolled on these courses including those who obtained a scholarship. This report uses data about students in all course intakes during 2020/21 and 2021/22, plus autumn 2022. This data is almost entirely complete for the main three priority characteristics.

The other data sources used here are results from programme-wide online surveys of participating students, implemented in waves to reflect the timing of main intakes to courses. These include a 'student survey' in the early weeks of a course, from which we have 1030 responses (representing 25 of the 28 funded providers). Results in this report focus on outcomes data from a 'completion survey' implemented two to three months after students have completed a course, again in waves. Just over 280 valid responses have been obtained to date, from students in all Year 1 intakes and autumn 2021 intakes, who represent three providers. The estimated response rate to the completion survey is over 11 per cent of the approximately 2500 students who by then had completed a course. In practice the rate was higher, as not all providers circulated the survey invitations, and they

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<sup>2</sup> Similar to characteristics prioritised in undergraduate widening participation programmes.

may not have reached all the targeted students (as some no longer hold contact details for alumni).

## 2 Progress to date: courses and students

### 2.1 Numbers of enrolments and scholarships

Overall, more than 6300 students have enrolled on courses in the programme to date (Table 1), well above the original aspirations for the total programme of 2500. Full data is awaited from intakes at ten providers in January/February 2023 (which are not included here), as well as intakes in spring 2023.

Launch period	All enrolments			All scholarships		
	Target	Total	% of UK domicile	Target	Total	% of UK domicile
Autumn 2020	605	784	61%	220	139	88%
January 2021		535	52%		71	70%
Spring 2021		74	49%		8	100%
<b>Total Year 1</b>		<b>1393</b>	<b>53%</b>		<b>218</b>	<b>83%</b>
Autumn 2021	835	1786	37%	350	258	71%
January 2022		688	12%		34	35%
Spring 2022		75	23%		NR	0%
<b>Total Year 2</b>		<b>2549</b>	<b>33%</b>		<b>2</b>	<b>67%</b>
Autumn 2022	1060	2375	20%	430	377	48%
Remaining Year 3						
<b>Cumulative total</b>	<b>2500</b>	<b>6317</b>	<b>32%</b>	<b>1000</b>	<b>887</b>	<b>61%</b>

**Table 1: Enrolments and scholarships to 31 December 2022, based on providers' data**

UK-domiciled students comprised the majority of entrants to courses in Year 1 (2020/21), but this proportion has fallen subsequently as the number of international students has grown. Overall, to date, 32 per cent of enrolled students have been of UK domicile. Responses to our student survey suggest courses have drawn students from at least 69 different countries to date, mostly (65 per cent) from countries outside the European Union.

Table 1 also summarises the numbers of scholarships awarded in the programme. There was almost full use of the 220 available scholarships in Year 1 intakes, but awards in Year 2 fell below target. The cumulative total to date is just under 900, but more will have been allocated in intakes during January/February 2023 and in the upcoming spring 2023 intakes.

On the basis of the autumn 2022 (Year 3) intakes, course cohort sizes are again very healthy and, in many cases, large. Mean cohort sizes in this intake have been just over 75 students for Data Science (DS) courses, over 85 for combined DS and AI courses, and around 35 for AI courses (all slightly higher than for the autumn Year 2 intakes). There have been and continue to be some very large cohorts, with several providers now having enrolled over 200 students in a single intake, some more than once, and many over 100.

Only one provider enrolled fewer than ten students in its autumn 2022 intake (although enrolments to certain variants of particular courses can be lower).

## 2.2 Profile of scholarship students

Results presented here mainly focus on UK-domiciled students, partly because conventions limit the reporting of student ethnicity to UK domiciles. Table 2 summarises key aspects of profile of the 556 UK-domiciled students awarded scholarships to date, for whom there is full profile data. 70 per cent have been women, 35 per cent of black background (and a further 24 per cent another ethnic minority background), while just over one quarter (26 per cent) declared a disability. These proportions have remained relatively consistent throughout the programme.

Around one third of these UK-domiciled awardees were reported by providers to be in one or more of the other under-represented groups eligible for a scholarship, although this data is less robust as several providers report they cannot identify such characteristics among postgraduate students. Fewer than 30 scholarships in total were awarded to students who did **not** also qualify through being in one or more of the main three eligibility groups. These results confirm that many awardees have been eligible on the basis of multiple criteria.

Launch period (term and year)	UK-domiciled scholarship students (in per cent)				
	Total	Women	Black	Ethnic minority	Disabled
Autumn 2020	124	74%	40%	56%	30%
January 2021	50	80%	40%	56%	26%
<b>Total Year 1</b>	<b>179</b>	<b>77%</b>	<b>40%</b>	<b>56%</b>	<b>29%</b>
Autumn 2021	183	69%	34%	56%	23%
January 2022	12	92%	33%	58%	33%
<b>Total Year 2</b>	<b>196</b>	<b>71%</b>	<b>34%</b>	<b>56%</b>	<b>24%</b>
Autumn 2022	181	68%	34%	65%	26%
<b>Cumulative total</b>	<b>556</b>	<b>70%</b>	<b>35%</b>	<b>59%</b>	<b>26%</b>

**Table 2: Key characteristics of UK-domiciled students awarded scholarships (cumulative to December 2022), based on providers' student data**

As the data in Table 1 shows, in Year 1 of the programme, 83 per cent of scholarships were awarded to UK-domiciled students, but this fell to 67 per cent in Year 2 intakes. In the autumn 2022 intakes, just under half the awards went to UK-domiciled students (48 per cent). The proportion of awards made to UK students has fallen significantly with time, and the profiles in Table 2 are for a reducing proportion of all scholarships. Although overall scholarship numbers have increased since Year 1, the number awarded to UK students each year has only risen slightly.

Detailed analysis of scholarship data and dialogues with course leaders suggest most providers prioritised UK students in award-making in Year 1, many only awarding scholarships to UK students. This has shifted over time, with an increasing number of providers awarding progressively higher proportions of their scholarships to international students. In autumn 2022 intakes, around half the providers awarded more than half their

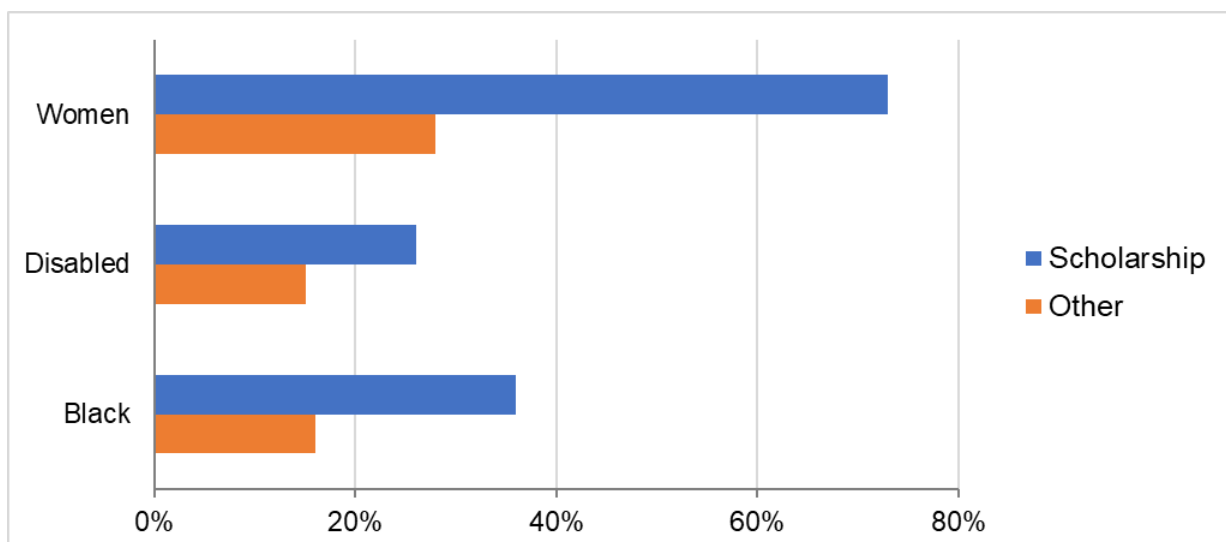
scholarships to international students and only very few providers made awards only to UK students. Although, overall, providers continue to report more demand for scholarships than supply, it is clear now that some do not have enough UK-domiciled eligible applicants to absorb their allocation.

### 2.3 Effect of scholarships

To date, overall, 38 per cent of all enrolled students have been female, a proportion which has remained very consistent. In contrast, the proportion reporting disabled status has fallen progressively (13 per cent in Year 1, to 5 per cent in Year 3 to date), although the proportion amongst UK students has been higher throughout (18 per cent overall) than for international students (2 per cent overall). Amongst UK students, to date, 21 per cent have been of black background. The total proportion of UK-domiciled students from an ethnic minority background has been just under half.

The UK-domiciled proportion of student cohorts has, however, been falling since Year 1, when they were the majority (56 per cent). In Year 2, the proportion of UK students was 30 per cent and in Year 3 intakes to date, it is lower again at 20 per cent. Thus, the ethnicity statistics above relate to a diminishing proportion of the total cohort.

One of the aims of the programme is to enhance the diversity of student cohorts. Figure 1 compares key aspects of profile for students with and without scholarships, again focusing on UK-domiciled students. The proportions of women, black and disabled students amongst scholarship students are all markedly higher than amongst students without scholarships (most prominent for women – who comprised 73 per cent of scholarship awardees but only 28 per cent of other UK students). The ‘more diverse’ profile of scholarship students has the desired effect of diversifying the total student cohort in terms of these targeted characteristics. However, this effect is somewhat lessened as the proportion of UK domiciles reduces and the total student cohort size increases faster than the number of scholarships.



**Figure 1: Chart showing the proportion of UK students to date with key profile characteristics, with and without scholarships, from student data (Ns: scholarship students 540; others 1485)**

### 3 Students' career outcomes

#### 3.1 Prior career aspirations

A key aspect of the evaluation is to ascertain what the graduates from these courses go on to do afterwards in their careers. This is best understood with the context of understanding the career intentions and motivations of the students when they chose to study their course. Based on student survey responses, around three quarters of respondents indicate they hope to work afterwards in a role making use of data or AI and about 60 per cent in a technical role working on data or AI. Almost 80 per cent would like that work to be in an employer/sector in which they could apply their data or AI skills, or in a specialist data/AI organisation (69 per cent).<sup>3</sup> On this basis, most students entering the courses appeared to aspire in the medium term to an employment outcome of the sort that the conversion course programme was funded to achieve.

#### 3.2 Next career steps

Based on responses to our completion survey, which comprise a modest but growing sample, 38 per cent of respondents had started a new job and 7 per cent more had a new job offer since completing their course, while 8 per cent had started a doctorate. 36 per cent of respondents were currently looking for a new job at the point of survey (two to three months after course completion). Only 8 per cent had remained in or returned to a pre-existing job and were not seeking other employment. This proportion may reflect that few part-time students have completed a course yet, as they could be more likely to remain working for their existing employer. These proportions are illustrated in Figure 2.

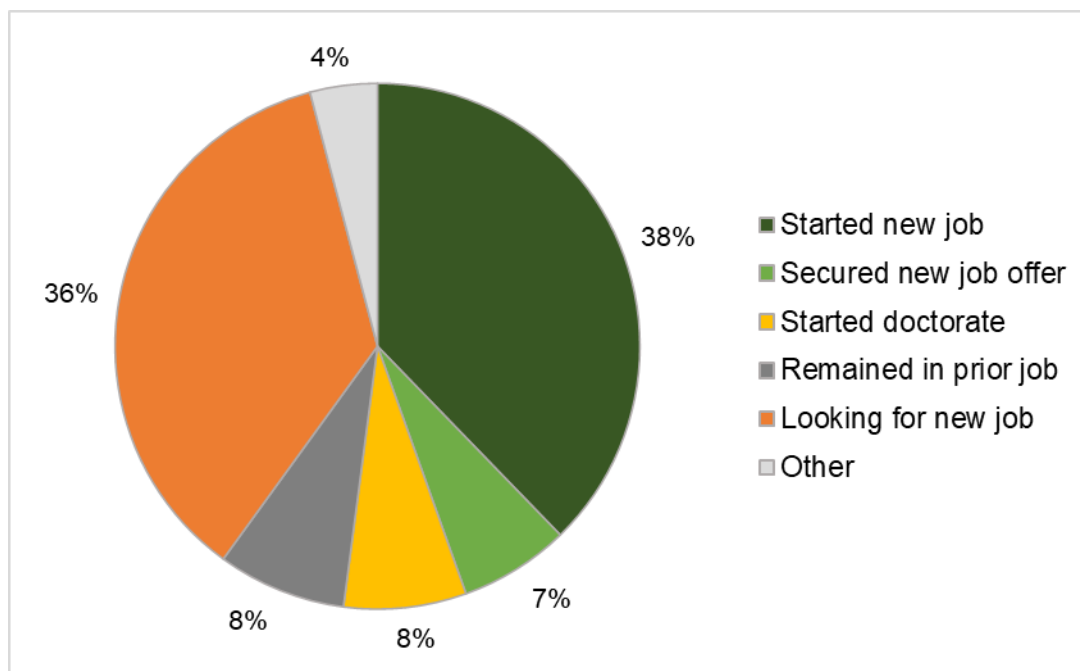
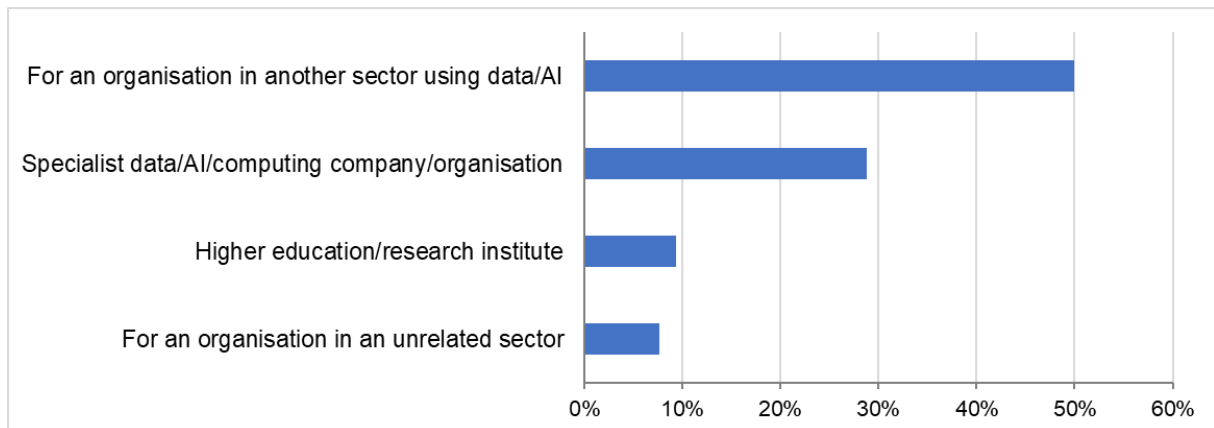


Figure 2: Chart showing graduates' current employment position, post-course (from completion survey responses, N=265)

<sup>3</sup> Multiple responses were permitted to this question.



Amongst the graduates who had a new job, a new job offer or a pre-existing job, half were in a role in a sector/employer using data science or AI, 29 per cent worked in a specialist data/AI organisation and 9 per cent in a higher education or research institute (i.e. 88 per cent in total were in employment directly related to the course). Figure 3 illustrates these proportions. This pattern of employment outcome is very similar to the pattern of the career aspirations prior to course study reported by student survey respondents. If those now studying for a doctorate are also included in the analysis, the proportion in an occupation closely related to the courses is over 90 per cent.



**Figure 3: Chart showing post-course career destinations for employed graduates (from completion survey responses, N=118)**

Analysis of the industrial sectors in which these jobs were located indicates a good spread, including in the public sector (health and government), as well as a wide variety of private sector industries including IT and communications (the most common sector). Preliminary inspection of given job titles confirms that almost every role achieved appears to be quite strongly data-focused.

It is also important to note 95 per cent of the graduates in employment were working in the UK, despite 44 per cent of these respondents being non-UK domiciles. This suggests that the courses may be enabling transition of international students into the UK workforce.

Amongst the respondents looking for a job, almost all were seeking a role either as a specialist in data/AI or in an organisation in another sector where they would use their data/AI skills, and almost all expected that role would be in the UK.

These emerging results provide growing evidence that, overall, most who complete the conversion courses are securing (or trying to) the types of employment that the conversion courses programme was designed to facilitate entry to in the UK. As the size of the response sample increases, it should be possible to analyse whether these positive results are being achieved by all types of graduate, including the specific targets for the scholarship scheme.

## 4 Summary of results

At this point in the evaluation, the data we have (from a range of sources) provides increasing confidence that a range of outcomes from the programme are aligning well with its desired objectives:

- New conversion courses in data science and AI have successfully been developed and continue to be delivered, attracting a large number of students to enrol. A wide range of domiciles and other personal characteristics are represented in the course cohorts.
- There is evidence that the offer of scholarships is resulting in a more diverse profile of UK-domiciled students in relation to the target underrepresented groups (female, black and disabled students).
- As the provision matures, an increasingly high proportion of the enrolled students is international rather than UK-domiciled. In parallel, the proportion of scholarships awarded to UK students has been falling, and in the most recent year was just under half (with some providers stating that they did not have enough UK students in priority categories to utilise).
- Based on survey evidence from 280 students who have completed a course, most have quickly secured jobs that specialise in or use data and/or AI. Almost all of those jobs are in the UK, irrespective of graduate domicile. Most who have not secured a new job a few months after completion of a course are looking for similar types of employment.

The evaluation is ongoing and a final report will be available in autumn 2023.