

ESES City Region Deal IRES Programme

Appendix One

Data Driven Innovation (DDI) Skills Gateway

Project Proposition - FINAL

Approved by Joint Committee on 1 March 2019

Lead: Alison Muckersie, University of Edinburgh

ACCELERATING
GROWTH

EDINBURGH AND SOUTH EAST SCOTLAND
CITY REGION DEAL

Data Driven Innovation Skills Gateway Project Proposition

Table of Contents

1	Introduction.....	5
1.1	About this Document	5
1.2	Project Vision.....	5
1.3	Context: Data Driven Innovation (DDI).....	6
1.4	Overview of the DDI Skills Gateway Project	9
1.5	Targeting resources	11
1.6	Summary of outputs.....	12
2	Strategic Case.....	13
2.1	PART A: The Strategic Context	13
2.1.1	National Context and Strategy Alignment	13
2.1.2	Alignment across the IRES Programme	15
2.2	Part B: The Case for Change	16
2.2.1	Existing Arrangements, Challenges & Business Needs	16
2.3	Objectives and Benefits	22
2.3.1	Early Wins	23
2.4	Scope of investment requirements	24
2.4.1	Data Education in Schools – early skills programme	24
2.4.2	Data Education for FE students - introductory and intermediate skills programmes	27
2.4.3	Data Education for HE students, both College and University learners - introductory and advanced skills programme	29
2.4.4	A Data Training for Work project – reskilling and upskilling programme.....	32
2.4.5	Diversity and Inclusion lead	36
2.5	Operational Risks, Constraints and Dependencies	36
3	Economic Case.....	37
3.1	Labour Market Context and Gap Analysis.....	37

3.2	Reducing inequalities	38
3.3	Evidence Base of Demand.....	38
3.4	Effecting Change	39
3.5	Identification of Options.....	39
3.5.1	Appraisals Approach	40
3.5.2	Programme Option Analysis	42
3.5.3	Preferred Option.....	42
3.6	Summary of Outcomes Benefits, and KPIs	43
4	Commercial Case	45
4.1	Delivery Options	46
4.1.1	Sourcing Approach.....	46
4.1.2	Overview of Responsibilities.....	46
4.2	Risk Mitigation	47
4.3	Contract Length.....	47
4.4	Personnel Issues.....	47
4.5	Implementation Timescales.....	48
5	Financial Case.....	48
5.1	Introduction.....	48
5.2	Expenditure profile	48
5.3	Impact on Income and Expenditure (I and E) Accounts	51
5.4	Financial risks.....	51
6	Management Case.....	53
6.1	Project Management and Theme Support	53
6.1.1	Central co-ordination:.....	55
6.1.2	Data Education in Schools Project	55
6.1.3	Data Education for FE students	56
6.1.4	Data Education for HE students Project	56
6.1.5	In work data training.....	56
6.1.6	Diversity and Inclusion.....	56
6.2	Programme Plan	57

6.3 Risk Mitigation Plan	58
<i>ANNEX 1 DDI Skills Gateway Programme Development Board</i>	59
<i>ANNEX 2 Projected outcomes</i>	60
<i>ANNEX 3 Risk Matrix</i>	63

1 Introduction

1.1 About this Document

This Business Case, following UK Treasury Green Book principles, sets out a detailed case for investment of around £8 million in a targeted Data Driven Innovation (DDI) Skills Gateway, as part of the Integrated Regional Employability and Skills (IRES) programme. It should be considered in conjunction with the IRES Programme Business Case, and alongside the DDI activities being undertaken as part of the Edinburgh and South East Scotland City Region Deal by the University of Edinburgh and Heriot Watt University. Reference is made throughout the document to the City Region – this encompasses the area covered by The City of Edinburgh Council, East Lothian Council, Fife Council, Midlothian Council, the Scottish Borders Council and West Lothian Council.

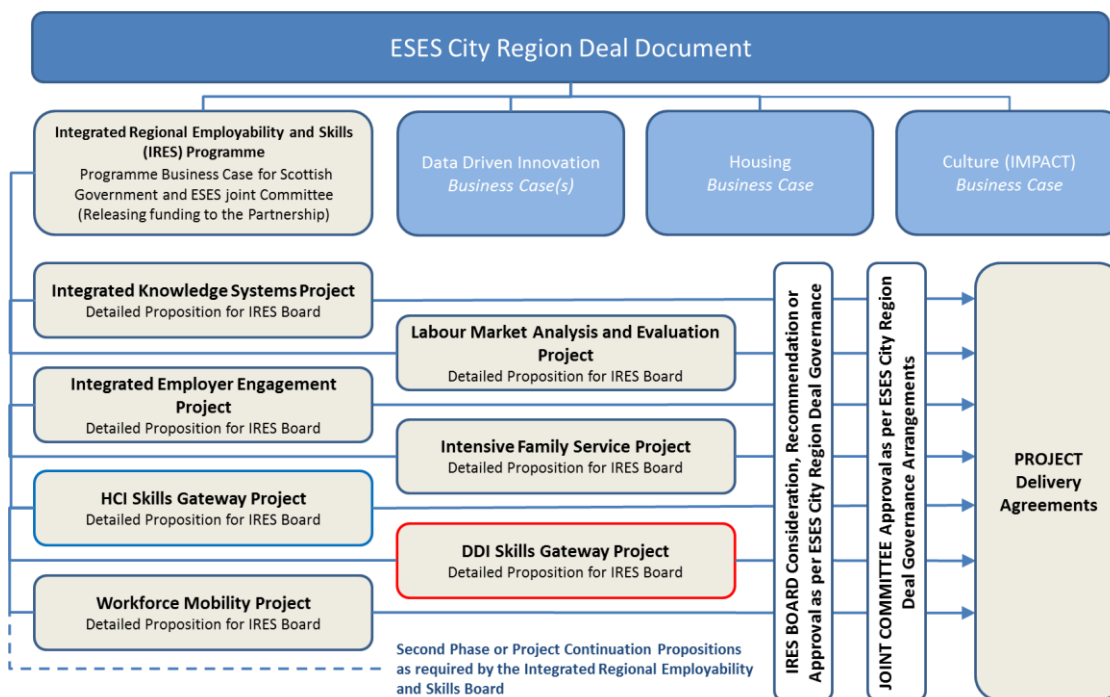


Figure 1: Suite of IRES programme documents

1.2 Project Vision

The DDI skills programme aims to develop a strategic approach to increasing the data skills of the population of the city region, regardless of gender, background or location. The skills activity brings together industry, universities, colleges, schools and other partners to help to develop an integrated pipeline of skills development and progression routes into data careers.

The programme aims to develop *data literacy*, or the ability to derive meaningful information from data. This skillset is not the same as digital literacy, although in practice working with data often requires digital skills such as using analysis software or programming, and improving data literacy is also likely to improve digital

literacy. Because data is so crucial for organisational success, data literacy, and associated meta-skills, are increasingly in demand for all employees.

The complexity of data analysis means that data literacy requires some knowledge of mathematics and statistics, but the skills required go beyond that. It includes the ability to:

- Know what data is appropriate to use for a particular purpose;
- Interpret data visualisations, such as graphs and charts;
- Think critically about information yielded by data analysis;
- Understand data analytics tools and methods and when and where to use them;
- Recognize when data is being misrepresented or used misleadingly; and
- Communicate information about data to people lacking data literacy, an ability sometimes referred to as data storytelling¹.

Where possible references in this document relate to data skills activity, but where this information is not available information on digital skills has been used as a best fit.

1.3 Context: Data Driven Innovation (DDI)

There has been an explosion in the amount of data being generated since the start of the digital age. Today, we create as much data every two days as we did from the beginning of time until 2000.² Advances in storage and machine learning algorithms means that many different types of data can be captured, stored and analysed. The ability to collect all of this data, and use it to advantage across a wide range of areas, sits behind the concept of data driven innovation.

Furthermore, as Artificial Intelligence (AI) systems become better at sorting data, finding patterns, and making predictions, algorithms are undertaking an ever-increasing range of tasks, from processing medical scans, to computing efficient delivery routes, and to tackling more sophisticated problems such as providing legal advice. Increased attention is being paid to the impact of AI-powered automation on jobs and employment, with the 'Intelligence Revolution' predicted to have a significant effect on a range of tasks, meaning that more jobs can potentially be performed by robots and computers. A number of high-profile studies have predicted high levels of job displacement as a consequence of automation across developed economies.

The Centre for Cities Outlook 2018 predicts that 17.5% of the City of Edinburgh's workforce are currently in occupations that are likely to shrink due to automation³ – comparable figures are not available at a regional level. However, the increasing use of data science, machine learning and artificial intelligence poses both a

¹ <https://whatis.techtarget.com/definition/data-literacy>

² www.bernardmarr.com What Is Big Data?

³ <http://www.centreforcities.org/wp-content/uploads/2018/01/18-01-12-Final-Full-Cities-Outlook-2018.pdf>

threat but also an opportunity to the Scottish workforce⁴. Predictions of new technology and automation related redundancy range from 47% to 9% of the workforce⁵.

Whilst there is a lot of uncertainty about the shape of the future jobs market, we can be more certain that jobs that rely on more routine, simple tasks can more easily be automated, whereas creative and complex tasks will be more resistant to replacement. This risks exacerbating inequality and impacting on future inclusive growth in a number of ways:

Socio-economic: *“Many low- or middle-skilled occupations (e.g., manufacturing production) are expected to become less important in the workforce. The predicted decline in administrative, secretarial and some sales occupations is also consistent with these trends ... Employment growth is expected to derive disproportionately from smaller, generally high-skilled job families that will be unable to absorb job losses coming from other parts of the labour market⁶”* World Economic Forum

Gender: *“There is a strong gender dimension to expected employment changes whereby, notably, gender gaps appear to be more pronounced within both high growth and declining job families. For example, women make up low numbers in the fast-growing STEM job families, pointing, on current trends, to a deteriorating gender gap over time⁷”* World Economic Forum

Generational: *Much of the current workforce in employment now will still be in employment in 2030. With the rapid adoption of data-driven technologies and automation the current workforce needs to access re-training so they are not left behind.*

In addition, employer investment in skills and training of their workforce has declined significantly⁸ across the UK in recent years and is a huge contributing factor to flagging productivity. Whilst this is beginning to be recognised as an issue, and associated programmes are beginning to increase investment in ‘new talent’, there are comparatively fewer skills enhancement programmes targeted at those already in work.

As set out in the Edinburgh and South East Scotland City Region: science and innovation audit⁹, across the UK there is a publicly identified Digital Skills Crisis¹⁰ with an additional 740,000 digital-savvy workers being required over the period 2013-2017. “The big data dilemma” report from the House of Commons Science and Technology Committee¹¹ suggests that “the digital skills gap is approaching crisis levels and this not only has economic implications but also puts the quality and security of this data at risk. This risks UK business being

⁴ <https://www.ippr.org/publications/scotland-skills-2030>

⁵ <http://www.nesta.org.uk/publications/future-skills-employment-2030>

⁶ http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf

⁷ http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf

⁸ https://www.ippr.org/files/publications/pdf/skills-2030_Feb2017.pdf p.22

⁹ https://www.ed.ac.uk/files/atoms/files/edinburgh_science_and_innovation_audit_mainreportoct16.pdf

¹⁰ House of Commons Science and Technology Committee Second Report of Session “Digital Skills Crisis” 2016-2017

¹¹ “The big data dilemma”, House of Commons Science & Technology Committee 2015-16

unable to grow the big data sector at the rate it should. In the meantime, this skills gap is forecast to grow exponentially as big data reaches further into the economy”.

Demand for digital talent is expected to grow strongly in the medium to long term. The Scottish Futures Trust forecasts that, as Scotland emerges as a world-leading digital hotspot, 175,000 new digital jobs would be created by 2030.¹² We estimate that approximately 30%, or 50,000 of these additional jobs would be created in the City Region as a whole, with 37,000 of these being in Edinburgh (3,600 additional jobs per year). This represents a level of growth that is 2-3 times higher than for the economy as a whole. Given the increasing importance of information to the digital sector discussed previously, these jobs will become increasingly DDI-oriented. As the size of the sector increases, staff attrition¹³ in the sector will also grow as a result of factors such as retirement, pursuit of alternative career paths and re-location. New talent will be needed to fill these roles, and this has a considerable effect on the volume of new talent that will be required to sustain the digital sector in the City Region. Combining the demand for new talent resulting from both sector growth (3,600 additional jobs per year) and attrition (1,550 in 2016, 4,050 by 2030), demand for new talent in the City Region will grow from 5,100 per annum in 2016 to 7,600 by 2030 – an increase of 46% over the period.

There is a risk that the growth of the City Region digital economy will be limited by skills shortages. In spite of rising salaries, 61% of digital organisations in the City Region continue to cite a limited supply of talent as the single biggest challenge they face, with 21% citing problems with retention of workers.¹⁴ As the global competition for digital talent intensifies and our own local demands increase, the lack of availability of **data professional** skills within the City Region will inevitably impact upon business competitiveness.

In addition the importance of data skills is being recognised in a large number, and diverse range, of job roles. For example, care workers are likely to be required to provide more patient-centred care using telemedicine to connect with doctors and coordinate care activities, and drivers, threatened by the increasing prevalence of autonomous vehicles, may be required to develop new skills so that they can carry out tasks using data management to co-ordinate and supervise a convoy of autonomous vehicles.¹⁵ The **data worker** is in demand. Such workers can apply basic knowledge of statistics, programming and / or analysis software to generate and interpret datasets from their organisation to answer questions, target markets and develop business models. The DDI Skills Gateway aims to equip local people, working across all sectors, with these skills, training them for changing roles and preparing them for the jobs of the future.

As well as the economic benefits of investing in skills for data worker roles, there is a societal need to educate **data citizens** about how data impacts their everyday lives on topics such as how personal data is processed by

¹² Deloitte for Scottish Futures Trust “The economic and social impact of enhanced digitalisation in Scotland” July 2015

¹³ The analysis assumes that individuals pursue a 20-year career in the sector on average, resulting in 5% attrition from the sector.

¹⁴ Tech City UK <https://technation.techcityuk.com/cluster/edinburgh/>

¹⁵ https://www.accenture.com/t20171012T025413Z_w_/in-en/_acnmedia/PDF-62/Accenture-New-Skills-Now-Report.pdf

companies, individuals’ rights with respect to data and the wider societal implications of data and automation within a democracy.

1.4 Overview of the DDI Skills Gateway Project



Figure 2: Overview of DDI Skills Gateway

As significant City Region Deal investment in the DDI programme drives change in the regional economy, the DDI Skills Gateway is targeted at providing educational and skills opportunities to enable local people to be key contributors to the data sector, and to respond to the challenges presented by the rise in “Big Data”. The aim is to provide high quality data education, skills development and supported routes into data-related jobs for people across the City Region, including those from disadvantaged groups. Furthermore, citizens across the city region will have the opportunity to learn about **data citizenship**; how personal data is collected, stored and used, as well as their legal rights and privacy implications. The target learner groups include school pupils, a wide range of Further and Higher Education students, in-work learners and groups of people with untapped talent. This is illustrated in overview in Figure 1 and further elaborated in the diagrams in Section 2.4.

The DDI Skills Gateway proposal has been developed by a board of experts working across the current technical skills pipeline, (details of the Programme Development Board are shown in Annex 1), and through engagement with a range of relevant national and local organisations, including third sector representatives. What is envisaged is a wide-reaching programme, aimed at testing a range of approaches to developing data skills, stretching from school education to in-work learning. Furthermore, there is a real ambition to look at how best

to redress gender imbalance across data roles through a range of interventions, and ensure that intersectional equality is respected and supported across the sector.

Evaluation points are built into the programme to allow for a redirecting of resources as appropriate. The city deal funds and governance arrangements being proposed will help to ensure a joined up approach across the various stakeholders involved in this programme of activity and a regional spread of activity.

The ambitions of the eight-year programme are that:

1. Economic opportunities are addressed: there will be a closer match between supply and demand for data skills;
2. Aspirations are met: individuals will get more opportunity to participate in interesting and well-paid careers in the growing data sector;
3. Learners leave education with higher levels of data skills, ready to excel in later stages of their learning journey; and
4. There will be increased participation of women and other minority groups in data roles, with positive and inclusive working environments in the technology sector.

The programme aims to provide an accessible gateway and clear pathways to support entry to key training and jobs in the city region; develop and deliver new courses, training, partnerships and skills aligned to industry needs; attract new entrants to the sector and support equality across all levels; support and grow local talent, as well as encouraging talent to stay in the region.

The Programme has been developed around a number of core themes, namely;

- *Inclusive learning opportunities, coaching, mentoring and support for disadvantaged and under-represented group.* The programme will ensure that there is equality of opportunity, particularly for women returners, people facing redundancy, the unemployed and people with special employment needs, including those with disabilities;
- *Investment in teacher education* (for example through the development of *Knowledge Sharing Schools*) to help develop data skills in all of the region's school pupils;
- *Curriculum Development.* The programme will help to develop a data science curriculum and high quality inclusive learning material across all stages of the learner journey;
- *Continued Professional Learning and innovative Learning Networks.* The programme will touch teachers, FE and HE lecturers, executives, those in changing job roles, those whose current roles would benefit from additional skills in data analysis, (including frontline support workers), and data scientists who wish to deepen their expertise;
- *Data Career Pathways.* The programme will offer clearly defined routes along the skills pipeline. The focus will be on widening access pathways and raising awareness of the sector opportunities to a wider cohort. This activity will be linked to the Integrated Employer Engagement programme which will provide opportunities to engage directly with key client groups. Ongoing engagement with SDS will also ensure that timely and inclusive information about data opportunities can be provided to careers advisers; and

- *Engagement with data employers.* The programme will offer placements, assist in further developing inclusive working environments, provide intelligence on skills demands and training routes, and support the route from education to employment.

1.5 Targeting resources

This programme provides an opportunity to support inclusive growth ambitions by exploring ways to target key client groups for the DDI Skills Gateway. These will include:

- *School pupils* across the city region, *college learners*, from a variety of backgrounds, and *university students*, drawn from the local population;
- *Unemployed* people;
- People with *disabilities*;
- Those whose roles are *at risk of redundancy* through automation; and
- *Women* returners

The programme has the potential to help diversify the cohort of those working within the technology sector, and to prepare local people for the transformation in the workforce which is likely to result from automation.

The interventions proposed will be integrated with the opportunities provided by the City Region Deal investment in DDI, drawing on the academic expertise within the city region and aligning with sectoral developments and opportunities where appropriate. These will work towards ensuring that we help to reduce skills shortages and gaps, and deliver incremental system-wide improvements to boost the flow of individuals from disadvantaged groups into the good career opportunities generated through the city region deal investment.

Proposed investment has been prioritised across a number of inter-related strands of activity, details of which are provided later in the business case. These include:

- Diversity and Inclusion;
- Data Training for Work;
- Data Education for Schools, FE and HE students (augmenting activity proposed as part of the wider DDI programme at The University of Edinburgh and Heriot Watt University); and
- Employer Engagement to create inclusive work opportunities for all data students in the City Region

Whilst the activities above constitute the initial core DDI Skills Gateway Programme, there is also a recognition of the importance of ongoing engagement with employers, regional DYW groups and employability providers, amongst others, to continue the exploration of opportunities to pilot innovative approaches to skills development and explore further ways to widen access into data related roles and opportunities. The initial

priorities will be reviewed as the programme rolls out and the impacts of early interventions are evaluated. Furthermore, opportunities to leverage in additional funds to augment this initial programme of activity, and assist with delivering the vision of the DDI Skills Gateway, will be explored with a wide range of stakeholders.

Alignment with existing local and national related activity will be ensured by way of robust governance and ongoing engagement activity.

1.6 Summary of outputs

A summary of projected outcomes is shown in Annex 2.

2 Strategic Case

The DDI project strategic case is set out in two parts:

Part A: The Strategic Context – indicating the alignment of the DDI project proposals with government policy and existing assets and strengths; and,

Part B: The Case for Change – which summarises the objectives to be addressed by the programme and identified investment needs and operational risks, constraints and dependencies.

2.1 PART A: The Strategic Context

2.1.1 National Context and Strategy Alignment

*Scotland's Economic Strategy*¹⁶ sets out the Scottish Government's purpose "to create a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth" and has two key goals- increasing competitiveness and tackling inequality. In its Economic Action Plan 2018-20¹⁷ the Government outlines its plans to help develop a highly skilled workforce through education, training and reskilling,

*The ICT and Digital Technologies Sector Skills Investment Plan*¹⁸ published in March 2014, and informed by an industry-led steering group which included representatives from Amazon, JP Morgan. ScotlandIS and e-Skills UK (at the time the sector skills body for the tech sector), provided a framework to develop skills provision to meet industry needs. The plan has been structured around two strategic objectives, namely "Attracting more talent today" and "Closing the gap". There is recognition in the plan of the need to help address immediate skills shortages, but also to begin to broaden the talent pool for the technology sector. This includes making the education system more responsive to the needs of employers, raising the profile of careers within the sector, promoting new entry routes into technology jobs and highlighting the benefits of these routes to schools and employers. Reference is also made of the need to increase the number of women in technology roles.

¹⁶ Scotland's Economic Strategy, Scottish Government, 2015, <https://beta.gov.scot/publications/scotlands-economic-strategy/>

¹⁷ Economic Action Plan 2018-20 <https://economicactionplan.mygov.scot/>

¹⁸ Skills Investment Plan for Scotland's ICT and Digital Technologies sector
https://www.skillsdevelopmentscotland.co.uk/media/35682/ict_digital_technologies_sector_skills_investment_plan.pdf



Figure 3: The ICT and Digital Technologies Sector Skills Investment Plan

*Realising Scotland’s full potential in a Digital World: A Digital Strategy for Scotland*¹⁹, published by The Scottish Government in March 2017, includes a vision which focuses education and training systems on expanding the pool of digital skills and capabilities and tackling the current gender gap in digital skills and careers. It also points to the use of City and Region deals to maximise the role that digital innovations and infrastructure can play in delivering both economic and inclusive growth. Furthermore, the Skills Investment Plan for Edinburgh and South East Scotland²⁰ identifies the priority to develop an employer-led programme to upskill the region’s residents in data and digital skills.

The Scottish Government’s Programme for Scotland 2018-19, *Delivering for Today, Investing for Tomorrow*²¹ references the importance of data-driven innovation and calls for action to address the data skills gap. The initial findings of the Scottish Government’s Enterprise and Skills Strategic Board also point to the need to ensure a demand led skills system that is flexible and responsive to industry and learner needs – underpinned by robust evidence of employer demand, predictive analysis of future skills needs and access to lifelong careers advice.²² Furthermore, it references the need to encourage a greater uptake of digital skills and technologies.

¹⁹ Realising Scotland’s full potential in a Digital World: A Digital Strategy for Scotland

www.gov.scot/publications/realising-scotland-s-full-potential-digital-world-digital-strategy-scotland/

²⁰Skills Investment Plan for Edinburgh and South East Scotland <https://www.skillsdevelopmentscotland.co.uk/media/43648/edinburgh-sip-2017-digital-version.pdf>

²¹ Delivering for Today, Investing for Tomorrow, The Government’s Programme for Scotland 2018-19

<https://www.gov.scot/binaries/content/documents/govscot/publications/publication/2018/09/delivering-today-investing-tomorrow-governments-programme-scotland-2018-19/documents/00539972-pdf/00539972-pdf/govscot%3Adocument>

²² Working Collaboratively for a Better Scotland <https://www.gov.scot/publications/working-collaboratively-better-scotland/>

Allied to this the Creating a Fairer Scotland (Employability)²³ policy and Equalities Act 2010 seeks to promote greater fairness and equality in employment, while also driving continuous service improvement through strong productive partnerships.

*No One Left Behind, Next Steps for the Integration and Alignment of Employability Support in Scotland*²⁴ urges the need to incrementally develop an integrated regional employability and skills system that is more:

- flexible, tailored, and takes a 'whole person' approach;
- straightforward for people to navigate;
- better integrated and aligned or interwoven with other supporting services;
- provides pathways into sustainable and fair work;
- is driven by evidence to supports people into the right job at the right time;
- designed, delivered, and improved in partnership;
- responsive to those with high needs (e.g. young care leavers, workless, and those in low paid or insecure jobs) who are at major risk of missing out on the benefits of economic growth; and
- minimises skills shortages and gaps or gender imbalances in our key growth sectors, while promoting greater workforce diversity

The DDI project tightly aligns with all of these policy aims. The ambition of the programme is to equip local people with the skills needed for them to benefit from the data revolution and to help mitigate any adverse effects of this. By focusing attention on strengthening and streamlining the progression pathways into roles requiring data skills for young people, disadvantaged individuals, and those whose current roles are at risk of automation it also establishes collaboration across regional partners to deliver better impact from existing (public, private and third sector) investments that will support accelerated progress towards a more inclusive economy.

2.1.2 Alignment across the IRES Programme

The current strength of demand for technology-based roles previously mentioned, and detailed later in the Economic Case, has resulted in significant and increasing skills gaps and workforce shortages.

The DDI Skills Gateway, along with other IRES projects, will help open up new sources of labour market supply and achieve more inclusive growth outcomes. It will also ensure that talent is grown locally, and is more likely to be retained in the city region. Whilst the DDI Skills Gateway can be considered a sector based skills and support pipeline, its impact has the potential to be far-reaching as increasing numbers of job roles will require data skills.

²³ Creating a Fairer Scotland: A New Future for Employability Support in Scotland, Scottish Government, <https://beta.gov.scot/publications/creating-fairer-scotland-new-future-employability-support-scotland/>

²⁴ No One Left Behind - Next Steps for the Integration and Alignment of Employability Support in Scotland, Scottish Government, <https://www.gov.scot/Publications/2018/03/5358/downloads>

Positioned within the IRES programme of activity, there are links particularly across the DDI and HCI Skills Gateways into the Integrated Employer Engagement, (for example, raising awareness of gender and disability challenges, and identifying opportunities within data roles across sectors), and Disadvantaged Families, (potentially providing a pipeline of new learners), IRES project activities. Furthermore there is an opportunity to use the evolving DDI capabilities within the city region to develop more responsive Labour Market information to help profile and predict labour market demand. The overall plan is for a much improved and focussed Skills Gateway Pipeline specific to industry needs with heightened focus on increasing throughput of numbers into employment in the sector. The Skills Gateway Delivery Group and IRES Board will ensure robust monitoring and reporting of progress towards targets as outlined in the Management Case.

2.2 Part B: The Case for Change

2.2.1 Existing Arrangements, Challenges & Business Needs

The Digital and IT sector is forecast to be the fastest growing sector in Scotland by 2024. Digital tech jobs in Edinburgh increased at over three times the national average between 2014 and 2017, according to a recent report by Tech UK²⁵. However, companies within the sector reported ongoing challenges around access to talent, and demand for digital and data talent is expected to grow strongly in the medium to long term.

Current data education and skills provision is limited and fragmented. The skills system is complex, with no clear pathways for learners wanting to acquire data skills and identify route ways into data jobs. Typical paths into data-related roles rely on the traditional Higher Education route, which is not delivering either the number or diversity of workers required to fill the growing regional and national demand for workers with the relevant skill sets to undertake both data worker and data professional roles.

2.2.1.1 Schools

The most relevant school-based subjects are Computing Science and Mathematics. Take-up and attainment levels at a national level for both are shown below (this information is not readily available at a regional level):

²⁵ Tech Nation 2018

SUBJECT	2018				2017			
	A - C		Entries		A - C		Entries	
	No.	%	No.	%	No.	%	No.	%
National Courses - National 5 (Qualification of 24 SCQF credit points)								
Computing Science	4,814	75%	6,442		6,108	82%	7,442	
Computing Science	3,787	73%	5,178	80	4,857	81%	5,990	80
Computing Science	1,027	81%	1,264	20	1,251	86%	1,452	20
Mathematics	26,894	65%	41,590		26,927	64%	42,191	
Mathematics	12,699	64%	19,759	48	12,856	64%	20,176	48
Mathematics	14,195	65%	21,831	52	14,071	64%	22,015	52
National Courses - Higher (Qualification of 24 SCQF credit points)								
Computing Science	2,816	69%	4,099		2,887	64%	4,476	
Computing Science	2,301	67%	3,430	84	2,436	64%	3,818	85
Computing Science	515	77%	669	16	451	69%	658	15
Mathematics	13,973	75%	18,753		13,953	74%	18,861	
Mathematics	7,039	73%	9,701	52	7,215	73%	9,929	53
Mathematics	6,934	77%	9,052	48	6,738	75%	8,932	47
National Courses - Advanced Higher (Qualification of 32 SCQF credit points)								
Computing Science	454	71%	636		454	71%	641	
Computing Science	379	69%	548	86	395	70%	565	88
Computing Science	75	85%	88	14	59	78%	76	12
Mathematics	2,751	75%	3,683		2,672	75%	3,586	
Mathematics	1,637	72%	2,265	61	1,628	72%	2,252	63
Mathematics	1,114	79%	1,418	39	1,044	78%	1,334	37

	Boys		Girls
--	------	--	-------

Figure 4: SQA Computing Qualifications.

It is worth reflecting that:

- The numbers taking Computing Science across qualification levels have decreased between 2017 and 2018;
- Boys are opting to take Computing Science in significant more numbers than girls; and
- Girls who did take Computing Science out performed boys²⁶

Limited numbers of Computer Science teachers, and inflexibility in some option choices, might also act as a barrier. However, Computing Science is just one of the learning pathways into tech courses and careers; Maths is also a relevant qualification.

Since a positive meeting with the DDI Skills Gateway team in autumn 2017, SQA have pulled together a qualification development group working on National Progress Awards (NPA) in Data Science at Levels 4, 5 and

²⁶ SQA Attainment Statistics <https://www.sqa.org.uk/sqa/64717.html>

6 and the team are actively involved with this. These non-exam based qualifications should be available to schools and colleges from summer 2019.

The University of Edinburgh is also working with SDS, and other national stakeholders, to help address a national shortage in Computer Science teachers. An options appraisal is currently under development to offer more flexible routes into the teaching profession, and draw together existing valuable, but unevenly distributed, Corporate Social Responsibility (CSR) initiatives by employers targeted at schools into a more coherent framework which gives equal coverage across the regions' schools.

2.2.1.2 Colleges

There are clear concentrations of Computing Science courses in particular parts of the country. For example, Glasgow has 20% of the enrolments whereas Edinburgh only has 10%. Furthermore, the computing science cohort at college is predominantly male (85%) and increasingly under 24 years (62%). At a national level, in 2014/15, 86% of computing science college leavers entered further full time study, compared with 69% across all college disciplines.²⁷

Level	Passes	Trend
SCQF 1-5	1,692	-12%
SCQF 6	533	4.5%
SCQF 7 - 12	3,708	1.5%

Table 1. College computing science courses.

According to information provided to partners by the Scottish Funding Council, there are around one thousand students studying Computer Science related courses across the Edinburgh and South East city region, of which only 10% are female. Over half of the students are studying at Edinburgh College and a further third at Fife College. Only around a dozen students are studying computer science related courses in the Borders College. Around 125 students articulate from Edinburgh College computing courses to undergraduate degrees in Computing Science and related programmes, with over 85% going on to Edinburgh Napier University.

2.2.1.3 Universities

The City Region contains approximately 1740 students graduating in subjects related to Computer Science and Data related courses (3710 total student numbers)²⁸. This represents a significant shortfall in the current

²⁷ Digital Scotland Scotland's Digital Technologies: Summary Report 2016 – based on "Scotland's Digital Technologies Sector Analysis" conducted by Ekosgen

²⁸ Figures supplied by Scottish Funding Council (SFC)

projected demand of 5,100 per year as set out in the Science and Innovation Audit²⁹. The computing science cohort at university is also predominantly male (81%) and increasingly under 24 years (71%).^{See 27}

The DDI Talent ambitions of the University of Edinburgh and Heriot Watt University have been described in the DDI Programme Business Plan³⁰, and approved by the city region deal Joint Committee. These include proposals for the Universities to engage with around 716,000 people across the UK and globally over the fifteen year programme lifecycle, (of whom around 62,000 will receive formal certification and an additional 30,400 CPDs).

Edinburgh Napier and Queen Margaret Universities are well placed to augment this ambition, and also help develop local learners, with 45% and 41%, respectively, of all of their UK domiciled students coming from the Edinburgh and South East Scotland city region area.

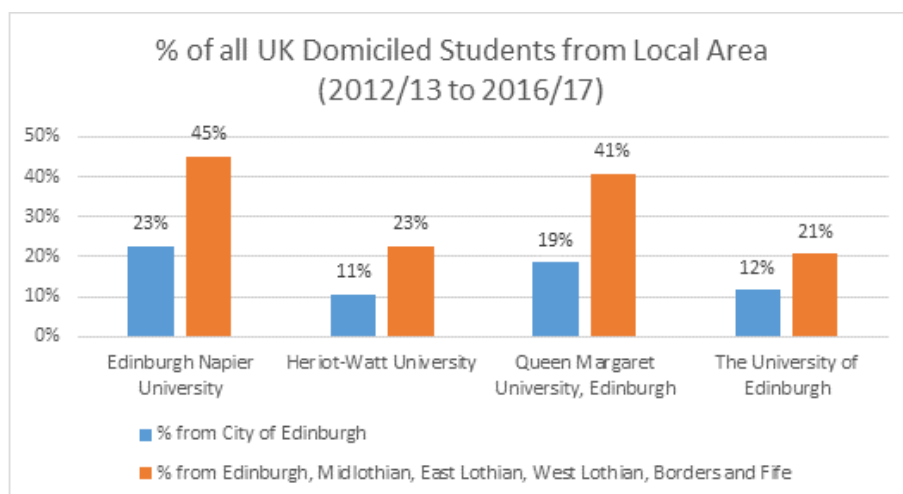


Figure 5: Proportion of UK-domiciled undergraduate students from Local Area (2012/13 to 2016/17)

Like the other university partner organisations, Edinburgh Napier University has a demonstrable track record in enrolling students from deprived postcodes (Figure 6). Courses highlighted for further data skills development have been identified to maximise the opportunity to reach MD20/ MD40 students and those most likely to be drawn from, and remain in, the City Region population.

²⁹ https://www.ed.ac.uk/files/atoms/files/edinburgh_science_and_innovation_audit_mainreportoct16.pdf

³⁰ Programme for Delivery of a Data Driven Innovation Cluster in the Edinburgh City Region

	2018/19		2017/18	2016/17
	Number	%	%	%
Deprivation by SFC Quintile				
1 - 20% Most Deprived (MD20)	341	12.6%	10.2%	10.5%
2	443	16.3%		
3	550	20.3%		
4	635	23.4%		
5 - 20% Least Deprived	742	27.4%		
SDUE with matching postcode	2711	100.0%		

Figure 6.: Proportion of Scottish-domiciled undergraduate entrants from the 20% and 40% most deprived postcodes studying at ENU

2.2.1.4 Apprenticeships

There are over 120 apprenticeship types available in Scotland, with apprentices getting flexible training and a qualification designed for particular industries. Apprenticeships can be used to attract new talent, or upskill existing staff. Skills Development Scotland (SDS) will contribute towards the training costs, with the amount being dependent on the age of the apprentice, the type and level of training. However, contributions are generally for employees who are aged 16 – 24, although there is an enhanced contribution available for disabled and care-experienced young people between the ages of 20-29. Despite the age restrictions, apprenticeships are a key part of the employability pipeline, providing flexible routes into upskilling and drawing in wider cohorts of learners.

In 2017/18 a rural support policy was applied for trainees who live in more remote Local Authority areas, including the Scottish Borders. This supports the payment of additional supplements, above the standard contribution rate.

2.2.1.4.1 Foundation Apprenticeships (FAs)

There are currently no Foundation Apprenticeships in Data specifically. The FA most closely aligned to opportunities within the technology sector is the FA in Software Development. The National Progression Award (NPA) in Data Science, currently under development, provides an opportunity to develop a data specific framework at this level which could be embedded in the Foundation Apprenticeship model, and there is the potential for this to be made available from 2021.

2.2.1.4.2 Modern Apprenticeships (MAs)

The Modern Apprenticeship framework aligned to this skill set is the Data Analytics Technical Apprenticeship (SCQF Level 8). However, although, the apprenticeship was available from 2016/17, there were no starts on the framework until 2018/19. As at the end of quarter 2, 2018/19, there were only 11 starts spread across the country, and none of the starts have completed the framework.

Part of the focus of the proposed investment in the FE pipeline is to work in partnership with SDS to develop the MA course further, along with the capacity to deliver this, working with regional employers to offer a bespoke solution.

Furthermore, the DDI Skills Gateway team has been working with SDS to shape a pilot that would look at options to embed data skills in existing non-data specific MA frameworks, piloting initially in the Financial Services and Health and Social Care areas. The learning from this pilot will help inform ongoing apprenticeship-related activities across the programme and at a national level.

2.2.1.4.3 Graduate Apprenticeships (GAs)

A new GA framework for BSc (Hons) Data Science has been published, with an initial pilot cohort in 18/19 with University of Edinburgh and St Andrews University and a single employer in the first instance. Graduate Apprentices are full-time employees of the company throughout the duration of the programme. Ongoing employer engagement would suggest that there is an opportunity to significantly increase provision of this type and this would follow the ongoing annual SDS procurement process for funded apprenticeship places.

Further Graduate Apprenticeships with some relevance to the DDI activity include: Software development, ITMB, and Cyber Security.

The universities in the region offering these apprenticeships will conduct a skills audit to review data science/ data engineering content in order to maximise the opportunities to embed DDI activity. Through the Masters provision identified in the DDI skills pipeline, graduated apprentices from these frameworks could then continue to specialise in data science or data engineering at Masters level, providing a route for highly skilled data professionals working in the region and/or further development up to DDI-related PhD study.

2.2.1.5 Diversity challenges

The 2018 Regional Skills Assessment Summary Report for Edinburgh and South-East Scotland City Region³¹ concludes that although the outlook for the local economy is positive there are some key inclusive growth challenges that still remain.

Despite the current arrangements and ways of working, around only 40% of working age disabled adults are in employment, compared with more than 80% of adults with no disability³². The diversity and gender profile of the technology industry does not compare well against the region's population profile, indicating that the industry is not attractive to many sections of society, impacting on its ability to reduce skills gaps and shortages, or effectively innovate. For example, whilst analysis of the most recent ONS Annual Population Survey shows the number of women in tech has risen from 18 per cent to 23.4 per cent in the last two years,

³¹ Regional Skills Assessment Edinburgh & South East Scotland City Region: Summary Report, Skills Development Scotland, <https://www.skillsdevelopmentscotland.co.uk/media/44990/rsa-edinburgh-and-south-east-scotland-city-deal-region.pdf>

³² Job support for disabled people (Policy), Scottish Government 2018, <https://beta.gov.scot/policies/disabled-people/job-support-disabled-people/>

and has more than doubled in the last eight - rising from 10,300 in 2010 to 24,000 in 2018, under-representation and the gender pay gap remains a challenge in the sector³³.

Scottish Government has committed to tackling the gender gap, maximising economic opportunities for women to participate fully in the regional economy and recognising the wider social role they provide³⁴. Regional partners are focused on promoting the fair work agenda and encouraging employers to mitigate the gender barriers, such as under representation of women within the technology sector, which prevents the development of a strong, innovative, and inclusive economy. Further work is required to establish the baseline position for those with minority characteristics undertaking data education and within tech roles, and to better understand the challenges faced by these cohorts. Early discussions with SDS have identified an opportunity to undertake some joint research on this, and to subsequently work in partnership on the development of a targeted action plan, building on work already underway to improve the gender imbalance within the sector. This research activity will be undertaken as part of developing an agreed approach to evaluation across the DDI Skills Gateway programme.

2.3 Objectives and Benefits

The focus of the DDI Skills Gateway programme is on growing local talent, opening up the data opportunity to all and ensuring that those with key data skills are retained within the city region. The aim is to develop pathways which will enhance opportunities for under-represented groups to develop these skills, and to work with employers and other relevant agencies to ensure wider representation within data roles. Activities within the programme, whilst recognising the need to help meet the demand for data skills, have been prioritised using the following criteria:

1. **Inclusion** – Does the activity help support an Inclusive Growth (gender, socio-economic, geographic, disability) agenda?
2. **Pilot** – Could the programme be piloted on a smaller scale first without affecting inclusion (or significantly impeding impact)?
3. **Delivery Model** – Could the delivery of the activity be embedded within pre-existing or planned services without sacrificing momentum and delivery of the activity? and
4. **Potential for Leveraged Funds** – Could the activity be funded in full or in-part by private sector funding (sponsorship or purchased) or additional public sector funding streams? Is the activity required in order to leverage additional funds?

³³ <https://www.skillsdevelopmentscotland.co.uk/news-events/2018/october/record-number-of-females-join-the-tech-sector/>

³⁴ Scotland's Economic Strategy, Scottish Government 2015, <https://beta.gov.scot/publications/scotlands-economic-strategy/pages/5/>

2.3.1. Early Wins

Some early wins have already been achieved by the partners which have helped to kick-start the programme.

These have included:

- Work with Newbattle Community School to support the development of data education within the school, establishing it as the first Knowledge Sharing School within the DDI Data Education in Schools Project;
- Participation in discussions with the SQA on the development of a National Progression Award (NPA) in Data Science across SCQF levels 4,5 and 6, with potential to provide the basis for a new Foundation Apprenticeship in Data Science;
- Participation in discussions with the SQA on a new HNC/D in Data Science. This will be College based and may become a contributing knowledge based qualification to the MA HNC/D Data Science;
- Partnership with SDS to pilot an approach to embedding data skills in existing Modern Apprenticeship frameworks, starting with the Financial Services and Health and Social Care sectors – worth £24,000;
- Working with SDS a new level 10 framework for Graduate Apprenticeships in Data Science has been developed and made available for universities in the tendering process for places in 2019/20. A pilot is underway with the University of Edinburgh and St Andrews University for a 2018/19 cohort;
- Partnership with SDS to pilot an approach to in-work data up skilling – worth £24,000;
- Partnership with Scottish Government to pilot an introductory Data Security course for autistic participants, with support from IntoWork and Autism Initiatives Scotland (No 6) – worth £18,000;
- With funding for development from DataLab, Edinburgh Napier University has plans to start a MSc Data Engineering in September 2019. The course will be fully online and is designed to appeal to career changers. It will be promoted both in the region and globally; and
- Investment from the University of Edinburgh in a pilot year of Data Education in Schools – worth around £220,000 – which has enabled widespread engagement with schools across the city region and establishment of a pilot project with Braidburn Special School.

The pilots identified are being developed within the Edinburgh and South East Scotland region, with potential for national roll-out. Furthermore, a Memorandum of Understanding (MoU) with SDS is under development to identify additional opportunities for joint working to help deliver the ambitions set out in this proposal.

The Economic Case also outlines specific key impacts and benefits of implementing the DDI Skills Gateway programme.

2.4 Scope of investment requirements

2.4.1 Data Education in Schools – early skills programme

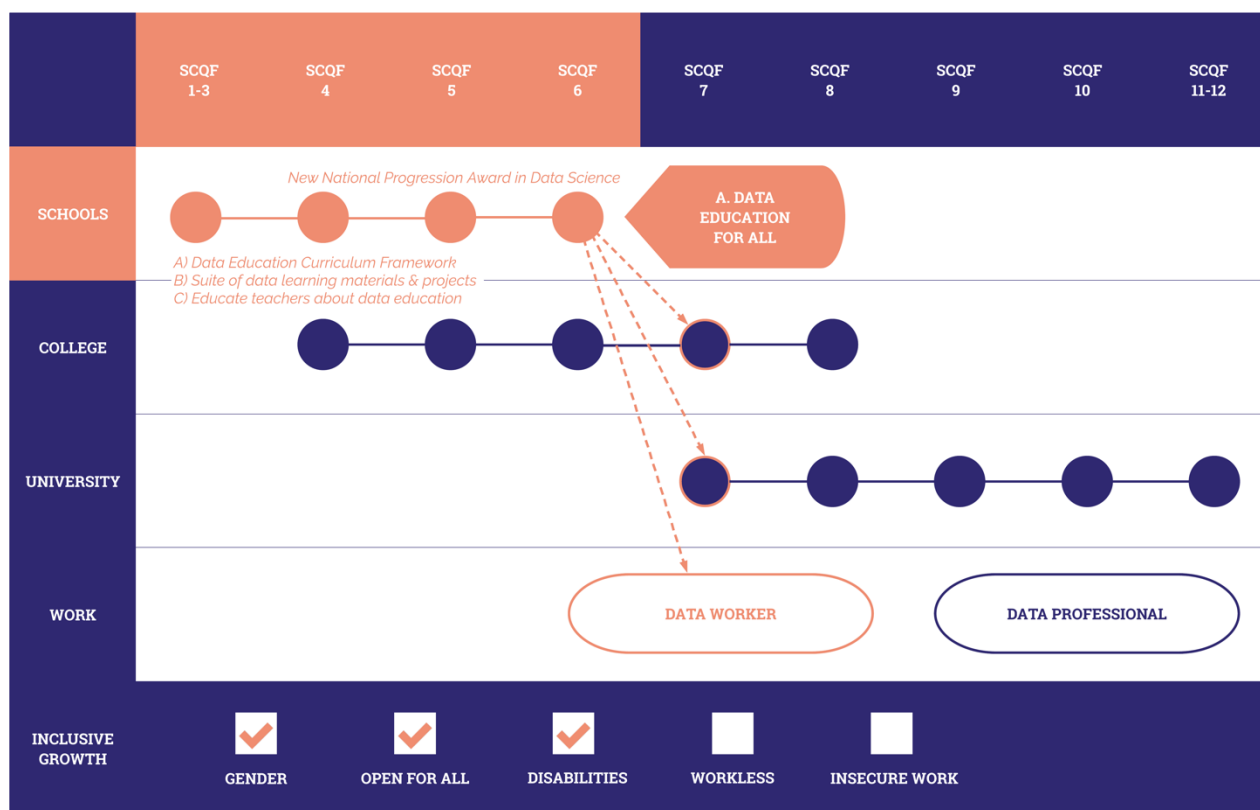


Figure 7: How Data Education in Schools fits within the DDI Skills Framework

The ambition for the Data Education in Schools programme is for children and young people across the City Region to learn about data to benefit their personal lives and open up new possibilities for interesting and well-paid careers. What is proposed is an ambitious and inclusive programme of *Data Education in Schools*, through which all children will have the opportunity to excel in data education, regardless of their gender, location or financial circumstances. The programme will invest in teacher education as a sustainable route to improving children and young people’s digital skills, as identified in the Scottish Government’s strategy for Enhancing learning and teaching through digital technology³⁵, and in the STEM education and training strategy which aims to increase capacity within the education system to deliver excellent education in science, technology, engineering and mathematics in Scotland.³⁶

This is an eight year programme, with review points at the end of years 3 and year 6. The purpose of the review points is to evaluate the extent to which the approaches to materials development and teacher education have been effective, and to re-plan the project accordingly. This programme will a) *synthesise a curriculum*

³⁵ <https://www.gov.scot/publications/enhancing-learning-teaching-through-use-digital-technology/>

³⁶ <https://www.gov.scot/publications/science-technology-engineering-mathematics-education-training-strategy-scotland/>

framework for data education in schools, based on existing Technologies, Numeracy and Mathematics Experiences and Outcomes, b) *collect and develop innovative learning materials and projects relating to data* and c) *educate teachers about data literacy*. Initial teacher education about data will be implemented by University of Edinburgh on its PGDE and MSc Transformative Learning and Teaching degrees.

The curriculum review, mapping and synthesis will be carried out in the first year of the project, led by a Senior Project Officer. It is important not to overburden teachers with an entirely new curriculum, but rather to support teachers in using cross curricular data science projects to deliver curriculum outcomes across a range of related areas (such as programming and databases in computer science, and information handling and probability in maths). This is in the spirit of Curriculum for Excellence and will support collaboration between primary and secondary teachers across sector and subject boundaries.

The curation and development of new learning materials will take place over the eight years, with the priority in the first three years to support the SQA's new National Progress Award in Data Science. Materials will be curated and repurposed from high quality sources world-wide (such as Bootstrap and Concord³⁷) in some cases, and new materials will be developed where necessary for learners, show-casing different sectors within the DDI project at University of Edinburgh and Heriot-Watt University. The project officers will take responsibility for developing the new materials, deliberately seeking input from academic and industry experts across the City Region about data as well as specific pedagogical expertise where necessary. This will be key to developing high quality, innovative, relevant and exciting materials.

Teacher education is fundamental to ensuring the long-term sustainability of the programme after the initial eight year funding period. The project will catalyse innovative approaches to professional learning by: 1) supporting education officers and digital leaders in the local authorities as they deliver professional development to their teachers, in conjunction with Regional Improvement Collaboratives; 2) establishing six knowledge sharing schools across the City Region (see below) 3) offering regular free Continuing Professional Development (CPD) events such as an annual conference, webinars, livestreams and seminars at University of Edinburgh; and 4) working directly with volunteer teachers who are looking for help in developing innovative ideas and agree to share the results with their peers.

2.4.1.1 Knowledge Sharing Schools (KSS)

The purpose of a knowledge sharing school is to become excellent in data education, and to share the journey towards this goal with other educators. One has already started work – Newbattle Digital Centre of Excellence in Midlothian. This school was chosen because of their commitment to improving ambition and attainment in their community through digital and data innovation. It has been funded to date through a partnership with University of Edinburgh. Schools across the City Region will be invited to apply for the remaining KSS

³⁷ <https://www.bootstrapworld.org/index.shtml>
<https://concord.org/our-work/focus-areas/data-science-education/>

opportunities. In the application, they must show their commitment and plans to improving data education for school learners and the wider community (the emphasis is on the plans for improvement not their current stage). Stakeholders from local authorities and national agencies will serve on the selection panel.

Knowledge Sharing Schools will be responsible not only for innovation in data education in their own schools, but also for being transparent about their progress and generous to other educators who wish to learn from their experiences. In return, they will receive support from the DDI Skills team, including the time of a project officer to try out innovative teaching ideas, projects and materials with learners, teachers and community. The model for establishing knowledge sharing schools in 2 waves is shown in Figure 8.

The role of knowledge sharing schools will include:

- Innovating in pedagogy for data education;
- Offering workshops for teachers across the region;
- Hosting knowledge sharing events; and
- Engaging with local authority advisors

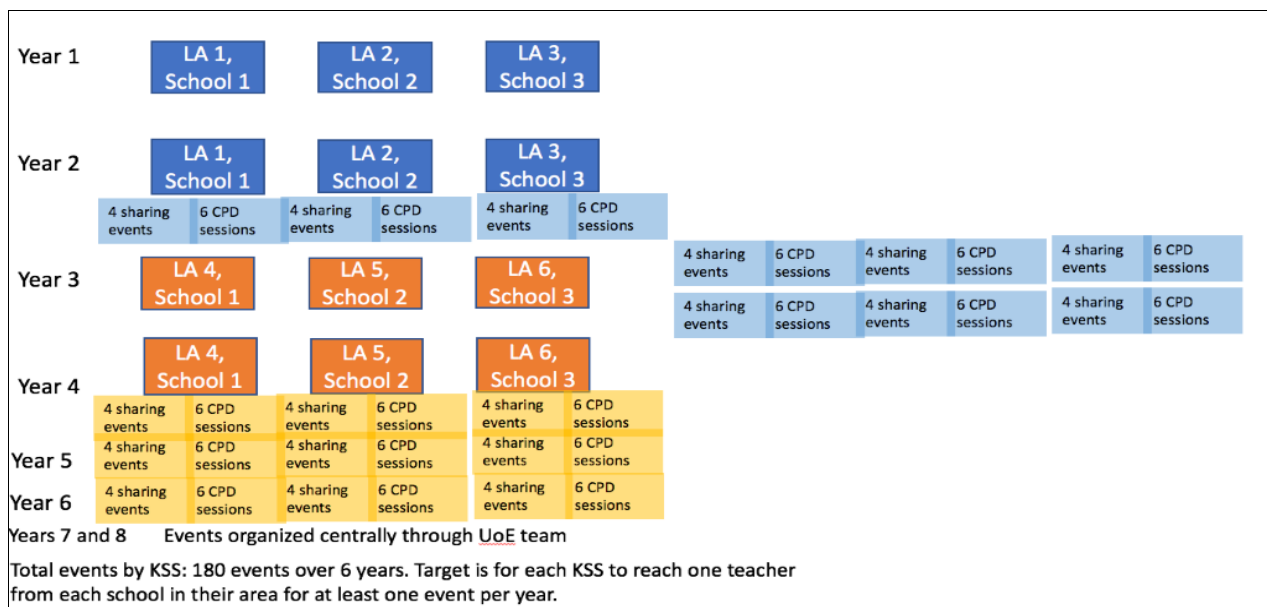


Figure 8: Knowledge Sharing Schools model

2.4.2 Data Education for FE students - introductory and intermediate skills programmes

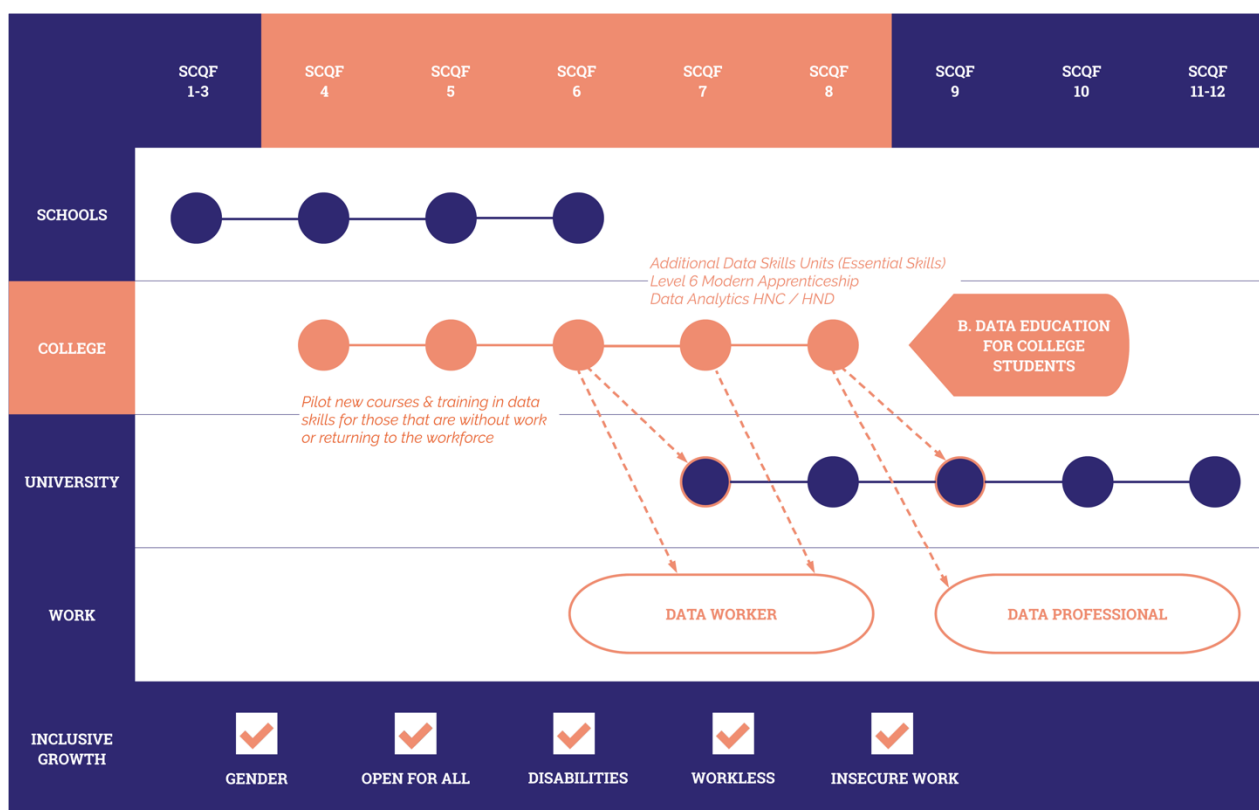


Figure 9: How Data Education for FE students fits within the DDI Skills Framework

The FE skills proposition is a further catalyst to transforming digital and data skills and will be rolled out across the region. It builds on the Colleges’ track record in attracting a wide cohort of learners from diverse backgrounds, including Care Experienced Learners (c.1% of College learners across the region), people with disabilities (15% of learners), BME (5% of learners) and learners from SIMD10 areas (c.8%). Irrespective of an individual’s starting point of career path, data literacy and data science skills will be embedded up to SCQF8. The Colleges will play a key role in the students’ learning journey into employment, university or in work upskilling at the level required.

The proposition aims to:

1. **Ensure Inclusive Growth: Create pilot courses and new training opportunities to different groups of learners across the whole city region:**

Working in partnership with SDS as appropriate, to provide free training opportunities at levels SCQF 4 -6 for the hardest to reach who are not in training or employment, or are in work poverty, or who have specific learning disabilities. It is anticipated that the introduction of wider pre-apprenticeship options will help ensure that greater numbers will be supported to achieve the minimum entry requirements for Modern Apprenticeships.

These courses will be aimed at those who require to be data citizens and data workers. There will be rolling programmes across all city region local authority areas.

The aim is to use a Challenge Fund approach to co-produce bespoke specifications for skills development activity, working with the region's Local Authorities and other employability providers, Skills Development Scotland, Department for Work and Pensions, 3rd sector organisations such as Cre8te, Leonard Cheshire Disability, Access to Industry, and Cyrenians. This approach is aimed at ensuring that the needs of harder to reach learners are met, targeting recruitment and testing models to provide tailored support for these learners. Colleges will provide accredited learning using Associate Trainers when and where required.

In parallel, the proposal is to run similar courses but aimed specifically at women, who may be adult returners, to address gender balance in technology industries. EQUATE will work in partnership to identify and support women on this programme.

This inclusive growth pipeline will complement the in work training proposition by offering SCQF levels 4-6 to some of those requiring the upskilling or 'into work' training, including frontline support workers. Other in work upskilling will provide SCQF 7-9. A flexible model is proposed so that the fund can be pooled to prioritise need flexibly as and when required both by level and by provider.

2. Create a pipeline of skills for DDI at levels SCQF 4 – 8 (FE activity up to level 6 and HE beyond):

The aim is to increase the number of students studying data literacy as part of their FE course at Levels 5 and 6, to understand data analytics, databases and data visualisation in preparation to become data workers or progress to University to professional roles. All students will have the option of additional units delivered as part of their FE course, and form part of their essential skills learning. For example, a new project based curriculum such as the creation of website, using data analysis provided by Digimap could be a vehicle for this strand. This approach is in line with skills needed for Industry 4.0.

An additional aim is to pilot, develop and roll out new Level 6 Modern Apprenticeships in Data Science. Initial set up costs will be for course development and employer engagement. This will also provide progression for Foundation and Graduate Apprenticeships in this area.

2.4.3 Data Education for HE students, both College and University learners - introductory and advanced skills programme

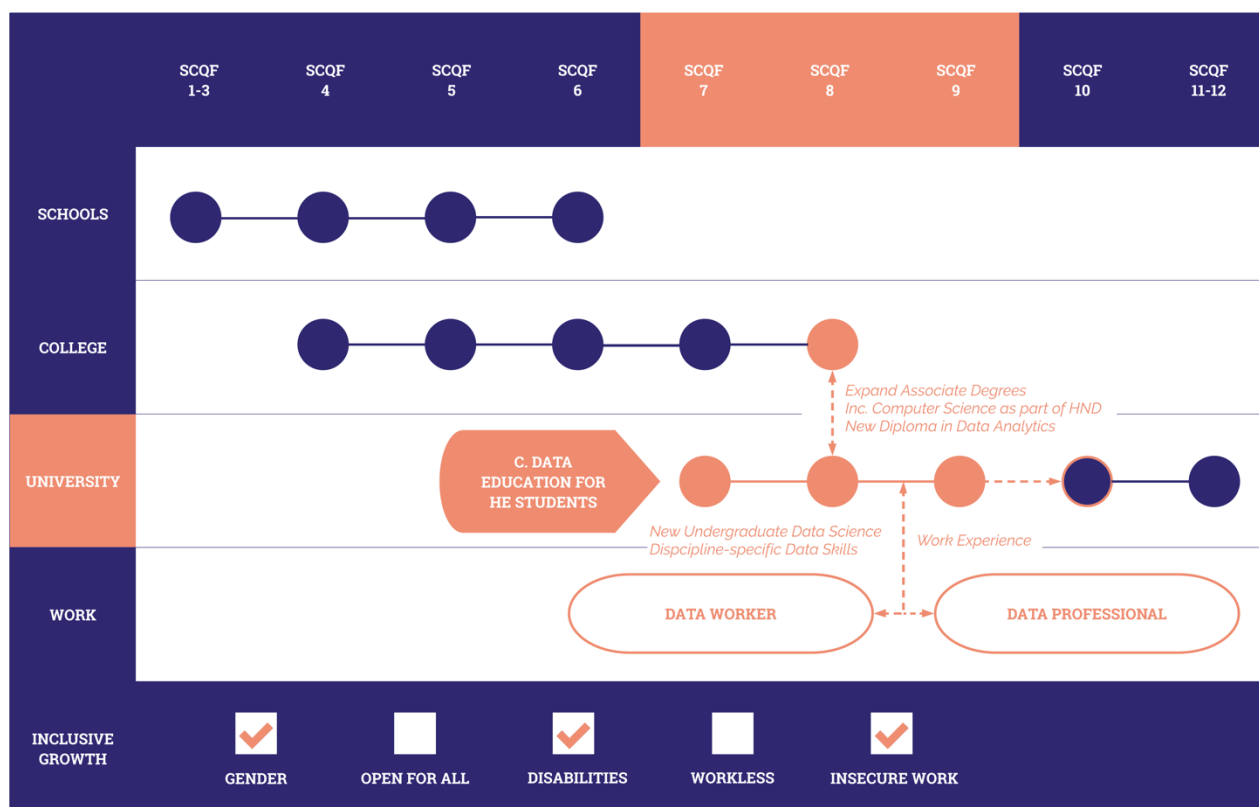


Figure 10: How Data Education for HE students fits within the DDI Skills Framework

The ambition of the HE proposition is threefold: i) to create inclusive and extensive routes into careers as data professionals; ii) to increase data capability of HE students studying in areas that are becoming increasingly reliant on data to provide evidence for decision-making (skills for data workers); and iii) to create inclusive employment opportunities through relevant work experience for students. This aspect of the Gateway proposition aligns closely with the wider DDI Programme, most particularly in relation to the Talent ambitions set out within it (see DDI Programme Business Plan). The scope of the University of Edinburgh and Heriot Watt University DDI Talent programme includes:

- New DDI-centred full undergraduate and postgraduate courses (both campus-based and distance learning);
- DDI-centred undergraduate modules counting towards partial degree accreditation;
- Increased numbers of doctoral students focusing on data analytics to gain new insights (and solve unmet needs across the private, public and third sectors);
- New Continuing Professional Development (CPD) specialised courses; and
- Open Online courses

To ensure a broad and inclusive pipeline towards data professionals and data workers, the HE proposal brings capacity and capability to introduce new courses and modules at Edinburgh Napier University and Queen Margaret University. Combined, the HE Programmes will develop a significant and sustainable pool of talent in the city region, and build a workforce more resilient to data driven change.

The College HE dimension of the DDI Skills Gateway is focused at complementing this DDI talent programme, and most specifically in widening participation. The proposition aims:

- To expand the successful *Associate Degree model*, increase and widen access to College students entering degree level (year 3) with advanced standing. This model will not receive any more additional SFC funding but can be expanded to Computer Science HND / BSC students. Opportunities to award scholarships will be considered as part of the project delivery.
- Aligned with related activity for university students, to increase the number of students studying *Computer Science as part of their HND*, to understand data analytics, databases and data visualisation in preparation as data workers or progressing to University to professional roles. STEM students may receive this as part of their course therefore Social Science, Finance, Business, Health and Social Care students will receive additional training before mainstreaming in line with HND next generation reform.
- To pilot, develop, promote and roll out new courses at *SCQF Level 8 Diploma in Data Analytics*. This will be provided initially with free funded training until it can be mainstreamed into core funding and numbers have been established.

The university dimension of the Gateway also expands and extends the DDI talent programme, with a particular focus on inclusion (of both students and universities) and retaining data skills in the region. The proposition has three aspects:

- Create **new undergraduate provision** for Data Science in the region in order to enhance Data Science capacity and capability. This new provision would be used to encourage school (and college) leavers into degree level study, leveraging SFC funded student places to increase the numbers of data-skilled graduates in the region. The design and roll-out of the new Data Science degree would draw on project partners to orientate the curriculum, the marketing and course team to recruit students with inclusion characteristics, (working with relevant third sector partner agencies such as Into Work), targeting local schools and colleges for recruitment. This expansion would be hosted by Edinburgh Napier University who have worked in partnership with DataLab to develop new Masters provision in data science and data engineering.

- Aligned with the College proposal, to develop **discipline-specific embedded data provision** in the form of new courses/modules available for all students to embed data literacy in nursing, business studies, social science, and other relevant subjects. This will provide subject-specific skills in understanding, interpreting, visualising, and analysing data relevant to their future careers as data workers for large cohorts of students (see ANNEX 2 Projected outcomes). This approach will ensure that graduates on courses that recruit high levels of local students will have new data skills that will be retained in the region. The programme will be rolled out through a series of pilots starting with nursing and business courses at Edinburgh Napier University, initially selecting those courses that will maximise MD20/MD40 reach. The pilot modules and approach will be reviewed and further planning undertaken to maximise impact. New curriculum innovations, learning material and data sets will be shared with project partners, in particular with Queen Margaret University joining in the second phase.
- Extensive employer engagement to create meaningful routes into data careers through relevant **work experience** which has shown to be consistently valued by employers. Recent research has found that support to find a meaningful student placement is essential for students who do not have social and professional networks that can provide work experience³⁸. The ambition is that *all* diploma-level, undergraduate and postgraduate data-focused students should be offered the opportunity to undertake a summer placement or sandwich year with a local company. The emphasis will be on working closely with companies and relevant third sector organisations to support under-represented groups i) students from MD20/MD40 postcodes; ii) students with a disability, including neuro-atypical students; and iii) women. The value of student placements is recognised in the Scottish Government's STEM strategy: including as a means to foster close links between industry and universities and colleges; increasing employment and employability to ensure high and levels of employment amongst under-represented groups in the region. The cost-effective proposal is to invest additional resources in e-Placement Scotland, a partnership between Edinburgh Napier University and ScotlandIS (the trade body for IT in Scotland). The aim is to build on an existing network of IT employers to engage with new local companies to identify additional data positions and to encourage more organisations to offer paid work placements. Resources to support applications and preparation for placement will increase inclusion and ultimately lead to better outcomes for graduates from our target groups. The opportunity will be open to all students in the Edinburgh and South East Region and will be delivered through expanded capability in e-Placement Scotland to work with HE/FE tutors and employers across

³⁸ Smith, S., Taylor-Smith, E., Bacon, L., & MacKinnon, L. (2019). Equality of opportunity for work experience? Computing students at two UK universities "play the game". *British Journal of Sociology of Education*.

the region, targeting data professional roles. This will provide capacity to data driven organisations in the region while challenging the unconscious bias of many current recruitment approaches.

2.4.4 A Data Training for Work project – reskilling and upskilling programme



Figure 11: How Data Training for Work fits within the DDI Skills Framework

The Edinburgh and South East Scotland City Region has the opportunity to drive economic growth by rapidly increasing the adoption of data-driven innovation. However, without the local skills based enabled by better labour force planning, investment in lifelong learning and flexible training opportunities, many people within the region will be ill-prepared to benefit from economic growth.

We can help to forge an optimistic future for the future world of work in this region. The Data-driven Innovation Skills Gateway proposes developing a suite of programmes to help to empower at-risk employees and low-paid workforce across the region to prepare and equip themselves with the skills to take advantage of the world of work shaped by data-driven innovation.

A data-literate workforce is needed to meet both the current and future demand for employment. This model will allow companies and public institutions to respond quickly to changes in the economy, while exploring ways to ensure that workers who may lose their jobs are given alternative opportunities.

We need a thriving market of upskilling options that reflect different learner needs, constraints and tastes. This programme incentivises a range of alternative training routes in data so that the learner can choose the path that best suits them. The aim is to test innovative approaches to helping adults up-skill, re-skill and progress in their careers. The pilots will help us learn more about how to support and incentivise adults to learn the data skills that will help them, their local economies and national productivity.

City Region Deal investment will be dedicated to supporting projects that fund, design and test flexible, accessible ways of delivering learning to working adults with low or intermediate skills and pilots to overcome barriers to adults' learning.

The Data Lab will act as a hub for data training for work in the City Region. The Lab has a broad and deep network with regional organisations employing data workers and data professionals and is best placed to convene and understand the needs of a broad range of employer needs for data skills. It will act as a gateway for businesses and individuals seeking training in data analytics, data science, and other data-related activities, signposting to relevant courses provided by local FE, HE, online and other training and education providers. The Data Lab will work with national agencies to enable the approach tested in the City Region deal to work across the rest of Scotland.

This approach has been inspired by Singapore's SkillsFuture programme³⁹, recommendations from the IPPR's Scotland skills 2030 report⁴⁰ and the narrative outlined by the proposed National Retraining Scheme for England.⁴¹

2.4.4.1 Data Skills Credit Scheme

The Data Skills Credit scheme being piloted is a regional programme to use small training grants to provide low-paid or relatively lower-skill workers, and those returning to work, with the opportunities to develop the necessary data skills to gain meaningful employment and progression as part of the data-driven economy.

The scheme will provide grants in the form of 'data skills credits' to encourage employers and learners to share responsibility for developing data skills. A pilot scheme is underway, funded by SDS, and involving Fife College and CodeClan to look at designing course content and delivery models suitable for those in or returning to work. The learning from this will help shape the DDI Skills Gateway proposition. Training could include Higher Education courses, Further Education College, online training courses, Apprenticeships, and other local ad-hoc training providers.

Where the worker is in employment, the funding body, the employer and the learner would enter agree the learning pathway and explore the future progression opportunities for the learners on completion of their

³⁹ <http://www.skillsfuture.sg/>

⁴⁰ <https://www.ippr.org/publications/scotland-skills-2030>

⁴¹ <https://www.tes.com/news/government-announce-new-national-retraining-scheme>

training. We will pilot the use of ‘progression agreements’, a tripartite agreement between government/provider, employer and learner. In return for Credit, the learner would agree to meet certain learning outcomes, and if met, the employer would agree to additional training funds for the learner and a form of progression (this could include increased pay, a promotion, or other career progression).⁴²

Additional funding will be leveraged from employers seeking to retrain their own employees, or future employees, and through other funding and loans from relevant national agency training schemes. For example, the Digital Development Loans and the Workforce Development Fund.

Recipients of Data Skills Credits will be invited to semi-regular face-to-face meetings with their peers to **track** learning progress and to support each other on their learning journey. Volunteer mentoring opportunities will be fostered from the private sector.

The pilot phase will set numeracy and digital skills thresholds for access to Data Skills Credits. However, it will not abandon those who do not meet these thresholds, but rather signpost individuals to available local online courses in numeracy and essential data skills. Details of this provision will also be included in the data skills journey.

The pilot phase will also identify and work with a network of routes to access and inspire local workless, returning workers, low paid, disabled workers and at-risk of redundancy individuals. This will include engagement with the local authority employability services and third sector provision across the city region.

2.4.4.2 Data Skills Journey

The Data Skills Journey is a framework that will be developed for the region’s workforce with employers, unions, and professional bodies. It will transparently provide up-to-date information on data employment, data career pathways, data occupations, existing and emerging data skills, as well as relevant education and training programmes for data. Employers can use the Data Skills Journey to design progressive human resource practices to recognise skills and make informed decisions on skills investment⁴³.

The Data Skills Journey will include a list of quality-assured, flexible, local or online industry-relevant training programmes that focus on emerging data skills. Informal online learning courses are widely-recognised routes for learning data skills⁴⁴ but they are still not widely recognised by employers or formal education providers. These courses will be included in recognised learning pathways as they often provide a high-quality yet cost effective means of learning data skills.

⁴² <https://www.ippr.org/publications/scotland-skills-2030>

⁴³ Singapore Skills Framework & SFIA (Skills Framework for IT) as models of good practice.

⁴⁴ http://www.data-mania.com/blog/self-taught-data-scientist-curriculum/?utm_source=ReviveOldPost&utm_medium=social&utm_campaign=ReviveOldPos

A short list of curated pathway across providers will be developed to make it easy for learners to choose the right Data Skills Journey for them. Learners receiving Data Skills Credits should undertake a curated pathways but can make a request to undertake training outside of the curated journey when suitable for their learning needs.

It is envisaged that the Data Skills Journey will be piloted in the region and promoted as part of the Employer Engagement activities and other employability work being developed elsewhere. The Data Lab will work with national agencies to enable the approach tested here to be applied across the rest of Scotland. The Data Skills Journey has four key components:

- **Data Career Pathways.** Develop a 'data career pathway' that outline the skills competencies required of current data jobs and matches those with local and online training providers. This will provide clear information for learners and employers outlining how they can achieve career progression in data jobs and a clear framework to anchor career 'progression agreements' between learners and their employers. A limited number of curated pathways will be developed to make choice of training providers simpler.
- **Quality Assurance.** Existing formal courses at colleges and universities will not require additional QA, but their learning outcomes will be assessed so that they can be mapped onto the career pathway. New data training and education providers or online courses will be checked to make sure they provide the skills required by industry.
- **Open Accreditation.** Working in partnership with SQA and aligning with national approaches where relevant, the pilot would scope the development of a set of open badges (or similar alternative) that will be developed against data skills categories – such as machine learning, visualisation, statistics and their sub categories. Open badges could work flexibly across all data training and education providers and online courses. Learners could use these open badges to show to employers that they have achieved the varied skills required of specific data jobs.
- **Data Skills Portal.** An online portal will be created to outline the abovementioned career-pathways and training options which will be accessible across the region. It will include a self-assessment against job profiles and links to the relevant courses and training options including new courses developed as part of the DDI programme.

2.4.4.3 Training for the adoption of Data-Driven Innovation and planning for a data-literate workforce

Uptake of data technologies is still low and is dominated by specific sectors and large technology companies. Yet, the benefits could be realised – and need to be so that Scottish companies remain internationally competitive. Managerial understanding of data science, machine learning and AI would help increase the uptake of new technologies leading to increased productivity and high-skilled employment in data careers.

The adoption of data-driven technologies and processes are likely to see an increase in many jobs and the creation of completely new occupations. Some industries that have the potential for growth through the adoption of data-driven innovation do not understand (1) how they can start on their data journey, (2) how they can support their current workforce to develop the skills to initiate and sustain data-driven innovation or (3) recruit new talent to innovate using data. All courses would cover gender equality and inclusive HR practices.

We propose to support a range of organisations in the City Region, including relevant public sector organisations, by funding the delivery of Data Science Adoption and data-workforce planning training for managers, HR managers and staff with strategic and operational responsibility within that organisation. This training will work with the organisations to understand the potential for the use of data within their organisation, and support them to understand the first steps they need to take to get started. It will help organisations consider the ways they can train or re-skill their current workforce to meet their future data skills requirements.

The DDI programme includes provision for the development of an ‘Executive Education / Data Adoption’ training course. This would be adapted and delivered in strategically important sectors, including the public sector.

2.4.5 Diversity and Inclusion Lead

Through a joint approach, shared with the HCI Gateway, there will be a dedicated resource to focus on diversity and inclusion throughout the skills development teams and to assist with engaging the technology sector on diversity issues. Relevant third sector organisations will also be approached to ensure expert input and representation at Board level. On the ground activities will include developing and delivering diversity and inclusion training, with a focus on women, BME and disabled people’s under-representation in the technology (data) field. Work will also be undertaken on considering diversity and inclusion within curriculum design, and on promoting training and employment opportunities related to data skills.

2.5 Operational Risks, Constraints and Dependencies

The success of the DDI Skills Gateway Programme will depend on close partnership working at a local, regional and national level, and with alignment with wider DDI and Inclusive Growth activities. This approach will require an ongoing review and the active support of local, regional and national stakeholders.

The DDI Skills Gateway Delivery Board, and ultimately the IRES board, will regularly review project progress with decisions made on continuation, adjustment or withdrawal of funding.

The full DDI risk register is included in ANNEX 3 Risk Matrix and is regularly updated as potential risks become apparent, with mitigating actions closely monitored by the DDI Skills Gateway Delivery Board and IRES Board.

3 Economic Case

The impact of the digital revolution is no longer confined to technology companies, but reaches across business areas. The technology (tech) sector is growing and contributed £3.9bn to the Scottish economy in 2015. 25% of businesses within the sector are located in Edinburgh and 6% in Fife. Some key facts about the sector include:

- GVA per head for the tech sector is 60% higher than for the economy as a whole, with the sector forecast to be the fastest growing sector in Scotland to 2024;
- Over 90,000 people are employed in tech roles across all sectors in Scotland – this represents 4% of the national workforce and there has been a 10% increase in employment from 2015-2016;
- 40% of these people are employed in tech businesses with the remaining 60% employed in other sectors such as Finance, Creative Industries and Healthcare;
- Women are under-represented in the tech sector (23%) and in tech roles;
- The average national salary for tech jobs is around £37,500 – over 30% higher than the Scottish average of £28,000; and
- It is estimated that Scotland has up to 12,800 tech job opportunities annually. This represents a significant opportunity for young people and new entrants across a wide range of roles⁴⁵.

To deliver the impacts and address key needs for the workforce it is critically important that investment starts early for key skills gaps, new training courses and pilot projects. Investing in a regional inclusive skills approach, via the DDI Skills Gateway, provides an opportunity to catalyse early for this economic development pipeline.

The inclusive skills push provides data education for the region's school pupils, enhanced data skills for College and University students, training and employment opportunities across the region for disadvantaged groups, 'into work' training and upskilling of the region's workforce, both private and public sector.

3.1 Labour Market Context and Gap Analysis

Digital tech turnover in Edinburgh was worth £1.14bn in 2017 and contributed £1.3bn gross value added.⁴⁶ The Edinburgh and South East Scotland City Region already has the UK's leading research strengths in informatics and new data technologies. This, combined with the skills and volume of the Region's graduates, has helped establish the Region as one of the main centres of the UK digital economy, enabling the:

- Multi-national growth of local digital companies, including the 'Unicorns' FanDuel and Skyscanner;

⁴⁵ Scotland's Digital Technologies: Summary Report www.skillsdevelopmentscotland.co.uk/media/43306/scotlands-digital-technologies-summary-report.pdf

⁴⁶ <https://technation.io/insights/report-2018/>

- Development of Europe's leading ecosystem to support digital company growth (for example Codebase, Codeclan, Informatics Ventures and the Data Lab); and,
- The attraction of global companies such as Amazon, Avaloq and Computershare, Disney and Intel.

However, companies within the sector reported ongoing challenges around access to talent, and demand for digital and data talent is expected to grow strongly in the medium to long term⁴⁷.

3.2 Reducing inequalities

Currently, access for DDI Skills related activity is fragmented and there is little prioritisation from the sector to target disadvantaged groups and especially those living in SIMD 20 areas. Also, as already referenced, the diversity and gender profile of the technology industry does not compare well against the region's population profile.

Youth unemployment across parts of the region continues to be a concern. More needs to be done to target and develop data skills within our schools, and specifically those in SIMD 20 areas. Additional activity is required to support unemployed people too, through better joint working across Local Authority employability services and Colleges to increase labour supply and linkages with industry demand. There is an opportunity for the targeting of veterans, carers and supporting women into higher paid jobs and helping those planning to return to work.

3.3 Evidence Base of Demand

The Scottish Futures Trust has forecast that, as Scotland emerges as a world-leading digital hotspot, 175,000 new digital jobs would be created by 2030. It has also been estimated that approximately 30%, or 50,000 of these additional jobs would be created in the City Region as a whole.

Over half of employers recruited technology skills in the last 12 months. The most sought after roles have been software development and implementation and client interface, sales and marketing and it is anticipated that this trend will continue.

38% of employers currently have vacancies in tech roles and are increasingly using a variety of solutions to meet their recruitment needs, including interns and graduates. 82% of employers reported difficulties in recruiting the right skills and experience. International recruitment is also being used to help fill gaps – 37% of employers have recruited tech skills internationally.⁴⁸ This suggests an appetite from employers to consider a wider recruitment pool. At the time of writing the average Data Scientist salary in Edinburgh is £52,875. This

⁴⁷ <https://www.dataiq.co.uk/news/70-firms-braced-data-skills-shortages-year>

⁴⁸ See footnote 41

is substantially more than the average salary across Edinburgh, currently at around £37,000. Average salaries for Data Scientist jobs in Edinburgh have gone up 11.0% year-on-year, compared to a change of 0.4% for all jobs in Edinburgh.⁴⁹ .

Employers also anticipate the most significant issue in the future will be keeping pace with the growth of their business and the new technological opportunities. Over half of employers want to provide more tech skills training to their staff.

The focus of the DDI Skills Gateway programme is on growing local talent, opening up the data opportunity to all, ensuring progression along the data skills pipeline and ensuring that those with key data skills are retained within the city region. The integration of education and training providers and employers working together through the ESESCRD provides a platform to enable a regional inclusive growth approach and to develop a strong highly skilled regional workforce.

3.4 Effecting Change

In line with the wider IRES programme aims, future employability and skills programmes should enhance and help to future proof the regional economy by aligning and augmenting existing resources. The aim is to provide opportunities for local people, increase the employment rate, address sector skills shortages and close the opportunity gap between different sections of society. The aim is also to increase productivity and earnings, and help reduce the gap between the lowest and highest earners.

3.5 Identification of Options

Given alignment to the wider City Region Deal proposals and opportunities available for ensuring inclusive growth, reducing poverty and widening equality, partners agreed to focus limited resource investment initially on HCI and DDI Skills Gateway proposals. The most effective, efficient means of delivering the Skills Gateways was then considered and after deliberation the following best options were selected for appraisal:

- **Status Quo (Business as Usual)** - Continuous improvement actions within individual organisations, but no integration or alignment between organisations.
- **Public Sector Unitary Skills Supply Provider** - Increase resources for existing local training activity, but no integration or alignment between organisations
- **Private Sector Industry Skills Supply Provider** - Increase resources for existing local training activity, but no integration or alignment between organisations
- **Third Sector Regional Skills Supply Provider** - Introducing new regional employability and skills services to augment current activity

⁴⁹ <https://www.adzuna.co.uk/jobs/salaries/edinburgh/data-scientist>

- **Integrated Regional Skills Supply Provider** - Integrated and aligned activity from community level to authority and regional scale as part of an inclusive, multi-agency, whole system, and whole person progression approach to services.

3.5.1 Appraisals Approach

Pros and cons of each option were assessed against impact criteria linked to the identified goals for an improved future Employability & Skills programme.

3.5.1.1 Status Quo (Business as Usual)

Continuous improvement actions within individual organisations, but no integration of alignment between organisations

Pros	Cons
Minimal disruption to service	Duplication and progression bottlenecks
Ease of transition for participants	Limited option to shared capacity across partners
Promotes Diversity	Limited opportunity to achieve economy of scale
	Service capacity will reduce over time due to financial constraints
	Current system for improving employability and delivering skills training has led to disparities and inequalities within the region.
	Continuing the status quo this trend is likely to continue, resulting in a widening of the skills and productivity gap
	Limited opportunity to test innovative approaches to education and skills development across the skills pipeline
	Limited ability to respond to reskilling requirements resulting from current and emerging advances in technology

3.5.1.2 Public Sector Unitary DDI Skills Supply Provider

Increase resources for existing local training activity, but no integration or alignment between organisations.

Pros	Cons
Alignment with key growth sectors	Public Sector expenditure unlikely to increase
Aligned with wider city region deal activity	Capacity issues within the sector
Promotes Diversity	Conflict with combined service offer
	Lack Regional coherence and alignment with wider city region deal
	Difficult to sustain due to affordability
	Not Industry recognised
	Lack of capacity for the sector to respond
	Unlikely to fully reflect future skills requirements

Pros	Cons
	Limited opportunity for innovation

3.5.1.3 Private Sector Industry Unitary DDI Skills Supply Provider

Increase resources for existing local training activity, but no integration or alignment between organisations

Pros	Cons
Alignment with key growth sectors	Significant disruption to services and beneficiaries
Aligned with wider city region deal activity	Loss of best practice and expertise during transition
Promotes Diversity	Risk of disconnect from local priorities
	Capacity and capability issues within the sector
	Limited focus on Inclusive Growth priorities

3.5.1.4 Third Sector Regional DDI Skills Gateway Provider

Introducing new regional employability and skills services to augment current activity.

Pros	Cons
Alignment with key growth sectors	Add to complexity and fragmentation
Aligned with wider city region deal activity	Significant disruption to services and beneficiaries
Promotes Diversity	Lack of capacity and capability for the sector to respond

3.5.1.5 Integrated Regional DDI Skills Gateway Provider

Integrated and aligned activity from community level to authority and regional scale as part of an inclusive, multi-agency, whole system, and whole person progression approach to services.

Pros	Cons
Adds additional capacity and expertise, with potential to share learning resources and expertise	Requires cultural change and strong buy in from all partners
Minimal disruption	Coordination and sequencing is challenging
Aligned with wider city region deal activity – most especially the DDI Innovation programme	Requires investment in collaboration infrastructure (e.g. management systems)
Reduced fragmentation over time	
Opportunity to test approaches with potential for subsequent national impact	

Pros	Cons
Provides a pipeline of opportunity for a wider cohort of learners	
Ensures dual focus on Inclusive Growth and Productivity	
Opportunity for potential leverage of resources	
A regional approach to developing opportunity	

3.5.2 Programme Option Analysis

A summary assessment of each of the options in terms of set impact criteria and value for money is shown below, and aligns with the scoring in the HCI Skills Gateway Business Case.

Impact Criteria (0-None, 1-Low, 2-Medium, 3-High)	Status Quo	Public Sector DDI	Private Sector Industry	Third Sector Regional	Integrated DDI
Positive impact for service beneficiaries	2	2	2	2	3
Ease of Transition	3	1	1	1	2
Builds on established good practice	2	1	1	1	3
Targeting progression of disadvantaged groups	2	2	2	2	3
Increases value for money achieved	1	1	1	1	2
Aligned with key growth sectors	2	2	2	2	3
Promotes Regional collaboration	2	2	2	2	3
Contributes to City Region Deal commitments	2	2	2	2	3
Drives service streamlining and agility	2	2	2	2	3
Promoting Diversity	3	3	3	3	3
Affordable and sustainable	2	1	1	1	2
COMBINED (# out of 30):	23	19	19	19	30

3.5.3 Preferred Option

The Integrated Regional DDI Skills Gateway - integrated and aligned activity from community level to authority and regional scale as part of an inclusive, multi-agency, whole system, and whole person progression approach to services, compared to the as-is position and other alternatives considered, is the preferred option for best delivery approach moving forwards.

Analysis highlighted that although the model is more difficult to introduce than to maintain the status quo, both options outweighed the others considered. Impacts for service beneficiaries, building on established practice, better targeting of disadvantaged groups, value for money, affordability and sustainability were all key determinants.

The Integrated DDI project will be underpinned by a “regional skills partnership” consisting of the key public, private and third sector stakeholders that will pro-actively shape the regional skills offer to meet the current and future needs of the Edinburgh and South-East Scotland’s labour market.

The DDI project is an evidence based, citizen and employer-centric, and outcome-focused approach that will make an impact by:

- Developing a pipeline approach to DDI skills development;
- Help to de-clutter the data skills landscape and provide clear signposting to skills and employment opportunities, ensuring a “no wrong door” approach;
- Promoting multi-agency working, along with associated benefits including innovation, knowledge and resource sharing, a focus on inclusive growth;
- Maximising the local impact of wider Edinburgh and South-East Scotland City Region Deal capital investments;
- Focusing on fair work and increasing the flow of talent from disadvantaged groups and communities into sustainable career opportunities; and
- Reducing current and forecasted skills shortage and gaps in our key sectors Impact of implementing the DDI Skills Gateway project

The IRES programme has been allocated £25 million over an eight-year period to help facilitate a step change in inclusive growth by stimulating a change in culture and regional approach. This combined with the development of new skills content, enablers, and pilot activity will ensure our economy continues to generate good opportunities and that these are open and accessible by all sections of society. The DDI Skills Gateway is a crucial delivery component.

The DDI Skills Gateway will bring about a much needed innovative focus on upskilling the population of the city region to help it respond to changes in technology and the employment market. It is anticipated that more local people will be engaged in the opportunities available. An improved approach will open up and provide direct linkage to new job gateways with industry, including where there are current skills gaps, future skills gaps and where new skills are demanded.

3.6 Summary of Outcomes Benefits, and KPIs

The DDI Skills Gateway is an integral part of the IRES Programme and it is anticipated that significant inclusive benefits will be generated including;

- Increasing the visibility and unlocking access to good opportunities for those facing disadvantages in the labour market, or are under-represented within the industry;
- Opening up new talent pools to business and stimulating increased recruitment from under-represented groups into the good jobs and careers to help address skills shortages;
- Evolving, streamlining and integrating DDI Skills career pathways to support progression;
- Upskilling and improving workforce diversity across the region, while also increasing capacity to equip citizens with the skills they need to succeed throughout their working life; and
- Preparing local people for technological changes, and the resultant impact on job roles and inclusive growth, across organisations

Target numbers for learners across the DDI Skills Gateway have been identified. It is intended that this focus on outputs will be complemented by additional evaluation approaches (including career outcomes), in line with those agreed for the wider IRES Skills Programme. Roles within the tech sector are changing rapidly and there is limited baseline data to work with- the intention is to develop this data in the early stages of the programme. Stretch targets will be developed in line with the baseline information, and refined in the light of experience at the various review points built in to the timeline.

Logic models have been developed for activity across the DDI programme which describe the expected short, medium and long term outcomes. These will be discussed with the IRES PMO and reviewed to reflect agreed programme-level evaluation approaches. They include the following:

Short term outcomes – 2 years
Increased knowledge, confidence and skills in data educators
Increased learner interest in next stage in pathway towards data skills: increased uptake in courses and reduction in gender gap
Students gain experience and develop employability skills
Employers benefit from students' knowledge and skills
Increase in employed people retraining in data
Increase in women returners starting data learning journey
Selected employers committed to positive, equal supportive working
Mid-term outcomes – 5 years
Increase in learners gaining skills and qualifications in data
Increase in positive destinations for learners relating to data

Participation in data opportunities by more diverse groups of people
Strong partnerships between schools, college and universities with local employers
Students form relationships with employers and stay in region after graduation
Increase in women and other groups participation in data
Long term outcomes – 8 years
Reduced mismatch between supply and demand for data skills
Wider range of individuals have interesting and well paid careers in growing data sector
Learners leave education with higher level data skills
Increased participation of women in data sector

Table 2. Intended outcomes of DDI Skills Gateway

Evaluation of activity will also be covered by existing mainstream evaluation activity where appropriate. This measures the effectiveness of individual institutional activity, through established institutional approaches such as “How good is our college?”

The characteristics of DDI participants will be closely tracked and monitored, most particularly, sustained outcomes, and the proposed interventions reviewed in the light of experience. Robust client monitoring and tracking systems are already in place across education institutions and each of the local authority areas, and work is also ongoing to further refine and develop these systems through the IRES Integrated Knowledge Systems Project, involving each of the local authorities, Education Departments, Department for Work and Pensions, Skills Development Scotland and Developing the Young Workforce.

4 Commercial Case

This is a time of real opportunity and change in the economy. However, to support continued economic growth and diversification it is critical to ensure that skills supply can keep pace with demand. Furthermore, with a data revolution underway, it is important to ensure that the city region’s citizens can have the opportunity to learn about how, and contribute to discussions about what, data is being collected about them, how it is used, their legal rights and privacy implications.

The DDI Skills Gateway programme proposes a mix of public, private and 3rd sector interventions. The DDI Skills Gateway Board will oversee and ensure an evolving and flexible strategy in order to provide the highest level of value for money outcome performance over the programme lifecycle. Opportunities to lever in additional resources to augment the core IRES funding will also be explored throughout the programme lifecycle.

Individual projects, or indeed particular aspects of individual projects, may be managed, delivered or procured in different ways dependant on context. All procurement will uphold the overarching principle to achieve best value and maximum impact, and align with approved practice in participating organisations.

The programme aims to test a number of approaches to meet current and future demand for data skills in the region. A range of education and skills packages are included in the programme to help ensure that a wide cohort of learners can follow upskilling pathways.

4.1 Delivery Options

4.1.1 Sourcing Approach

This is a time of real opportunity and change nationally, and for the region, however, to support continued economic growth and diversification it is vitally important to ensure that skills supply can keep pace with demand.

Strategic collaboration therefore, across public, private and third sector agencies is recognised as the most cost-effective means to achieve this. The programme offers the opportunity to share expertise and resources, ensure support across the pipeline for learners, and promote joint learning and development where appropriate. It has been developed by using the extensive expertise and knowledge of the partner organisations to create a programme, and set of mutually supporting projects, that not only add value to current services and interventions, but also creates the conditions to incrementally improve the inclusive growth impact of our collective investment in the regional labour market.

This programme will be reviewed at particular check-points to reflect on impact and consider the realignment of resources where appropriate. The funding is being directed at testing innovative approaches to education, training and reskilling, and proof of concept testing is at the heart of what is being proposed.

4.1.2 Overview of Responsibilities

Employability and Skills partners are committed to working together to align provision with agreed priorities. Recognising there is a need to widen access, to address skills shortages and gaps, and to deliver improvements to boost the flow of individuals from disadvantaged groups into career opportunities, the DDI programme has developed an integrated approach to upskilling. There is an understanding that impacts should be felt in the short, medium and long term and that delivery organisations should be committed to working in partnership to ensure maximum effect.

The IRES and DDI Skills Gateway Boards will provide robust governance arrangements and will ensure that future services are consistent with Best Value for Money principles. There may be requirements for further reporting where funding has been leveraged from additional partners.

4.2 Risk Mitigation

Risk management and mitigation is an integral feature of the DDI Programme and the initial programme risk register ANNEX 3 Risk Matrix covers all aspects of the business case- Strategic, Economic, Commercial, Financial and Management.

The IRES and DDI Skills Gateway Boards are ultimately responsible for managing the programme and project risk - plans will be reviewed on an ongoing basis by a sub group of the IRES Board to ensure that they satisfactorily capture the up to date risk profile and ensure there are appropriate mitigation procedures in place.

New risks will be highlighted in the first instance to the DDI Skills Gateway Board, and where escalation is required mitigating actions will be agreed and implemented along with approved timescales for review. Risk mitigation will be reported through the quarterly progress and annual review processes that will be set up to steer and manage the IRES programme.

4.3 Contract Length

The IRES Programme (revenue change funding) is subject to various constraints, and particularly that each element of the IRES Programme requires to become self-financing and sustainable in the longer term, and certainly within the eight-year profile period. As detailed above, individual projects within the DDI Skills Gateway programme may be managed or procured in different ways dependant on context. The DDI Skills Gateway Board will oversee and ensure an evolving and flexible procurement strategy in order to provide the highest level of value for money outcome performance over the programme lifecycle

Considering the significant changes in the external political and economic environment (e.g. Brexit, further devolution of employability services, and changes emerging from the recent review of the Enterprise and Skills Agencies) flexibility and agility are critical to the successful implementation of the plan. The programme also provides opportunity to enable, encourage and attract further leverage and to consolidate this in mainstream funding.

The City Deal governance arrangements require quarterly progress report and annual reviews to track progress, and the IRES Programme will mirror these arrangements. However, it is also proposed to undertake a review at the end of 2021, in line with Scottish Government requirements, to ensure the direction of travel is right and funding priorities are still as originally envisaged.

4.4 Personnel Issues

These will be addressed by relevant delivery partner organisations

4.5 Implementation Timescales

The main investment period for the IRES programme is from 2019 to 2026 (8-years) and comprising four key stages as set out in the Programme Plan, but is anticipated to create a significant legacy beyond this period as the collaboration matures and develops.

- Phase 1: Establish
- Phase 2: Programme Delivery
- Phase 3: Review and Deliver Next Step Change Projects
- Phase 4: Reinforce, Embed, and Further Develop

The IRES Board and individual Project Development and Implementation groups will jointly agree a Monitoring and Evaluation Framework to measure and assess progress against key milestones.

Quarterly progress reports and annual progress reviews will be undertaken throughout the programme implementation period. The partnership will conduct an evaluation in 2021 to check the direction of travel is still right. Key tasks, stages and reporting structure required to deliver a project in accordance with the necessary governance and sign off is tabulated and each Project Implementation Group is required to report regularly against design, budget, risk and programme.

If a realignment to agreed parameters is required the IRES Board will sign off progress to the next stage. This will ensure the implementation of any necessary changes, resolve any major problems or respond to any major opportunities that could affect the delivery of the plan.

5 Financial Case

5.1 Introduction

It is recognised that the collaborative structures that have been developed under the City Region Deal partnership provide an opportunity to better align and integrate the activity of partners to deliver a more targeted and inclusive data skills pipeline. Through this co-production and co-delivery approach the partners will be able to share best practice and more fully exploit the opportunities provided by the wider DDI programme.

5.2 Expenditure profile

The DDI Skills Gateway proposes investment of around £8 million over the eight year programme lifecycle.

Project	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	Total
Data Education in Schools	£ 365,628	£ 363,157	£ 367,571	£ 340,761	£ 249,274	£ 249,010	£ 253,842	£ 258,770	£ 2,448,013
Data Education in Colleges	£ 218,686	£ 573,492	£ 441,565	£ 415,128	£ 363,381	£ 309,957	£ 281,193		£ 2,603,402
Data Education in Universities	£ 108,718	£ 68,274	£ 69,640	£ 100,465	£ 102,474	£ 104,524	£ 74,118	£ 75,601	£ 703,814
Data Education for Work	£ 241,736	£ 263,342	£ 259,609	£ 197,941	£ 199,360				£ 1,161,988
Equality and Diversity lead resource	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 190,504
Operational Costs (including lead role and expenses)	£ 100,878	£ 102,797	£ 104,751	£ 106,746	£ 108,781	£ 110,857	£ 112,974	£ 115,133	£ 862,917
Total	£ 1,059,459	£ 1,394,875	£ 1,266,949	£ 1,184,854	£ 1,047,083	£ 798,161	£ 745,940	£ 473,317	£ 7,970,638

Table 3 and Figure 12 outline the anticipated expenditure profile for the planned activities, for the period

2019-26, with Figure 13 showing the allocation across the programme. Further detail can be provided on request.

Project	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	Total
Data Education in Schools	£ 365,628	£ 363,157	£ 367,571	£ 340,761	£ 249,274	£ 249,010	£ 253,842	£ 258,770	£ 2,448,013
Data Education in Colleges	£ 218,686	£ 573,492	£ 441,565	£ 415,128	£ 363,381	£ 309,957	£ 281,193		£ 2,603,402
Data Education in Universities	£ 108,718	£ 68,274	£ 69,640	£ 100,465	£ 102,474	£ 104,524	£ 74,118	£ 75,601	£ 703,814
Data Education for Work	£ 241,736	£ 263,342	£ 259,609	£ 197,941	£ 199,360				£ 1,161,988
Equality and Diversity lead resource	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 23,813	£ 190,504
Operational Costs (including lead role and expenses)	£ 100,878	£ 102,797	£ 104,751	£ 106,746	£ 108,781	£ 110,857	£ 112,974	£ 115,133	£ 862,917
Total	£ 1,059,459	£ 1,394,875	£ 1,266,949	£ 1,184,854	£ 1,047,083	£ 798,161	£ 745,940	£ 473,317	£ 7,970,638

Table 3. Spend profile for DDI Skills Gateway

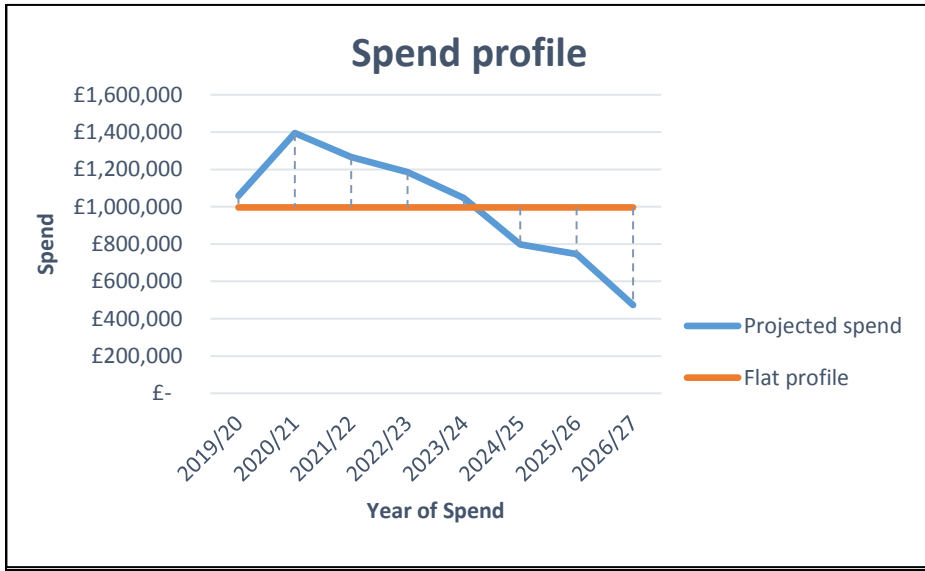


Figure 12: DDI Skills Gateway projected spend profile 2019 - 2027

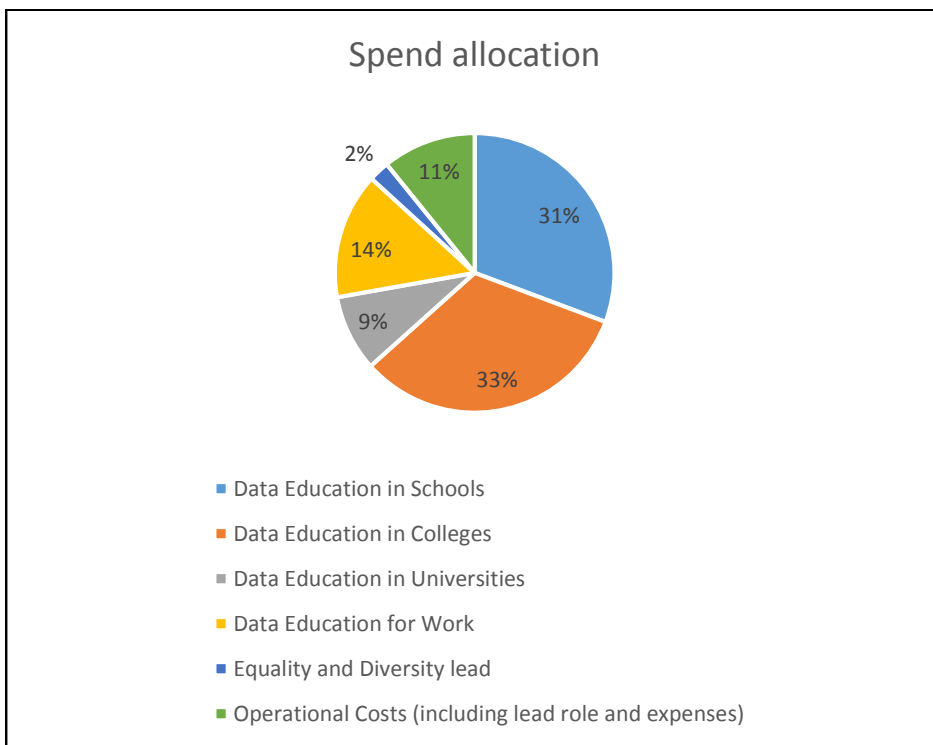


Figure 13: DDI Skills Gateway projected spend allocation.

This profile will be subject to regular review, (quarterly progress and annual review), by the partners through the DDI Skills Gateway Board, as described in the Management Case. Therefore the actual spend profile may vary across the timeline and project areas in response to learning and changing circumstances, to ensure that the funding achieves maximum impact against its objectives.

The following assumptions have been made in developing this cost profile:

- Staff costs will align with relevant employing organisations;
- These staff costs will rise with inflation; and
- Oncosts have been included, to cover pension and NI contributions

It is recognised that the city region deal funding will be supplemented by leverage of other resources including from:

- Participating partner organisations;
- Relevant national agencies, including Skills Development Scotland (SDS); Education Scotland; Scottish Qualifications Authority (SQA);
- Relevant skills budgets e.g. Workforce Development Fund
- Third sector partners;
- Private sector providers; and
- Philanthropic supporters

Leverage and partnership opportunities are identified in Table 4:

Organisation	Activity	Contribution
DDI Programme - University of Edinburgh	Funding to undertake a feasibility study to help with preparations for the Data Education in Schools project	£220,386 – already secured
Moray House School of Education – University of Edinburgh	Funding secured to cover 0.1 FTE for the Programme Director Data Education in Schools time over an 8 year period	£163,421
FE College network	Upskilling and accelerating talent for industry and delivery staff in institutions	£865,000

SDS	Upskilling and reskilling in Data Science to drive business productivity - pilot	£24,000 – already secured
SDS	Embedding blended Data Science learning and skills into Modern Apprenticeships for Financial Services and Healthcare - pilot	£24,000 – already secured
EQUATE	<ul style="list-style-type: none"> • Copyright free access to relevant EQUATE training materials • Promotion of events, courses etc. through EQUATE networks 	
Draft MoU with SDS	Areas of joint working as identified in draft MoU	In-kind contributions under discussion
Partner contributions	Gap funding	£857,000 over eight year programme (c. £107,00 per annum)

Table 4. Leverage and partnerships

5.3 Impact on Income and Expenditure (I and E) Accounts

The City Region Deal IRES Change fund will be held by City of Edinburgh Council on behalf of the partnership. This will be advanced to lead partners for the delivery of agreed activities upon approval of detailed business cases and the conclusion of any legal agreements or due diligence deemed necessary to ensure accountability and proper use of funds.

5.4 Financial risks

The City of Edinburgh Council will be the lead accountable body and will ensure that all management accounting is in accordance with the relevant statutory procedures. The City Region Deal Programme Management Office will provide secretariat support to the IRES Board with strict monitoring of programme income, expenditure and performance outcomes against project delivery profiles. The Programme Management Office, together with project leads, will be responsible for reporting performance outcomes to the IRES Programme Board and the wider ESES City Deal governance structures, and supporting the annual audit process.

The Accountable Body will put in place individual agreements with partners, as required, to ensure that project grant allocations are fully compliant, including any overarching terms and conditions where appropriate. Any variations to the programme will be notified by the accountable body and reviewed by Government in accordance with the following proposed agreement chain.

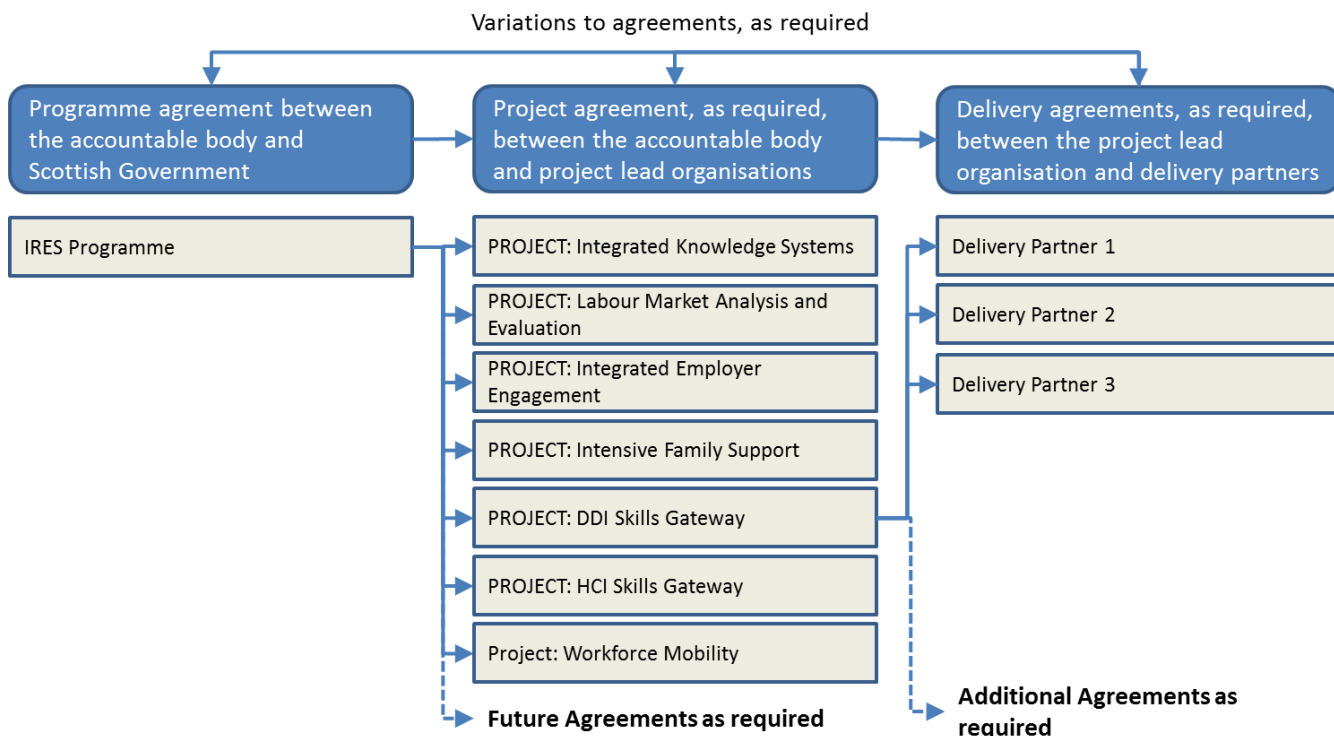


Figure 14: Agreement chain

The IRES Board and DDI Skills Gateway Delivery Board will regularly review progress with decisions made on continuation, adjustment or withdrawal of funding. The IRES Programme fund is a gap fund, (funder of last resort), that is matched against existing resources and any leverage secured by partners. Risk is therefore proportionate across partners and collaboratively managed to ease mainstreaming of all successful approaches developed.

IRES programme underspends or de-commitments will be reserved to the IRES Board, while project overspends will remain the responsibility of the relevant project lead organisation and delivery partners. In exceptional and extenuating circumstances request for additional support can be made to the IRES Board for consideration.

The IRES Programme creates the structures to support collaboration and best use of existing resources as well as the optimum use of City Region Deal IRES change funds. The anticipated financial profile for the DDI Skills Gateway programme has been constructed using the estimated cost of proposed project activity and anticipated funding gaps, but appropriately proportioned across the programme to ensure cohesion and balanced delivery against overall programme goals. This will be kept under review over the programme lifecycle.

The IRES programme board business case and proposition development processes encourage ongoing dialogue and mutual support to mitigate many of the risks associated with the IRES Programme. The initial risk register is included in the ANNEX 3 Risk Matrix.

6 Management Case

The activities of the DDI Skills programme will be overseen by the **DDI Skills Gateway Delivery Board**. This group will work with the IRES Board to support the delivery of wider programme goals. It will also look for opportunities to align with Talent activities being developed as part of the wider DDI Programme and to help facilitate the sharing of expertise, content and experience across the delivery partners

Robust lines of reporting for all IRES projects groups are summarised in the IRES Programme Business Case. It is proposed that, subject to The University of Edinburgh Court agreement, the accountable body for delivery of the DDI Skills Gateway Programme will be The University of Edinburgh through a delivery agreement with the ESES City Region Deal Lead Accountable Body (City of Edinburgh Council), with strict monitoring of the DDI Skills Gateway progress within an approved agreement framework.

Any variations to the programme will be in accordance with the agreement chain outlined in Figure 15:

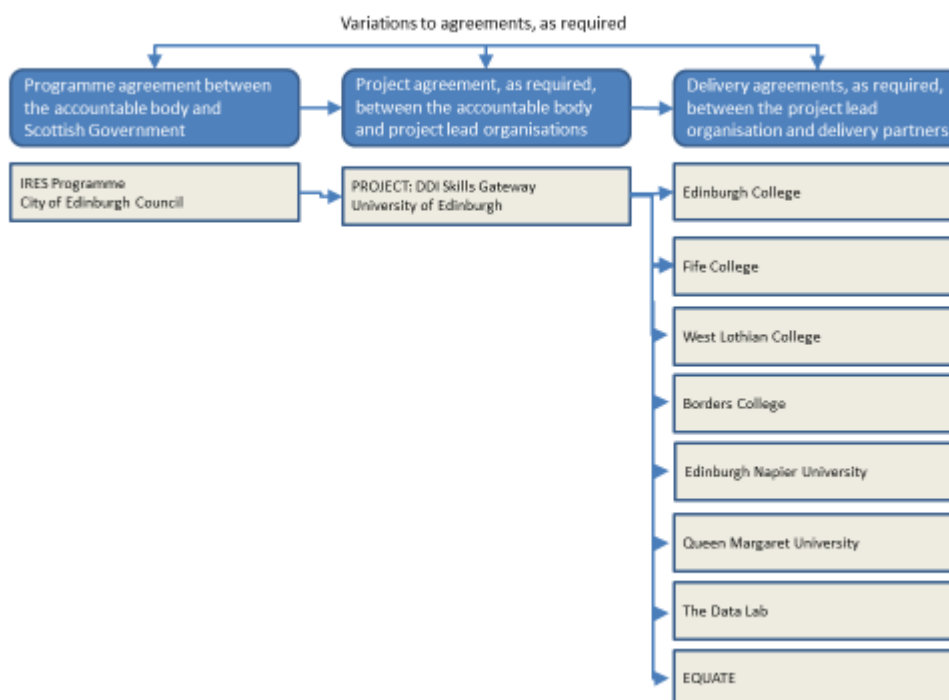


Figure 15: Agreement Chain

6.1 Project Management and Theme Support

The delivery of gateway activities will be undertaken by the Project Management and Development team, as illustrated below. Each of the DDI Skills Gateway subthemes will be led by a lead partner – providing direction, and with responsibility to monitor progress and track impact. As each subtheme comes forward for funding support there will be a programme plan with proposed impacts and outputs associated with the activity identified, prior to commencement.

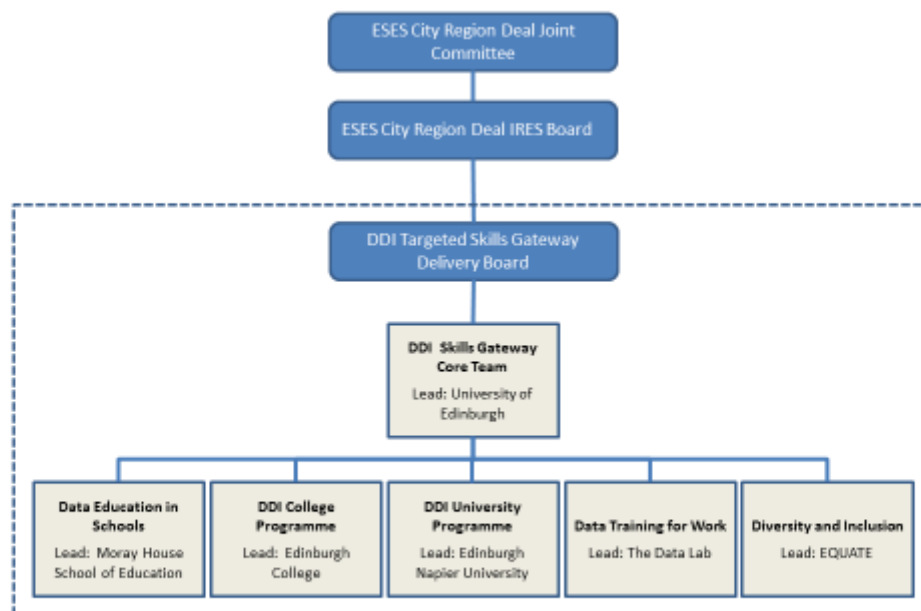


Figure 16: Proposed governance structure

The **DDI Skills Gateway Delivery Board** will be responsible for planning, implementing, reviewing, and refining the DDI Skills Gateway activity to ensure it delivers the change and inclusive growth ambitions for the City Region Deal. Proposed membership of this Board will be as follows, with the Board chaired by an industry or communities focused representative, supported by a vice chair with a background in inclusion.

Role	Organisation or Group
Chair/Vice-Chair	Independent representatives – covering both industry and inclusion priorities
Delivery Partners	The University of Edinburgh (Lead and Project Accountable Body) , Borders College, Edinburgh College, Fife College, West Lothian College, Edinburgh Napier University, Queen Margaret University, The Data Lab , EQUATE
Inclusion Representatives	Local Authorities, Third Sector, STUC
Industry Representatives	Industry representatives to be advised by ScotlandIS,
Public Skills Bodies & Innovation	To be selected from range of partners including: Skills Development Scotland, SQA, SFC, Regional Education Collaborative (s), Computing at Schools Scotland, Royal Society of Edinburgh, The Scottish Council for Development and Industry (SCDI)

Table 5. Proposed DDI Skills Board membership

This multi-stakeholder project management arrangement is supported by DDI Skills Gateway staff and will report to the IRES Board as indicated.

Core Staff roles and functions are as follows:

6.1.1 Central co-ordination:

A **director** role is required to co-ordinate the initial set up of the project and be responsible for its successful delivery across partners. Duties to include:

- Ensure DDI Skills Gateway activity is integrated with other IRES propositions to ensure maximum impact;
- Establishing monitoring and tracking arrangements; financial management systems and the use of IRES funding; reporting progress and future development recommendations to the IRES Board;
- Identifying opportunities for the leverage of additional resources to support programme development and delivery;
- Working with delivery partners on streamlining delivery and integrating into business as usual (mainstreaming) over the duration of the programme;
- Undertaking stakeholder and industry liaison, to support industry linkages and wider talent engagement ;
- Developing relationships, mechanisms and supports to unlock jobs/opportunities for individuals progressing through pipeline. Working with Employers, Employer engagement teams and DYW to promote opportunities and flexible routes into DDI Skills careers. This role will also feed in to the Integrated Employer Engagement activity as part of the wider IRES;
- Overseeing activities to help ensure workforce development/diversity and the benefits of fair work;
- Maintaining an oversight of philanthropic and community benefit activities; and
- Monitoring risk management

In addition, there is a requirements for centralised part-time administrative support- to assist with programme delivery and development

6.1.2 Data Education in Schools Project

- **Senior Project Officer:** Responsible for managing the work of other project staff and expert advisors for the duration of the eight year project.
- **Senior Education Advisor:** For the first three years of the project, to get things off to a stable start, additional support (at 40% FTE) is required from a Senior Education Advisor who would have considerable expertise in supporting schools develop their technology and digital capacity.

- **Project Officers:** 2 project officers to work with the Senior Project Officer and the Senior Advisor in the first four years until the first review point, and one thereafter.
- **Expert advisors:** In addition to the time of project officers, funding is required for payment to individuals with specific expertise in either a data driven innovation sector (e.g. space and satellite), or a pedagogical area (such as senior phase of secondary school or additional support needs). These experts may be drawn from industry, academia or the teaching profession.
- The services of a multimedia specialist are also required to produce some high quality learning resources to present key ideas. These costs are front loaded in the first four years of the project when materials development is a high priority.

6.1.3 *Data Education for FE students*

- **Project Lead and industry engagement co-ordinator**
 - Two years full time role and five years part-time
- **Course developer**
 - Two years full time role and five years part-time

6.1.4 *Data Education for HE students Project*

- **Development of undergraduate course in data science**
 - One year post for course development
- **Development of Data Literacy programme – ENU and QMU**
 - Funding for five years to develop and implement data literacy programme across both universities
- **Data placement provision**

6.1.5 *In work data training*

- **Senior Project Officer**
 - Five year post to lead the data training for work project and manage other project staff
- **Project Officer**
 - Three year post to co-ordinate and develop the administration of the programme
- **Researcher**
 - One year post or commissioned research to lead the design of the pilot

6.1.6 *Diversity and Inclusion*

A **Diversity and Inclusion Lead**, in a joint role, shared with the HCI Gateway. This important lead role is required to promote the focus on equality throughout the skills development teams and to engage with the technology sector to ensure a widening of opportunity for disadvantaged groups.

As the project becomes embedded, resource requirement for most of the above roles will be mainstreamed Governance and management arrangements as set out are aimed to empower the key delivery partners to:

- operate strategically to fully realise the inclusive growth potential of the sector and the economic assets that are created;
- respond to issues critical for the sector and its positive impact on wellbeing in the region; and
- align project and programme resources to maximise the impact of public and partner skills investments.

The DDI Skills Gateway, working to ensure alignment with the wider Integrated Employer Engagement activity, will provide a route to focus companies with an interest in the DDI Skills arena. Community benefits is a prominent theme within the IRES Integrated Employer Engagement programme, and across the wider city region deal, and the strong linkages between the local authority and other partners within the city region deal, and the key objectives of the skills programme, will help to align future community benefits and outcomes.

6.2 Programme Plan

It is proposed that the Programme be developed on a phased basis, subject to funding arrangements being agreed and impact evaluated. A piloted approach will also enable a systematic review of interventions, and provide the opportunity to refine activities as required. Indicative timeframes are laid out below, but these will clearly be subject to business case approval / learning from pilot activity.

Quarterly progress reports and annual progress reviews will also be undertaken throughout the programme implementation period. The partnership will conduct a programme evaluation in 2021, in line with Scottish Government requirements, to check that the direction of travel is still right.

Phase	Timeframe
Phase 1 – Project set up, research activities and commencement of delivery	2019-2021
Programme Evaluation in 2021 – in line with IRES Programme Business Case	
Phase 2 – Programme Delivery	2021-2024
Phase 3 – Review and Deliver Next Step Change Projects	2024–2026
Phase 4 – Reinforce, Embed, and Further Develop	2026-2027

Table 6. Project phases

ANNEX 1 DDI Skills Gateway Programme Development Board

University of Edinburgh (Programme Lead) – Alison Muckersie

University of Edinburgh (Digital Education Research Centre) – Professor Judy Robertson – Leading on Schools

University of Edinburgh (The Data Lab) - Joshua Ryan-Saha – Leading on In-work training

Edinburgh Napier University (Head of School of Computing) – Professor Sally Smith – Leading on HE

Edinburgh College (Assistant Principal) - Jon Buglass – Leading on FE

University of Edinburgh – (EDINA) Janet Roberts

Heriot-Watt University (Director of Planning) – Richard McGookin

City of Edinburgh Council (Edinburgh and South East Scotland City Region Deal PMO Skills lead) – Ken Shaw

ANNEX 2 Projected outcomes

Target groups	Target Numbers								2027/28 ⁵⁰	Totals
	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27		
Schools programme										
Event places for teachers	980	980	1730	1730	980	980	230	230		7840
Learners impacted by teacher education events ⁵¹	29400	29400	51900	51900	29400	29400	6900	6900		235200
College programme:										26585
Regional Key Skills Gap programme – Inclusive Growth	40	220	220	1500						
Pilot Projects HE upskilling new additional courses - pipeline +1 data	0	1000	1500	4590						
Pilot Projects HE upskilling new additional courses - pipeline Diploma	15	30		150						
Pilot Projects HE upskilling new additional courses - pipeline degree	0	10	20	80						

⁵⁰ Funding not secured for this year of activity

⁵¹ Notes: the assumption is that each teacher who attends an event then impacts 30 learners with that new knowledge. This is a conservative estimate because typically teachers would teach the same topic in multiple years. Also note that the same learner will encounter multiple topics about data - there are 121, 000 school leavers in the City Region in this period.

DATA DRIVEN INNOVATION SKILLS GATEWAY

<i>Pilot Projects FE/HE upskilling new additional courses - pipeline MA/ FA data science</i>	0	20	40	150						
<i>Pilot Projects FE/HE upskilling new additional courses - pipeline +1 core skill data</i>	0	2000	3000	1200						
HE Programme										
<i>New BSc Data Science including (as intake to third year from 22/23 onwards) articulating students from colleges</i>										
<i>Intake</i>		20	25	38	40	42	44	45	45	299
<i>Graduating</i>					18	23	35	38	40	269
<i>New provision of data science element in existing large undergraduate courses (business, nursing)</i>										
<i>Intake ENU</i>			100	200	250	280	280	280	280	1670
<i>Graduating</i>						92	180	230	250	...1503
<i>Intake QMU</i>					100	150	180	200	200	830
<i>Graduating</i>									92	...747
<i>Placements profile</i>										
<i>Placements created</i>	85	95	110	120	135	140	145	145		975
Data training for work										

DATA DRIVEN INNOVATION SKILLS GATEWAY

<i>Estimated learners per year (Recipients of Data Skills Credits)</i>	100	200	200	200	200	-	-	-		900
<i>Estimated learners per year (Leveraged in Inclusive Target Group)</i>	25	100	200	500	500	500	500	500		2,825
<i>Estimated learners per year (Leveraged - Not in Inclusive Target Group)</i>	25	100	200	500	500	500	500	500		2,825
Total	150	400	600	1200	1200	1000	1000	1000		6550

ANNEX 3 Risk Matrix

Risk	Mitigation measure
<p>Project fit and impact</p> <p>Developments in the economy, operational environment, performance factors, or good practice developments mean projects within the programme (or existing services) are no longer required in their current format, or there is evidence of under/over provision</p>	<ul style="list-style-type: none"> • The IRES and DDI Board structures will oversee the programme, constituent projects and wider change ambitions. • Progress will be regularly reviewed and the project portfolio and implementation plan amended as appropriate to ensure alignment with changes in the labour market and operational context. • Programme and Project activity will draw extensively upon collective partner knowledge to ensure activities are fit for purpose.
<p>Programme and project management capacity</p> <p>Inadequate programme or project management results in failure to deliver agreed outcomes</p>	<ul style="list-style-type: none"> • As above with options considered to review, increase or decrease any aspect of service delivery at any time
<p>Under-represented client groups</p> <p>There is a risk that under-represented client groups do not see tangible long-term benefits from the DDI Skills Gateway project</p>	<ul style="list-style-type: none"> • Links with the third sector and local authority employability teams will enhance provision. • Quarterly progress reports and annual progress reviews will be undertaken throughout the programme implementation period • Programme will be revised to ensure desired outcomes are met
<p>Private sector investment and support for inclusion</p> <p>There is a risk that the private sector buy-in and investment cannot be achieved reducing future impact and sustainability of interventions</p>	<ul style="list-style-type: none"> • ScotlandIS and other key industry representatives will be represented on the DDI Skills Gateway Board and there will be ongoing engagement with other industry representatives • DDI Skills Gateway aims to nurture employer relationships to demonstrate the business benefits of inclusive practices and the value of the services that have been put in place to encourage future direct and indirect investment.

<p>Mainstreaming of Activity</p> <p>There is a danger that the successful activities or practice changes initiated by the DDI Skills Gateway are not mainstreamed reducing the impact of ESES City Region Deal funding</p>	<ul style="list-style-type: none"> • A key intention of the project is to bring about cultural change for the sector. Phasing of project deliverables is weighted across years 1-3, with resource input reducing years 4-8 to accommodate mainstream shift. Progress regularly reviewed by DDI Skills Gateway Delivery Group and IRES Board.
<p>Performance and good practice learning</p> <p>The DDI Skills Gateway is expected to deliver a significant impact across the whole City Region Deal in terms of Inclusive Growth, however, the detail of the monitoring framework, impact and outcomes are still being developed.</p>	<ul style="list-style-type: none"> • The partnership structures, along with the engagement and communication activity that is being developed, will capture, disseminate, and mainstream learning. • Robust monitoring and tracking systems are already in place across partner organisations. • Quarterly progress reports and annual progress reviews will be undertaken throughout the programme implementation period. The partnership will conduct an evaluation in 2021, in line with Scottish Government requirements, to check that the direction of travel is still right
<p>Other reskilling/upskilling provision is available</p> <p>There is a need to avoid duplication/competition for clients/employers</p>	<ul style="list-style-type: none"> • This would be mitigated through effective partner engagement, cooperation and coordination at Programme Director / Board level
<p>Financial risk</p> <p>The partners have agreed to a target for leverage of additional resources. Failure to secure this will impact on programme scope and impact.</p>	<ul style="list-style-type: none"> • Ongoing discussions with a range of potential partner organisations are under way. Any inability to achieve leverage will result in a review of programme ambitions and a refocusing of priorities to ensure ongoing financial propriety. • The Partners/DDI Board will regularly review resources available and ensure the programme of investment that can be delivered (inc. IRES change fund, partner resources, and external leverage). • Release of ESESCRD IRES funds for Projects will be subject to the recommendations of the IRES board and approved by Joint Committee who will be satisfied that no other funding (as funder of last resort) or effective delivery mechanism exists.