
Overview

This sub-discipline is concerned with the competencies required to create, maintain and manage logical and physical data designs for information technology solutions to support the specific business needs represented in a Requirements Specification or Business Specification document, supported, where appropriate with the interrogation, use and application of information contained within conceptual data models or domain models produced by data analysis activities.

Data design includes identifying the data required by an information technology solution, confirming and enhancing information relating to data types and attributes, dealing with duplication and redundancy of data, ensuring data integrity by using business rules and other processing steps. As design activities progress through logical design through to physical design, the level and type of information recorded about items of data is enhanced and increased, with a view to supporting the practical data handling, security, privacy and integrity needs required within an IT/technology system.

Logical design involves the graphical organisation of data required by the IT/technology solution into a logical data model, a set of groups of data items which remain independent of their physical organisation and structure.

Physical data design involves the representation of this logical data model into a physical model and then further development into specific or organisational forms such as files, data base tables, object orientated and XML structures. These will be organised in a way which ensures integrity and efficiency of operation and enables them to interact with programs to perform specific functions required to meet a specific business purpose. Information relating to the data contained in the physical design of a database, including descriptions of the data, may be contained within a Data Dictionary.

In some organisations, typically those where rapid development approaches are used, data design may be undertaken in parallel with HCI design and systems design. Furthermore, in these organisations, an iterative process of data analysis and data design may also take place.

**Performance
criteria**

Select and implement appropriate data design processes

You must be able to:

- P1 Correctly select standards relating to data design activities
- P2 Correctly implement and maintain all processes, tools and techniques relating to data design activities
- P3 Correctly identify any specific security, privacy and integrity requirements for physical data structures, documenting the rules and controls required to ensure that they are met within the data design
- P4 Source and use, in a timely manner, appropriate advice and guidance from other individuals and organisations on the suitability of available data structures to meet any particular business needs
- P5 Negotiate effectively with any external organisations and bodies with whom information and data needs to be exchanged, in respect of data standards, conventions, types and formats

Manage the progress of data design assignments

You must be able to:

- P6 Effectively manage all changes to business requirements through change control mechanisms during data design activities
- P7 Optimise any physical data design within own area of accountability, under direction
- P8 Make well reasoned and rational decisions on what changes may be required to translate a logical design into an appropriate physical design
- P9 Assist others in identifying any data re-use requirements in any data design activities
- P10 Regularly monitor the progress of any particular data design assignment within own area of accountability

Review the effectiveness of data design deliverables

You must be able to:

- P11 Routinely monitor the logical and physical data design within own area of
- P12 accountability, to ensure that the requirements for the integrity, privacy and security of data have been met within it
- P13 Verify that data design deliverables always accurately represent how the data contained within the target IT/technology system/solution/service needs to be defined, organised, stored and managed in order to meet business needs
- P14 Assist others in the verification of the accuracy and completeness of any translation from logical to physical designs
- P15 Provide all relevant logical and physical data designs to sponsors and stakeholders for review and sign off, as directed by superiors

Knowledge and understanding

You need to know and understand:

Select and implement appropriate data design processes

- K1 Identify and select
 - K1.1 standards relating to data design activities and their deliverables
 - K1.2 further information during data design activities, as appropriate, in order to specify precisely how the data within an IT/technology system/solution/service needs to be defined, organised, stored and managed in order to meet business needs
 - K1.3 service and operational performance requirements in order that they may be incorporated or considered within physical data design deliverables
 - K1.4 appropriate file and data organisation technologies, based on the business needs and the need to integrate the physical data design with the 'end to end' design of the target IT/technology system/solution/service
 - K1.5 what changes may be required to translate a logical design into an appropriate physical design
 - K1.6 any specific security, privacy and integrity requirements for physical data structures
 - K1.7 any real life factors and constraints that need to be incorporated into physical data designs
 - K1.8 any external organisations or bodies with whom an organisation needs to exchange information and data
- K2 Source advice and guidance from other individuals and organisations on the appropriateness of available data structures for the particular business needs
- K3 Implement and maintain
 - K3.1 the processes, tools and techniques relating to data design activities and their deliverables
 - K3.2 the processes, tools and techniques to monitor the alignment of data design activities and their deliverables with all relevant legislation, regulation and external standards
 - K3.3 the rules and controls required to ensure the integrity, privacy and security of data held within the data design
- K4 Use
 - K4.1 service management and operational performance requirements in order that they may be incorporated within physical data design deliverables
 - K4.2 the processes, tools and techniques to monitor the alignment of data design activities and their deliverables with all relevant legislation, regulations and external standards
 - K4.3 lessons learned from previous data design assignments
 - K4.4 best practice in data design activities

- K4.5 internal and external expertise, as required, on the appropriateness of available data structures to meet particular business requirements
- K4.6 data reuse requirements in any data design activities
- K4.7 the rules and controls required to ensure the integrity, privacy and security of data held within the data design
- K5 Document the rules and controls required to ensure the integrity, privacy and security of data held within the data design
- K6 Negotiate
- K6.1 with any external organisations and bodies with whom information and data needs to be exchanged, in respect of data standards, conventions, types and formats
- K6.2 how the data will be defined, organised, stored and managed within the target IT/ technology system/solution/service with sponsors and stakeholders during data design
- K6.3 with other individuals and organisations involved in design and development activities as to how the design of the data structures will integrate with other
- K6.4 elements in any IT/ technology system/solution/service
- K7 Communicate information relating to the data design with individuals involved in the design and development of other elements of any 'end to end' IT/technology system/solution/service
- K8 Design a data dictionary
- K9 What is the range of issues associated with logical and physical data design activities
- K10 What are the
- K10.1 implications of internal and factors on data design activities and their deliverables benefits and disadvantages of using external providers of data design services
- K10.2 range of approaches that may be used for logical and physical data design and their appropriateness in a range of business and organisational contexts
- K11 Why
- K11.1 the alignment of data design activities and their deliverables with all relevant legislation, regulations and external standards needs to be monitored
- K11.2 the alignment of data design work with systems design and business requirements work needs to be monitored
- K12 Who are the sponsors of and stakeholders for data design activities

Manage the progress of data design assignments

You need to know and understand:

- K13 manage
- K13.1 changes to business requirements through change control mechanisms during data design activities

- K13.2 the alignment of data design activities and their deliverables with all relevant legislation, regulations and external standards,
- K13.3 relationships with sponsors, stakeholders and external bodies on matters relating to data design activities
- K13.4 relationships with external providers offering data design services
- K13.5 issues arising as a result of data design activities
- K13.6 internal and external factors that may impact on data design activities
- K14 Take action
- K14.1 to incorporate a range of real life factors and constraints, such as the need to de-normalise data, within the physical systems design
- K14.2 in the event of data design activities being out of alignment with architecture and analysis deliverables
- K14.3 to take account of internal and external factors in data design activities
- K14.4 to optimise any physical data design
- K14.5 to establish effective relationships with external providers of data design services
- K14.6 to ensure data design activities and their deliverables are integrated, where appropriate, into projects and programmes
- K14.7 data design activities and their deliverables are coordinated with other design and development activities to ensure the integrity of the 'end to end' IT/technology system/solution/service
- K14.8 approved changes to requirements are incorporated into data design deliverables
- K14.9 the information produced by data analysis activities is used to inform data design activities
- K14.10 data design deliverables always accurately represent how the data contained within the target IT/technology system/solution/service needs to be defined, organised, stored and managed in order to meet business requirements
- K15 Monitor the
- K15.1 progress of any particular data design assignment
- K15.2 accuracy, currency, completeness and appropriateness of any data design deliverables
- K15.3 alignment of data design deliverables with the business requirement
- K15.4 alignment of data design activities and their deliverables with all relevant legislation, regulations and external standards, in line with organisational strategy, policies and standards
- K15.5 alignment of data design activities with data analysis deliverables
- K15.6 alignment of data design activities and their deliverables with systems/services/solutions design activities
- K15.7 quality and effectiveness of data design activities and their deliverables
- K15.8 quality and effectiveness of external providers of data design services
- K16 Report
- K16.1 any discrepancies between data design deliverables and IT/technology

- architecture, business, data and HCI analysis deliverables
- K16.2 findings from monitoring data design deliverables
- K16.3 findings from monitoring the quality and effectiveness of external suppliers of data design services
- K17 The importance of
 - K17.1 data design deliverables being used to update, where appropriate, IT/technology architectures, data architectures and data models as appropriate
 - K17.2 ensuring that the translation of a logical into physical design incorporates 'real world' factors and constraints, such as the need to de-normalise data from its logical structure in order to meet data handling needs of the target IT/technology system
 - K17.3 ensuring that operational performance and service needs are considered during data design activities
 - K17.4 ensuring the implications of data reuse in any data design activities
 - K17.5 explaining, discussing, negotiating and agreeing how the data will be defined, organised, stored and managed within an information technology system with sponsors and stakeholders during data design
 - K17.6 managing relationships with sponsors, stakeholders and external bodies on matters relating to data design
 - K17.7 considering any relevant legislation, regulations and external standards in data design activities and their deliverables
 - K17.8 using appropriately skilled individuals, groups and bodies in any data design activities

Review the effectiveness of data design deliverables

You need to know and understand:

- K18 Monitor
 - K18.1 that the requirements for the integrity, privacy and security of data have been met within the logical and physical data design
 - K18.2 the alignment of data design deliverables with IT/technology architectures used by an organisation
- K19 Analyse
 - K19.1 the implications of internal and external factors on data design activities and their deliverables
 - K19.2 the results gained from monitoring the alignment of data design activities and their deliverables with all legislation, regulations and external standards
- K20 Review
 - K20.1 the alignment of data design deliverables with data analysis deliverables and architectures
 - K20.2 information produced by data design activities, particularly information relating to how data will be defined, organised, stored and managed within the proposed IT/technology system/solution/service, in an

- understandable form to a wide range of sponsors, stakeholders and other individuals, in order to confirm understanding and ensure business needs are being met
- K21 Present
 - K21.1 the quality and effectiveness of data design activities and their deliverables
 - K21.2 the quality and effectiveness of external providers of data design services
- K22 Make decisions on what changes may be required to translate a logical design into an appropriate physical design
- K23 Verify
 - K23.1 that data design deliverables always accurately represent how the data contained within the target IT/technology system/solution/service needs to be defined, organised, stored and managed in order to meet business needs
 - K23.2 the accuracy, currency, completeness and relevance of data and information used by data design activities
- K24 Provide logical and physical data designs to sponsors and stakeholders for review and sign off
- K25 The need for monitoring
 - K25.1 the quality and effectiveness of external providers of data design services
 - K25.2 that the requirements for the integrity, privacy and security of data have been met within the logical and physical data design
 - K25.3 the alignment of data design deliverables with IT/technology architectures for an organisation
- K26 The fact that
 - K26.1 service management and operational needs must be considered within physical data design activities
 - K26.2 the deliverables of data design activities must be accurately represented in the 'end to end' systems design deliverables

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Data Design Level 5 Role

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