Digital Industries Apprenticeship: Occupational Brief

Data Analyst

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Level 4 Data Analyst Apprenticeship

Minimum Standards and Grading Criteria

This paper defines the minimum requirements for the knowledge, skills and behaviours defined in the standard, which are required for a pass.   It also defines the criteria to be used for awarding the grade for merit or distinction.   This paper should be read in conjunction with the Standard and Assessment Plan for the Level 4 Data Analyst Apprenticeship

Overview of Grading

There are three sets of criteria on which the assessment and grading is made. The three criteria are

> The What: what the apprentice has shown they can do,

> The How: the way in which the work has been done

> The With Whom: The personal and interpersonal qualities the apprentice has brought to all their work relationships

Each of these three criteria has minimum (expected) requirements, which must be satisfied for a pass.

Each of these criteria has a number of dimensions which should be considered to determine if the apprentice is significantly above the minimum (expected) level of quality

The purpose of grading is to differentiate between those apprentices whose work is at the expected level of quality against the totality of the skills, knowledge and behaviours specified in the standard and those whose work is significantly above this expected level

> For a pass, <u>each </u>of the three sets of criteria must demonstrate at least <u>the expected (minimum requirement) level</u> of quality

> For a merit, t<u>he What has to be significantly above</u> the level of quality and <u>one of</u> <u>either the How or the With Whom has to be significantly above</u> the level of quality expected

> For a distinction, <u>each of the three sets of criteria must be significantly above the expected</u> level of quality

The assessor takes a holistic judgement of whether or not their assessments demonstrate that the apprentice is "significantly above the expected level of quality" in each of these three areas and can then determine which grade should be awarded

The what – what the apprentice has shown they can do

Minimum Requirements

The following table shows what the minimum, expected requirements are for a pass on this criteria

Competency Standard	Minimum, expected, requirements for a pass
Identify, collect and migrate data to/from a range of internal and external systems	Apprentices should be competent in abstracting data for subsequent analysis. This will include: • identifying the data necessary as inputs to the analysis based upon the requirements of those requesting the analysis • collecting data from a variety of sources. They should understand that data may be collected not only from stored data but also from sensors, cameras, recording devices, satellites, etc. • migrating data for subsequent analytics studies and specify data conversion requirements
Manipulate and link different data sets as required	Apprentices need to be able to manipulate and link data sets to provide the data set for data analyst, including: • manipulating data sets of structured and unstructured data from diverse sources • merging or linking data from a variety of disparate sources
Interpret and apply the organisations data and information security standards, policies and procedures to data management activities	Apprentices should be able to identify relevant internal standards and apply them to data analysis work as follows: • locate organisational standards and policies for secure data analysis activities and processes. • review and apply organisational standards and policies for secure data analysis activities and processes.
Collect and compile data from different sources	Compiling data in preparation for analyses is a core part of data analysis and can involve manually compiling data from multiple sources including • databases • spreadsheets • reports
Perform database queries across multiple tables to extract data for analysis	Apprentices should be able to filter and retrieve specific data using database queries in more than one database table. • single and multiple queries • use of database query tools • query processing • Query containment

Perform routine statistical analyses and ad-hoc queries	Apprentices should be able to undertake standard analyses using industry standard methods using popular methods: • general linear model: A widely used model usable for assessing the effect of several predictors on one or more continuous dependent variables. • generalised linear model: An extension of the general linear model for discrete dependent variables. • structural equation modelling: Usable for assessing latent structures from measured manifest variables. • item response theory: Models for assessing one latent variable from several binary measured variables.
Use a range of analytical techniques such as data mining, time series forecasting and modelling techniques to identify and predict trends and patterns in data	Apprentices need to be able to apply a range of analytical techniques, including: • data mining tools to discover useful patterns in large data sets. • time series analysis where data *is taken over time* in order to extract meaningful statistics and other characteristics • time series *forecasting* where a model is used to predict future values based on previously observed values
Assist with data quality checking and cleansing	Apprentices should be able to undertake data quality checking: • ensuring data quality including correcting, standardising and verifying data • checking data for errors, inconsistencies, redundancies and incomplete information • cleansing data, including de-duplication and verification of information;
Apply the tools and techniques for data analysis, data visualisation and presentation	Apprentices should be able to apply the tools and techniques for data analysis, visualisation and for communicating results: • work with data analysis and data mining tools to produce data insights • create and study the visual representation of data, to communicate information clearly and efficiently to users via a range of statistical graphics, plots, information graphics, tables, and charts.
Assist with the production of a range of ad-hoc and standard data analysis reports	Apprentices need to be able to develop reports summarising the business outcomes of analysis studies: • report the outcomes of analysis in many formats to the users of the analysis to support their requirements. • explain the quantitative messages contained in the data.
Summarise and present the results of data analysis to a range of stakeholders making recommendations	It is important that apprentices can summarise and present their findings: • summarise the outcomes of an analysis • present data to a wide range of stakeholders
Works with the organisation's data architecture	Data analyst can: • understand that the data architecture is composed of models, policies, rules or standards that govern which data is collected, and how it is stored, arranged, integrated, and put to use in data systems

	• identify particular characteristics of own organisation's data architecture

The how: the way in which the work has been done

The following table shows what the minimum, expected requirements are for a pass on this criteria

Competency Standard	Minimum expected requirements for a pass
Apprentices can demonstrate the full range of skills, knowledge and behaviours required to fulfil their job role	Knows what skills, knowledge and behaviours are needed to do the job well Are aware of their own strengths in the job role, and any areas for improvement Appreciate who else is important, for them to do their job and fulfil the role effectively (e.g. colleagues, managers, other stakeholders) Are aware of potential risks in the job role (e.g. security, privacy, regulatory) Use personal attributes effectively in the role, e.g. entrepreneurship Understand how the job fits into the organisation as a whole
Apprentices can demonstrate how they contribute to the wider business objectives and show an understanding of the wider business environments	Understands the goals, vision and values of the organisation Aware of the commercial objectives of the tasks/ projects they are working on Understands the importance of meeting or exceeding customers' requirements and expectations Is in tune with the organisation's culture Aware of the position and contribution of the organisation in the economy Understands the key external factors that shape the way the organisation function, e.g. regulation Knows how the organisation can gain advantage in the industry, e.g. through innovation, technology, customer service etc.
Apprentices can demonstrate the ability to use both logical and creative thinking skills when undertaking work tasks, recognising and applying techniques from both.	Logical thinking: • Understands initial premise(s) and preconditions • Recognises the conclusion to be reached • Proceeds by rational steps • Evaluates information, judging its relevance and value • Supports conclusions, using reasoned arguments and evidence Creative thinking: • Explores ideas and possibilities • Makes connections between different aspects

	• Adapts ideas and approaches as conditions or circumstances change
Apprentices can show that they recognise problems inherent in, or emerging during, work tasks, and can tackle them effectively	*Problem*-solving: • Analyses situations • Defines goals • Develops solutions • Prioritises actions • Deals with unexpected occurrences

The How: the way in which the work has been done

Criteria for a Merit or Distinction

The following table shows what the apprentices would need to demonstrate to be assessed as significantly above the expected level for the way in which the work has been done

Dimensions	Description of what significantly above the expected level of quality looks like
Responsibility – the scope of responsibility and level of accountability demonstrated in the apprentices work	Undertakes work that is more complex, more critical or more difficult Works independently and takes high level of responsibility
Initiative	Independently demonstrates an ability to extend or enhance their approach to work and the quality of outcomes Doesn't just solve the problem but explores creative or innovative options to do it better, more efficiently, more elegantly or to better

	meet customer needs
Delivery focus – the extent to which the apprentice has shown they can grasp the problems, identify solutions and make them happen to meet client needs	Shows strong project management skills, in defining problem, identifying solutions and making them happen
	Demonstrates a disciplined approach to execution, harnessing resources effectively
	Drives solutions – with a strong goal focused and appropriate level of urgency

The with whom: the personal and interpersonal qualities the apprentice has brought to internal and external relationships

Minimum Requirements

The following table shows what the minimum, expected requirements are for a pass on this criteria

	Minimum expected requirements for a pass
Apprentices can manage relationships with work colleagues, including those in more senior roles, customers/clients and other stakeholders, internal or external and as appropriate to their roles, so as to gain their confidence, keep them involved and maintain their support for the task/project in hand Apprentices can establish and maintain productive working relationships, and can use a range of different techniques for doing so.	Managing relationships: • Understands the value and importance of good relationships • Influences others by listening to and incorporating their ideas and views • Acknowledges other people's accomplishments and strengths • Manages conflict constructively • Promotes teamwork by encouraging others to participate Customer/client relationships: • Understands their requirements, including constraints and limiting factors • Sets reasonable expectations • Involves them in decisions and actions • Interacts positively with them • Provides a complete answer in response to queries ('transparency', 'full disclosure') Stakeholders: • Understands who they are and what their 'stake' is • Prioritises stakeholders in terms of their importance, power to affect the task and interest in it • Uses stakeholders' views to shape projects early on • Gains support from stakeholders, e.g. to win resources • Agrees objectives
Apprentices can communicate effectively with a range of people at work, one-to-one and in groups, in different situations and using a variety of methods. Apprentices can demonstrate various methods of communication,	Intention/purpose: • Understands the purpose of communicating in a particular situation or circumstance (e.g. inform, instruct, suggest, discuss, negotiate etc.) • Checks that the person/people with whom one is communicating also understand the purpose • Is sensitive to the dynamics of the situation • Is aware of anything that might disrupt the effectiveness of the communication (e.g. status, past

	history)
with an understanding of the strengths, weaknesses and limitations of these, the factors that may disrupt it, and the importance of checking other people's understanding.	a. Method: • Chooses a good, appropriate method for the situation • Aware of the limitations of the chosen method, and the possible risks of miscommunication (e.g. ambiguity) • Takes account of the affective dimensions of the method (e.g. body language, tone of voice, eye contact, facial expression etc.) b. Execution: • Expresses self clearly and succinctly, but not over-simplifying • Checks that the other person/people understand what is being expressed • Takes account of the potential barriers to understanding (e.g. filtering, selective perception, information overload) • Modifies the purpose and methods of communication during a situation in response to cues from the other person/people

The With Whom: the personal and interpersonal qualities the apprentice has brought to internal and external relationships

Criteria for Merit or Distinction

The following table shows what the apprentices would need to demonstrate to be assessed as significantly above the expected level for the personal and interpersonal qualities the apprentice has brought to internal and external relationships

Dimensions	Description of what significantly above the expected level of quality looks like
Scope and appropriateness – the range of internal and external people and situations that the apprentice has engaged appropriately and effectively with	Internally – works alone, 1:1, in a team and across the company with colleagues at all levels Externally – works with customers, suppliers and partners in a variety of situations

	Reads situations, adapts behaviours, and communicates appropriately for the situation and the audience
Reliability – the extent to which they perform and behave professionally	Can be trusted to deliver, perform and behave professionally, manages and delivers against expectations, proactively updates colleagues and behaves in line with the highest values and business ethics
A role model and exemplar to others	Actively inspires and leads others, takes others with them, leads by example

Annex: Data Analyst: Knowledge and Understanding

Knowledge and Understanding is assessed on programme through Knowledge Modules and Vendor or Professional Qualifications

Knowledge Module 1: Data Analysis Tools (for Level 4 Data Analyst Apprenticeships)

The Knowledge Standards	Definition of the Minimum Requirements
Understands and can apply the processes and tools used for data integration	a) Understand the purpose and outputs of data integration activities b) Understand that data integration involves combining data from several disparate sources, which are stored and provide a unified view of the data c) Understand how programming languages for statistical computing can be applied to data integration activities to improve speed, quality and usefulness of data integration for analysis d) Understand that the data can be sourced from a wide range of systems e) Understand the role of source data quality to the usefulness of data analysis results f) Understand the nature of data volumes being processed through data integration activities and that using programming approaches makes this more efficient g) Understand that proper testing is essential to ensure that unified data sets are correct, complete and up-to-date
Understands and can apply industry standard tools and methods for data analysis	a) Understand the data manipulating, processing, cleaning, and analysis capabilities of statistical programming languages and proprietary software tools needed to effectively solve a broad set of data analysis problems b) Understand how to apply statistical programming languages in preparing data for analysis and conducting analysis projects

The following Vendor or Professional Certifications exempt apprentices from this knowledge module:

- EMC: Data Science associate

Knowledge Module 2: Data Analysis Concepts (for Level 4 Data Analyst Apprenticeships)

The Knowledge Standards	Definition of the Minimum Requirements
Understands the different types of data, including open and public data, administrative data, and research data	a) Understand the range of different types of data

Understands the data life cycle	b) Understand that the flow of an information system's data follows a life cycle: from creation and initial storage to the time when it becomes obsolete and is deleted.
Understands the differences between structured and unstructured data	c) Understand that structured data is information, usually organised in databases which can easily be ordered and processed by data analysis tools d) Understand that unstructured, can be word processor, spreadsheet and PowerPoint files, audio, video, sensor and log data, or external data such as social media feeds. This is usually higher volume e) Understand that organisations want to be able to rapidly analyse both unstructured and structured data to maximise insight through analysis
Understands the importance of clearly defining customer requirements for data analysis	a) Understand that data itself does not provide the answers to business problems, the key to effective data analysis is by asking the right questions which are defined as requirements
Understands the quality issues that can arise with data and how to avoid and/or resolve these	a) Understand that minor data errors can cause major issues for data analysis b) Understand that improving data quality and defining an organisational strategy for improved source data creation and storage will directly benefit the value of data analytics to improved business decision making
Understands the steps involved in carrying out routine data analysis tasks	a) Understand that the steps in routine data analysis can typically include include: • Problem hypothesis • Identifying what to measure • Collect data • Cleanse data • Model data • Visualise data • Analyse data • Interpret results • Document and communicate results
Understands the range of data protection and legal issues	a) Understand the data protection and privacy issues that can occur during data analysis activities b) Understand what the Data Protection Act states c) Understand the need to comply with the Data Protection Act
Understands the fundamentals of data structures, database system design, implementation and maintenance	a) Understand that *data structure* refers to different ways of describing different types of information. b) Be aware of the different types of data structures including: • Files • Lists

	• Arrays • Records • Trees • Tables c) Understand that database design is the process of producing a detailed data model of a database. d) Understand how to implement a database from the data model e) Understand that database maintenance is an activity designed to keep a database running smoothly and that a database can become sluggish and lose functionality otherwise f) Understand that an important aspect of maintaining a database is backing up the data securely
Understands the organisation's data architecture	a) Understand that an organisations data architecture is a set of rules, policies, standards and models that define how data is used, stored, managed and integrated within an organization and its database systems.
Understands the importance of the domain context for data analytics	a) Understand the importance of domain knowledge to effective data analysis.