Higher National Unit Specification

General information

Unit title: Data Management (SCQF level 8)

Unit code: J4Y9 35

Superclass: CA

Publication date: December 2020

Source: Scottish Qualifications Authority

Version: 02

Unit purpose

This unit is for learners who wish to understand and apply the concepts, principles and technologies of data management with a particular focus on data management for data analysis. Learners should be familiar with basic concepts of data and repositories, and ideally have experience of working with data and using database technologies.

This **non-specialist** unit is designed for learners who wish to develop their skills in data management. The unit covers the key concepts, practices and principles of data management and governance set within the backdrop of a holistic and contemporary approach to the management and maintenance of organisational data. 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. A range of component and contributary factors are also explored, and consideration is given to topics 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 culminates with learners having the opportunity to use their knowledge and skills to define their own data management solution.

At the completion of this unit, learners may 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 J4YC 36 *Data Engineering* at SCQF level 9.

Higher National Unit Specification: General information (cont)

Unit title: Data Management (SCQF level 8)

Outcomes

On successful completion of the unit the learner will be able to:

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.

Credit points and level

1 Higher National Unit credit at Scottish Credit and Qualifications Framework (SCQF) level 8: (8 SCQF credit points at SCQF level 8)

Recommended entry to the unit

This is a non-specialist unit and although there are no formal prerequisites, learners should be familiar with basic concepts of data and repositories, and ideally have experience of working with data and using database technologies.

Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Core Skill component Critical Thinking at SCQF level 6

There are also opportunities to develop aspects of Core Skills which are highlighted in the support notes of this unit specification.

Context for delivery

If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Higher National Unit Specification: Statement of standards

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Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the significance of quality in data management.

Knowledge and/or skills

- Understanding data as an asset
- Definition of data quality
- Problems and risks associated with poor quality data including data bias
- Definition of data quality rules
- Data remediation and cleansing
- Data quality reporting
- Data management roles and responsibilities

Outcome 2

Describe the people, processes and technology required for consistent and secure data management.

Knowledge and/or skills

- Ethics and legislation relating to data management
- 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
- Combination of data from different sources safely using data integration, mining and warehousing techniques
- Metadata and its management

Higher National Unit Specification: Statement of standards (cont)

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Outcome 3

Explain the principles and practices of data governance.

Knowledge and/or skills

- Roles and responsibilities in data governance, ownership and stewardship
- Holistic nature of data governance when defining an organisation's overall approach to data
- Data governance and data management
- Success factors of data governance
- CDEs (Critical Data Elements) and KDEs (Key Data Elements)
- Data lifecycles
- Data governance frameworks within organisations
- Ethical considerations in data governance

Outcome 4

Apply data management techniques to define a full or partial data management solution.

Knowledge and/or skills

- Holistic approach to collecting, managing, securing, and storing data
- Critical data elements, organisational data structures, policies, rules and processes
- Application of data administration and maintenance in accordance with quality and security requirements
- Professional roles and responsibilities of those involved in defining data management standards within an organisation

Higher National Unit Specification: Statement of standards (cont)

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Evidence requirements for this unit

Learners will need to provide evidence to demonstrate their knowledge and/or skills across all outcomes. The evidence requirements for this unit will take two forms.

1 Knowledge evidence
2 Product evidence

The knowledge evidence relates to outcomes 1–3. Evidence is required for all knowledge and/or skills statements within these outcomes. The amount of evidence may be the minimum required to infer competence. The evidence may be produced over an extended period of time, in lightly controlled conditions.

The **knowledge evidence** may be sampled when testing is used. In this case, the evidence must be produced under controlled conditions in terms of location, timing and access to reference materials. The sampling frame must cover all outcomes (1–3) but not all knowledge/skills statements; however, the majority of the knowledge/skills must be sampled (at least once) in every instance.

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

The **product evidence** will relate to outcome 4. It will demonstrate that the learner has the competence to apply data management techniques to define a full or partial data management solution, including:

- Use 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
- Provide guidance on appropriate data administration and maintenance tasks, and how these may be applied in accordance with quality and security requirements
- Define professional roles and responsibilities of those involved in defining data management standards within an organisation
- Take into account potential ethical considerations

This evidence may be produced over the life of the unit, under loosely controlled conditions (including access to reference materials). Authentication will be necessary (see below).

The SCQF level of this unit (level 8) provides additional context on the nature of the required evidence and the associated standards. Appropriate level descriptors should be used when making judgements about the evidence.

When evidence is produced in loosely controlled conditions it must be authenticated. The *Guide to assessment* provides further advice on methods of authentication.

The support notes section of this specification provides specific examples of instruments of assessment that will generate the required evidence.

Higher National Unit Support Notes

Unit title: Data Management (SCQF level 8)

Unit support notes are offered as guidance and are not mandatory.

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

Guidance on the content and context for this unit

Outcome 1

Outcome 1 focusses on the people, processes and technologies that are involved in maintaining and improving data quality. The outcome begins by emphasising the significance and of good data as a valuable asset, whilst highlighting the pitfalls, problems and risks associated with bad data. More specifically, this outcome focusses on how organisations can set data quality rules that define the requirements businesses set on their data. Therefore, the importance of clearly defining business requirements for specific data should be emphasised. The five 'characteristics' of good data (accuracy, completeness, reliability, relevance, and timeliness) may also be discussed at this stage. Data remediation is discussed, and learners should be made aware of the techniques and processes involved in data cleansing and re-organisation to enhance the usefulness of data. The impact and contribution of people in the data management process should also be discussed as part of this outcome, and learners should be aware of data management roles and responsibilities, particularly those of the data manager.

Outcome 2

This outcome covers the concepts and principles of data management, and acts as further foundation for proceeding outcomes. The basic concepts of data management should be identified early on and it should be emphasised that because data is a valuable asset, good data management can significantly impact an organisation in terms of efficiency, maintaining and improving quality, whilst further mitigating against data related problems and risks.

Ethics and relevant legislation should be emphasised at this stage. Although coverage does not need to in-depth, learners should be aware of the main principles of Data Protection Act (2018) — the UK's implementation of the General Data Protection Regulation (GDPR). In addition, data management standards should be highlighted 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.

Higher National Unit Support Notes (cont)

Unit title: Data Management (SCQF level 8)

In terms of technology, learners should be given the opportunity to learn about principles of Database Management Systems (DBMS) in terms of their basic functionality and in terms of handling the storage, retrieval, and updating of data in a computer system. The basic principles of data integration and federation may also be introduced at this stage, particularly in terms how DBMS can support combine data from different sources into meaningful and valuable information. Different 'types' of data should also be defined, in particular reference data, metadata and master data.

At this stage the learner should also have a basic awareness of the key processes and techniques of data architecture, modelling and design, and in particular techniques used to discover, analyse, represent and communicate data requirements in a data model. Techniques for capturing work flows and relationships could also be covered at this stage, and learners should understand the significance of data models, particularly Entity Relationship Diagrams, as a form of communicating data and relationships.

Useful resources include:

https://www.gov.uk/data-protection
https://dama.org/content/body-knowledge
https://www.iso.org/standard/65344.html

Outcome 3

The focus of outcome 3 is data governance, and how this governance 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 premise of this outcome is that data governance in concerned with the way data is accessed and used within a wider data management strategy. The holistic nature of data governance should be highlighted, particularly how it impacts an organisation's entire approach to its data and data structures. Learners should appreciate the symbiotic relationship between data governance and data management - in particular in 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.

In addition, the practice of identifying critical data elements (CDEs) should be included in terms of how this not only helps an organisation prioritise its data, but provides the foundation for the development of its entire approach to data governance. A discussion on how critical data elements compare with key data elements may be included, although precise definitions may be difficult to come across as these vary between organisations. Learners should be aware however that successful identification of CDEs can form the foundation of a successful data governance program.

Outcome 4

The unit culminates with a final practical outcome in which previous learning, components and other elements from the preceding outcomes is synthesised to create new knowledge and skills, in this case through the development of a full or partial data management solution. The combination of components from the previous outcomes are synthesised in a way that can form new learning, insights and understanding.

Higher National Unit Support Notes (cont)

Unit title: Data Management (SCQF level 8)

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

Learners should make recommendations for data governance, making reference 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.

Learners should also be aware and make reference to the professional roles and responsibilities of the people involved in data management and governance.

Guidance on approaches to delivery of this unit

A practical, hands-on approach to learning should be adopted in order to engage learners and exemplify key concepts. However, all practical activities should be underpinned with appropriate knowledge before learners commence these activities.

At this level, learning should be mainly led by the learner, with some tutor intervention. It is anticipated that some initial introduction and explanation will be required for each Outcome. However, there is significant scope for learners to research and explore the topics once this initial seeding has taken place. Tutors should expect a significant amount of independent learning to take place and support students with this where appropriate.

Outcome 1 should be attempted first, followed by outcomes 2 and 3. It is anticipated that the delivery will culminate with the learner producing project or case study evidence covering the knowledge and skills of outcome 4.

A suggested distribution of time, across the outcomes, is:

Outcome 1: 8 hours
Outcome 2: 8 hours
Outcome 3: 8 hours
Outcome 4: 16 hours

Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

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

Higher National Unit Support Notes (cont)

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Outcome 4: Open-book project or case study based practical assignment. It is anticipated that evidence for this outcome would take the form of a case study or practical project, involving research and an investigative approach, with learners applying data management techniques to define a full or partial data management policy.

If a project-based approach is taken, a significant part of the work can be carried out without close supervision, although guidance and support may be provided by the assessor. The specific nature of the project may be directed by the assessor in the form or a case study, by providing the learner with a realistic scenario or brief as a basis. Alternatively, the learner could base the project around a 'real-life' scenario, possibly relating to data management within the learner's own workplace, or an organisation with which they are already familiar. It is recommended that learner led projects are cleared with the instructor first to ensure their suitability in terms of meeting the assessment criteria, and in particular there should be sufficient opportunities to apply sufficient range of data management techniques as part of the development of the data management solution. It is also advised that, where applicable, learner led projects are cleared with the host employer to ensure that relevant data, information and processes can be accessed and used for the purposes of assessment.

When assessing project-based work, a checklist must be developed defining the knowledge and skills to be covered and the standards to be achieved in the learner's project. This will help to 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.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

Although this unit does not embed any core skills, there are opportunities to develop Core Skills in both *Communication* and *Problem Solving.*

Outcome 4, which is a project or case study-based task, includes opportunities to develop critical thinking, planning and organisational skills. It also presents the learners with the opportunity to synthesise ideas, practices and concepts to form new knowledge and skills.

In addition, this outcome should provide opportunities to practice writing clearly and simply, which will contribute to the Core Skill of *Communication*.

The unit will also provide opportunities to develop broader skills, such as analytical thinking, which will be required when learners functionally decompose learning objectives.

Higher National Unit Support Notes (cont)

Unit title: Data Management (SCQF level 8)

The Critical Thinking component of Problem Solving at SCQF level 6 is embedded in this unit. When a learner achieves the unit, their Core Skills profile will also be updated to include this component.

History of changes to unit

Version	Description of change	Date
02	Core Skills Component Critical Thinking at SCQF level 6 embedded.	09/12/20

Additional copies of this unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.

Unit template: June 2017

General information for learners

Unit title: Data Management (SCQF level 8)

This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

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) and want to develop your knowledge and skills in the increasingly important field of data management. The unit is particularly suitable for those already working in vocational and professional roles, and may also benefit those wishing to progress to further study of data management, for example as a precursor to industry certification.

This unit 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 will 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 will also learn about the tremendous value of good data, and common pitfalls to avoid with regard to 'bad' or problematic data. Other topics include data quality and its implications, data processes and technologies, and you will 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 will have the opportunity to 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 be required to pass an assessment consisting of questions relating to the knowledge and skills contained in this unit.

Teaching methodologies for this unit may incorporate a variety of techniques, for example, active, project-based and collaborative learning. Your centre may delivery some of this remotely via video conference and through online learning materials. If this is the case, you are encouraged to fully participate in online learning activities. The unit may 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.

There will be opportunities to develop Core Skills in *Communication* and *Problem Solving*.

This unit is delivered as part of the PDA in Data Science at SCQF level 8. By the end of this unit you will be able to identify the main concepts, principles and techniques of data management. You will also be able to 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. On completion of this unit, you may be able to 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 J4YC 36 *Data Engineering* at SCQF level 9.

General information for learners

Unit title: Data Management (SCQF level 8)

The component of Critical Thinking at SCQF level 6 is embedded in this unit. When a learner achieves the unit, their Core Skills profile will also be updated to include this component.