Next Generation Higher National Unit Specification

Data Flow (SCQF level 7)

Unit code: J690 47

SCQF level: 7 (8 SCQF credit points)

Valid from: session 2022–23

Prototype unit specification for use in pilot delivery only (version 1.0) May 2022

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.

This edition: May 2022 (version 1)

Unit purpose

The purpose of this unit is to introduce learners to a methodology of mapping digital data flow in a business environment.

This is a specialist unit. It is particularly suitable for learners who are doing a Higher National qualification in computing, cyber security or business. No previous experience is necessary, however, a basic understanding of business organisation, computing systems and infrastructure would be beneficial.

The unit covers the basic concepts of digital data flow analysis. Learners understand how and why this is done, the importance of following a recognised methodology and the benefits to a business of using such a methodology in practice.

On completion of the unit, learners can use their knowledge to interpret a digital data flow, mapped using a recognised methodology, to identify potential risks. Learners may progress to the Data Flow unit at SCQF level 8.

Unit outcomes

Learners who complete this unit can:

1   describe the fundamentals of data flow analysis
2   describe the components of organisational data flow diagrams
3   interpret a data flow diagram

Evidence requirements

Learners must provide both knowledge and product evidence.

Knowledge evidence

The knowledge evidence relates to outcomes 1 and 2. Evidence is required for all knowledge and skills statements except those explicitly relating to skills. The following knowledge must be demonstrated:

♦   the definition of data flow
♦   the benefits to an organisation from carrying out data flow analysis
♦   the advantages of following a recognised methodology
♦   the purpose and use of data flow diagrams
♦   the construction of data flow diagrams
♦   applications of data flow analysis in organisations

Sampling is permissible in certain circumstances. You can use a test to sample knowledge evidence. If you use a test, it must be under supervised conditions, and controlled in terms of location and timing. Learners are not permitted access to reference material.

Knowledge evidence can be written, oral or a combination of these. Learners can capture, store and present evidence in a range of media (including audio and video) and formats (analogue and digital).

Product evidence

The product evidence relates to outcome 3. It demonstrates that learners can interpret at least one data flow diagram and produce an evaluation of risks to the flow of data. They can produce this evidence over the life of the unit, and under lightly controlled conditions (including access to reference materials), however, authentication is necessary. The 'Additional guidance' section on approaches to assessment provides further advice on methods of authentication and specific examples of assessment.

The SCQF level of this unit (level 7) provides additional context on the nature of the required evidence and the associated standards. 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:	Learners can:
- the definition of data flow - the benefits of understanding data flow in an organisation - the benefits of using a recognised methodology - the purpose of an organisation and systems diagram - the purpose of data flow diagrams - the use of layers to represent organisation structure and assets - how assets are represented - relationships between assets - relationships between layers - relationships within layers	- analyse a given scenario - identify relationships in a data flow diagram - identify flow of data in a data flow diagram - evaluate risks or recommend enhancements from a data flow diagram

Meta-skills

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

Self-management

Focusing — this unit prompts learners to convert raw information into easily understood and communicated data flow diagrams. This requires them to filter and sort information in a logical manner and select relevant data from a larger data pool.

Social intelligence

Communicating — this unit prompts learners to analyse a given scenario and define business objectives and/or challenges. They use this analysis to report back the identified risks and make enhancement recommendations.

Innovation

Sense-making and critical thinking — this unit prompts learners to detect themes and patterns in information gathered regarding business resources and assets. It requires them to put these into a holistic business context allowing analysis, while providing the opportunity to detect potential risk.

This unit prompts learners to deconstruct scenario information and come to logical conclusions regarding potential fail points within a business. It requires them to provide their judgement and advice on key areas in need of improvement.

Literacies

Numeracy

This unit contributes to learners' numeracy skills. Numeracy is developed through assigning time and cost values to data flows.

Communication

Learners develop communication skills by using a recognised methodology with pictures and diagrams that can assist business and systems improvement.

Digital

Learners develop digital skills and computer literacy through an introduction to the basic concepts of digital data flow analysis.

Delivery of unit

While the exact time allocated to this unit is at your centre's discretion, the notional design length is 40 hours. One possible approach is to distribute the available time as follows:

Outcome 1 — Describe the fundamentals of data flow analysis
　　　(10 hours)
Outcome 2 — Describe the components of organisational data flow diagrams
　　　(15 hours)
Outcome 3 — Interpret a data flow diagram
　　　(15 hours)

You can carry out summative assessment at any time. However, when using testing (see 'Evidence requirements' section) we recommend that you carry it out towards the end of the unit. When using continuous assessment, such as with the use of an e-portfolio, it can commence early in the life of the unit and continue throughout its duration.

There are opportunities to carry out formative assessment at various stages in the unit. For example, you can do it on the completion of each outcome to ensure that learners have grasped the knowledge it contains. This provides you with an opportunity to diagnose misconceptions, and intervene to remedy them before progressing to the next outcome.

No previous knowledge or experience is required. However, it is beneficial if learners have an understanding of the basic purpose of computing hardware and software, such as servers, operating systems, client applications, network routers and firewalls.

If you deliver this unit as part of a group award, we recommend that it is taught and assessed within the subject area of the group award to which it contributes.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the 'Knowledge and skills' section must be taught and available for assessment. You should not give learners advance information about the items they are being assessed on, and you should sample different items on each assessment occasion.

Additional guidance

The guidance in this section is not mandatory.

Content and context for this unit

Data flow is at the centre of today's complex digitally-driven business world. Most businesses understand that the data they hold is important to them, but not how it moves around their business. Understanding data flows and, more importantly, being able to communicate them to the entire organisation, allows a business to put people, processes and technology in context and allows the business to plan for efficiency, resiliency and security.

This unit is intended for anyone who wants to understand the basic concepts of data flow, and how clear communication using a recognised methodology can assist business and systems improvement. One methodology that you can use to demonstrate this is OBASHI, although others such as Yourdon/Demarco or Structured Systems Analysis and Design Method (SSADM) may be suitable.

You can tailor the content to specific learner contexts. For example:

♦ in a cyber security context, you could use data flow analysis to highlight areas in an organisation where data could potentially be intercepted or accessed by an unauthorised business area
♦ in a network analysis context, you could identify potential points of failure
♦ in a business context, you could highlight reliance on individuals or process bottlenecks

Explaining each knowledge and skills statement is at your discretion. The following guidance relating to specific outcomes, seeks to clarify the statement of standards where it is potentially ambiguous. It also focuses on non-apparent teaching and learning issues that may be over-looked, or not emphasised, during unit delivery. As such, it is not representative of the relative importance of each knowledge and skill.

Describe the fundamentals of data flow analysis (outcome 1)

For this outcome, you should first explain why using a recognised methodology using pictures and diagrams can be beneficial.

Engineers and architects use diagrams to simplify complex plans. You should explain the need to provide clarity in today's digital world and introduce a methodology like OBASHI. If using OBASHI, you can use Business and IT (B and IT) diagrams to demonstrate how a diagram can clearly communicate how an organisation works and show all the IT assets and infrastructure that make that business work.

You should use the introduction of these diagrams as an opportunity to introduce the concept of data flow, and how the flow of data for a single business process can be presented in a single Data Analysis View (DAV) diagram. You should also explain how that diagram can be used to analyse the process to allow the organisation to make informed decisions.

Describe the components of organisational data flow diagrams (outcome 2)

For outcome 2, if following the OBASHI methodology, you should further develop learners' understanding of both the B and IT and DAV diagrams, including how they are constructed.

The content of each of the layers, how they are represented and how the relationships between them are represented is crucial to the overall understanding of these diagrams. You should introduce the OBASHI core principles and laws, and make learners aware of how these diagrams are constructed by applying these principles and laws.

Interpret a data flow diagram (outcome 3)

There are opportunities in outcome 3 to apply learners' understanding of the construction of the previous diagrams to interpreting them. If following the OBASHI methodology, you could provide B and IT and DAV diagrams based on given scenarios, and give learners the opportunity to interpret them.

Approaches to assessment

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.

The assessment for this unit requires evidence of knowledge and understanding of the concepts introduced in outcomes 1 and 2, along with practical evidence of the skills in outcome 3.

You can assess knowledge and understanding with an end-of-unit test, or from a portfolio developed over the course of the unit. The end-of-unit test should sample from the knowledge and understanding contained in outcomes 1 and 2. The test could be a number of multiple response questions and is marked and assessed traditionally. For example, the test may be 25 questions with a pass mark of 15 marks. This test should be taken under controlled and timed conditions without access to reference materials. A suitable duration is 1 hour.

A more contemporary approach to assessment could use an e-portfolio to record learning (and the associated activities) throughout the life of the unit. The e-portfolio would provide evidence of knowledge and understanding through descriptions and explanations. You should assess the e-portfolio using defined criteria to ensure a correct judgement about the quality of the digital evidence. In this scenario, every knowledge and skill must be evidenced; and sampling is not appropriate.

Using an e-portfolio for summative assessment facilitates formative assessment, since learning (including misconceptions) is apparent, and you can intervene on an ongoing basis to correct misunderstandings.

Practical evidence for outcome 3 is product evidence, comprising a short report based on a scenario and diagram(s) provided by the centre. The report details the organisational process(es) contained in the scenario, the assets and how their relationships impact on data flow and highlight any risks to data flow(s). You should assess the evidence using a set of defined criteria.

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: www.sqa.org.uk/assessmentarrangements.

Information for learners

Data Flow (SCQF level 7)

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 section helps 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 need to do during the unit and opportunities for further learning and employment.

This unit introduces you to the theory and practice of creating diagrams to model data flow through an organisation using a recognised methodology. It is intended for anyone who has an appreciation of the importance of data in today's complex digitally-driven business world and why optimisation of the flow of this data is fundamental to the organisation's success.

There are three outcomes and this develops your knowledge and understanding of how to apply a methodology to create a visual map of an organisation and provide a clear picture of how that organisation works.

Outcome 1 —introduces you to a data flow analysis methodology and explains why using a common language allows clear communication. You identify the importance of using this common language to create visual maps of an organisation that can be understood without specialist knowledge, and learn how this allows a business to plan for efficiency, resiliency and security.

Outcome 2 — breaks down how you would create these diagrams, how you would represent different business processes and assets, and how you would clearly represent how these are shown on the diagrams.

Outcome 3 — introduces you to interpreting these diagrams so that you can apply the knowledge gained in the previous outcomes to see the benefits from using a methodology.

You may be assessed using a combination of a test for knowledge and understanding in outcomes 1 and 2 and a short report for practical skills in outcome 3.

On completion of this unit, you can progress to:

♦ Data Flow at SCQF level 8.

Administrative information

Published: May 2022 (version 1.0)

Superclass: CB

History of changes

Version	Description of change	Date

Note: please check SQA's website to ensure you are using the most up-to-date version of this document.

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