Next Generation Higher National Unit Specification

Data Management (SCQF level 8)

Unit code: J6CM 48

SCQF level: 8 (8 SCQF credit points)

Valid from: session 2023–24

Prototype unit specification for use in pilot delivery only (version 1.0) June 2023

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This unit specification is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

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Unit purpose

This non-specialist unit is for learners who want to understand and apply the concepts, principles and technologies of data management. It has a particular focus on data management and governance for data analysis. The unit uses holistic and contemporary approaches to the management and maintenance of organisational data. Learners should be familiar with basic concepts of data and repositories, and ideally have experience of working with data and using database technologies.

Central themes include data quality and its impact; the people, processes and technologies at the centre of data management, and the critical success factors that can lead to effective governance. Learners explore a range of component and contributary factors, such as the role of architecture, modelling and design, identification of critical data elements, understanding categories of data, and the emerging disciplines of data integration and inter-operability. The unit ends with learners using their knowledge and skills to define their own data management solution.

On completion of this unit, learners can progress to more specialised units in the field of data management and data security, or progress to higher level units in the area of data analysis such as the Data Engineering unit at SCQF level 9.

Unit outcomes

Learners who complete this unit can:

1   explain the significance of quality in data management
2   describe the people, processes and technology required for consistent and secure data management
3   explain the principles and practices of data governance
4   apply data management techniques to define a full or partial data management solution

Evidence requirements

Learners must provide both knowledge and product evidence.

Knowledge evidence

Evidence should relate to outcomes 1, 2 and 3, and is required for all knowledge and skills statements in these outcomes. The amount of evidence can be the minimum required to infer competence and produced over an extended period of time, in lightly controlled conditions.

You can sample evidence when testing is used. In this case, learners must produce the evidence under controlled conditions in terms of location, timing and access to reference materials. Sampling must cover outcomes 1, 2 and 3, but not all knowledge and skills statements. However, you must sample the majority of the knowledge and skills at least once in every instance.

Evidence can be written or oral or a combination of these. It can be captured, stored and presented in a range of media (including audio and video) and formats (analogue and digital).

Product evidence

Evidence in outcome 4 demonstrates that learners have the competence to apply data management techniques to define a full or partial data management solution, including:

♦   using a holistic approach to collecting, managing, securing, and storing data
♦   providing recommendations for data governance; making reference to critical data elements, organisational data structures, policies, rules and processes
♦   providing guidance on appropriate data administration and maintenance tasks, and how these can be applied in accordance with quality and security requirements
♦   defining professional roles and responsibilities of those involved in defining data management standards in an organisation
♦   taking into account potential ethical considerations

Learners can produce this evidence over the duration of this unit, under lightly controlled conditions (including access to reference materials), where authentication is necessary. The Guide to Assessment provides further advice on methods of authentication.

The standard of evidence should be consistent with the SCQF level of this unit.

You should use appropriate level descriptors when making judgements about the evidence.

Knowledge and skills

The following table shows the knowledge and skills covered by the unit outcomes:

Knowledge	Skills
Learners should understand: ♦ data as an asset ♦ the definition of data quality ♦ the problems and risks associated with poor quality data including data bias ♦ the definition of data quality rules ♦ data remediation and cleansing ♦ data quality reporting ♦ data management roles and responsibilities ♦ the ethics and legislation relating to data management ♦ the role of data architecture, design and modelling in data management ♦ organisational maturity in data management (DMM) ♦ data definitions, dictionaries and schemas ♦ categories of data including reference data, metadata and master data ♦ data management standards including DMBOK ♦ database management systems (DBMS) including data integration and federated databases ♦ document management systems ♦ a combination of data from different sources safely using data integration, mining and warehousing techniques ♦ metadata and its management	Learners can: ♦ demonstrate a holistic approach to collecting, managing, securing, and storing data ♦ provide recommendations for data governance, making reference to critical data elements, organisational data structures, policies, rules and processes ♦ apply data administration and maintenance in accordance with quality and security requirements

Knowledge	Skills
Learners should understand: ♦ the roles and responsibilities in data governance, ownership and stewardship ♦ the holistic nature of data governance when defining an organisation's overall approach to data ♦ data governance and data management ♦ the success factors of data governance ♦ critical data elements (CDEs) and key data elements (KDEs) ♦ data lifecycles ♦ data governance frameworks in organisations ♦ ethical considerations in data governance ♦ critical data elements, organisational data structures, policies, rules and processes ♦ the professional roles and responsibilities of those involved in defining data management standards in an organisation	

Meta-skills

Throughout the unit, learners develop meta-skills to enhance their employability in the data science sector.

Self-management

This meta-skill includes:

♦ integrity: ethics
♦ adapting: critical reflection

Social intelligence

This meta-skill includes:

♦ feeling: social conscience

Innovation

This meta-skill includes:

♦ curiosity: questioning, problem recognition
♦ sense-making: pattern recognition, holistic thinking, synthesis, analysis
♦ critical thinking: logical thinking, computational thinking

Literacies

Throughout this unit, learners have opportunities to develop their literacy skills.

Numeracy

Learners develop numeracy skills through detailed consideration of data elements.

Communication

Learners develop communication skills by providing recommendations and guidance in writing in their data management solution.

Digital

Learners develop digital skills and computer literacy throughout this unit.

Delivery of unit

You should adopt a practical, hands-on approach to learning to engage learners and illustrate key concepts. However, you should underpin all practical activities with appropriate knowledge, before learners start these activities.

At this level, learners should lead their learning, with some intervention. You should give them an initial introduction and explanation for each outcome, so they have significant scope to research and explore the topics. A significant amount of independent learning should take place, however, you can support learners with this, where appropriate.

We recommend that learners attempt the outcomes in numerical order, finishing with producing a project or case study as evidence for outcome 4.

You must teach all the content listed in the 'Knowledge and skills' section, even if you assess evidence for outcomes on a sample basis. Learners should not know in advance the items being assessed, and you should sample different items on each assessment occasion.

While the exact time allocated to this unit is at your centre's discretion, the notional design length is 40 hours.

We suggest the following distribution of time:

Outcome 1 — Explain the significance of quality in data management
(8 hours)
Outcome 2 — Describe the people, processes and technology required for consistent and secure data management
(8 hours)
Outcome 3 — Explain the principles and practices of data governance
(8 hours)
Outcome 4 — Apply data management techniques to define a full or partial data management solution
(16 hours)

Additional guidance

The guidance in this section is not mandatory.

Content and context for this unit

Explain the significance of quality in data management (outcome 1)

This focuses on the people, processes and technologies that are involved in maintaining and improving data quality. It emphasises the significance of good data, highlighting the pitfalls, problems and risks associated with bad data. You should concentrate on how organisations can set data quality rules that clearly define the requirements businesses set on their data. At this stage, you can also discuss the five 'characteristics' of good data (accuracy, completeness, reliability, relevance, and timeliness). Discuss data remediation, and make learners aware of the techniques and processes involved in data cleansing and re-organisation to enhance the usefulness of data. You should also discuss the impact and contribution of people in the data management process, and make learners aware of data management roles and responsibilities, particularly those of the data manager.

Describe the people, processes and technology required for consistent and secure data management (outcome 2)

This covers the concepts and principles of data management and provides a further foundation for proceeding outcomes. You should identify early on the basic concepts of data management and highlight that, because data is a valuable asset, good data management can significantly impact an organisation in terms of efficiency, maintaining and improving quality, while further mitigating against data related problems and risks.

You should emphasise ethics and relevant legislation at this stage. Although you do not need to cover this in depth, you should make learners aware of the main principles of the Data Protection Act (2018) — the UK's implementation of the General Data Protection Regulation (GDPR). Also highlight data management standards early in delivery, including the Data Management Book of Standards (DMBOK), and possibly ISO 8000, both of which are considered international standards on practices and processes of data management, and data quality.

Give learners the opportunity to learn about the principles of DBMS in terms of their basic functionality and in terms of handling the storage, retrieval, and updating of data in a computer system. You can also introduce the basic principles of data integration and federation at this stage, particularly in terms of how DBMS can combine data from different sources into meaningful and valuable information. Define different 'types' of data, particularly reference data, metadata and master data.

By this stage, learners should also have a basic awareness of the key processes and techniques of data architecture, modelling and design. In particular, techniques used to discover, analyse, represent, and communicate data requirements in a data model. You could cover techniques for capturing workflows and relationships, and learners should understand the significance of data models, particularly entity-relationship diagrams, as a form of communicating data and relationships.

Useful resources include:

- [Data Protection](#) (GOV.UK)
- [Body of Knowledge](#) (The Global Data Management Community)
- [ISO 8000-63:2019](#) (International Organization for Standardization)

Explain the principles and practices of data governance (outcome 3)

This focuses on data governance, and how it provides a definition of structures, policies, rules, processes, and metrics that apply at the different stages of the data lifecycle (collection, storage, use, protection, archiving, and deletion). The basis of this outcome is that data governance is concerned with the way data is accessed and used in a wider data management strategy. You should highlight the holistic nature of data governance, particularly how it impacts an organisation's entire approach to its data and data structures. Learners should appreciate the interdependent relationship between data governance and data management. Particularly that data management centres around the implementation of predefined architectures, tools and processes, with the aim of achieving the objectives set out in the organisation's data governance policies and frameworks.

You should include the practice of identifying CDEs in terms of how they not only help an organisation prioritise its data, but provide the foundation for the development of its entire approach to data governance. You can include a discussion on how critical data elements compare with key data elements, although precise definitions may be difficult to come across as these vary between organisations. Learners should be aware that successful identification of CDEs can form the foundation of a successful data governance program.

Apply data management techniques to define a full or partial data management solution (outcome 4)

The unit finishes with a final, practical outcome, where learners develop a full or partial data management solution. They combine learning from previous outcomes in a way that can form new learning, insights and understanding.

Outcome 4 presents learners with an opportunity to apply a range of data management techniques to define a full or partial data management policy. This might be a partial data management solution for a fictional organisation, based around a case study.

Learners should make recommendations for data governance, referring to critical data elements, organisational data structures, policies, rules, and processes. They should also make recommendations on how these could be implemented as part of a wider data management approach.

They should also be aware of, and refer to the professional roles and responsibilities of the people involved in data management and governance.

Approaches to assessment

Evidence can be generated using different types of assessment. The following are suggestions, however, there may be other methods that could be more suitable for your learners.

Outcomes 1, 2 and 3: closed-book assessment consisting of extended response questions covering a wide variety of knowledge and skills.

Outcome 4: open-book project or case study-based practical assignment. Evidence for this outcome should be a case study or practical project, involving research and an investigative approach. Learners would apply data management techniques to define a full or partial data management policy.

If learners take a project-based approach, they should carry out a significant part of the work without close supervision, although you can give guidance and support. You can provide a case study to learners, with a realistic scenario or brief as a basis. Alternatively, learners could base the project around a 'real-life' scenario, relating to data management in their own workplace, or an organisation they are already familiar with. We recommend that learner-led projects are shown to you first to ensure they are suitable and meet the assessment criteria. In particular, there should be opportunities to apply a sufficient range of data management techniques as part of the development of the data management solution. We also advise that, where applicable, learner-led projects are checked with the participating employer or organisation to ensure that relevant data, information and processes can be accessed and used for assessment.

When assessing project-based work, use a checklist to define the knowledge and skills to be covered and the standards to be achieved. This helps ensure that the assessment is valid and reliable, and that the requirements of the brief are met. This should not simply consist of a set of boxes to tick, but must allow space for the assessor to reference evidence against the outcome and/or standard for each aspect of the project.

Equality and inclusion

This unit is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

You should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and/or those with additional support needs is available on the [assessment arrangements web page](#).

Information for learners

Data Management (SCQF level 8)

This section explains:

♦ what the unit is about

♦ what you should know or be able to do before you start

♦ what you need to do during the unit

♦ opportunities for further learning and employment

Unit information

This unit is suitable for you if you already have some basic knowledge or practical experience of working with data, for example working a database. Also if you want to develop your knowledge and skills in the increasingly important field of data management. It is particularly suitable if you are already working in vocational and professional roles, and if you wish to progress to further study of data management, for example if you are wanting an industry certification.

It is for learners who wish to understand and apply the concepts, principles and technologies of data management and governance. The scope of data management is very wide, but this unit covers some of the most important concepts, practices and principles. You learn how practitioners can take a holistic approach to the management and governance of data, for example as part a company-wide approach to managing and maintaining data.

You also learn about the tremendous value of good data, and common pitfalls to avoid 'bad' or problematic data. Other topics include data quality and its implications, and data processes and technologies, and you learn about the different people whose work contributes to effective data management and governance.

The unit also describes a range of techniques that can contribute towards an effective data management program or solution — for example uncovering critical data elements, the role of data architecture, modelling and design, understanding categories of data, and the emerging fields of data integration and inter-operability.

Finally, you can put your knowledge and skills into practice by developing part of a data management solution for either a fictitious or real-life organisation. You may also answer questions relating to the knowledge and skills contained in this unit.

Teaching approaches may cover a variety of techniques, for example active, project-based and collaborative learning. Some of this may be via video conference and through online learning materials. If this is the case, we encourage you to fully participate in online learning activities. You can be assessed in a variety of ways, for example by completing a case study project or by more contemporary means, such as an online blog or e-portfolio, where you can showcase your work.

This unit is part of the Higher National Diploma (HND) in Data Science at SCQF level 8. By the end of this unit, you can identify the main concepts, principles and techniques of data management. You can also identify approaches and methodologies relating to data governance, and their features and benefits. Specialist knowledge and skills in data management and governance may contribute to enhanced employability opportunities.

You develop meta-skills in self-management, social intelligence and innovation.

On completion of this unit, you can progress to more specialised units in the field of data management and data security, or progress to higher level units in the area of data analysis such as the Data Engineering unit at SCQF level 9.

Administrative information

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Superclass: RB

History of changes

Version	Description of change	Date