ESKITP4054

Data Design Level 4 Role

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 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.

ESKITP4054

Data Design Level 4 Role

Performance criteria

You must be able to:

Assist with the development for data design activities

P1 Correctly select all relevant processes, tools and techniques relating to data design activities, under direction

P2 Correctly select all business requirements and any relevant business rules so that they can be reflected in a logical and physical data design

P3 Critically interpret all relevant information held within architecture models in order to inform data design activities

P4 Accurately identify and source all relevant information relating to IT/technology architectures together with business, data and HCI analysis deliverables in order to inform data design activities

You must be able to:

Manage, under supervision, the maintenance of data design assignments

P5 Design, implement and maintain effective and appropriate physical organisation structures, such as files or tables, for any particular data design assignment, under direction

P6 Ensure referential integrity in any data designs produced within own area of accountability

P7 Correctly identify any primary, secondary and foreign keys and indexes required, under direction

P8 Effectively manage a data dictionary and its contents, in support of a data design assignment within own area if accountability, under direction

P9 Ensure secure sign off to all the physical data design deliverables relating to a particular assignment, prior to development activities commencing

You must be able to:

Provide others, when requested, with specified information relating to data design activities

P10 Clearly present 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

P11 Provide all relevant logical and physical data designs as required to other organisations and/or bodies with whom an organisation needs to exchange information and data

P12 Assist others in the documentation of all rules and controls required to ensure the integrity, privacy and security of data held within the data design, under direction

P13 Assist others in the identification of what changes may be required to translate a logical design into an appropriate physical design, under

direction

Knowledge and understanding

Assist with the development for data design activities

You need to know and understand:

K1 Select
K1.1 the processes, tools and techniques relating to data design activities and their deliverables
K1.2 data naming conventions and standards in data design activities, in line with any data storage standards
K1.3 business requirements so that they can be reflected in a logical and physical data design
K1.4 business rules that need to be incorporated into data designs
K1.5 information relating to data entities and the relationships between them
K1.6 information relating IT/technology architectures together with business, data and HCI analysis deliverables in order to inform data design activities
K1.7 appropriate physical organisation structures in which to store data for any particular design assignment
K2 Interpret information held within architecture models in order to inform data design activities
K3 Source
K3.1 further information during data design activities, as appropriate, in order to specify precisely how the data within an IT/technology solution needs to be defined, organised, stored and managed in order to meet business need
K4 Take action
K4.1 to de-normalise data in order to maximise the efficiency and effectiveness of a physical design
K4.2 to secure sign off to the physical data design prior to development activities commencing
K4.3 to ensure referential integrity in any data designs
K4.4 that any discrepancies between data design deliverables and data analysis deliverables can be justified
K5 What is
K5.1 the contribution of data design to ‘end to end’ systems/solutions/service design
K5.2 the most appropriate physical data organisation structure to meet differing needs
K5.3 meant by data reuse and what it involves
K6 What are the
K6.1 business rules that need to be incorporated into data designs
K6.2 advantages and disadvantages of differing types of physical data organisation structures

K6.3 potential implications of data design deliverables being incorrectly or inadequately specified
K6.4 potential implications of failings of integrity, confidentiality and information security during data design activities
K6.5 professional and ethical standards relating to data design work within an organisation
K6.6 strategy, policies. plans and standards relating to data design activities and their deliverables
K6.7 potential implications of the need to exchange data, between organisations and individuals, on physical data design activities
K7 Who
K7.1 are the sponsors of and stakeholders for any particular data design assignment
K7.2 needs to use the deliverables produced by any particular data design assignment
K7.3 needs to authorise/sign off the deliverables from any data design assignment
K8 The importance of
K8.1 data design activities and their deliverables on the full life cycle of information within an organisation
K8.2 data design deliverables aligning with IT/technology architectures and data architectures in an organisation
K8.3 the value of data design deliverables in informing systems and file/database development activities, as appropriate
K8.4 physical data design models and other deliverables specifying precisely how the data should be defined, organised, stored and managed in any IT/technology solution
K8.5 and value of data design activities in specifying what is required of the data handling systems and assets that will be used to provide the target IT/technology system
K8.6 ensuring referential integrity in any data designs
K8.7 gathering information during data design activities, as appropriate, in order to specify precisely how the data within an information technology solution needs to be defined, organised, stored and managed in order to meet business needs

Provide others, when requested, with specified information relating to data design activities

You need to know and understand:

K9 Present
K9.1 the alignment of data design deliverables with data analysis deliverables and architectures
K9.2 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

K10 Provide logical and physical data designs as required to other organisations and/or bodies with whom an organisation needs to exchange information and data

K11 Document and store

K11.1 data into appropriate physical data organisation structures

K11.2 decisions made during and relating to data design activities

K11.3 data reuse requirements in any data design activities

K12 The importance of presenting information produced by data design activities, particularly information relating to how the data will be defined, organised, stored and managed, in an understandable form to a wide range of sponsors, stakeholders and other individuals, in order to confirm understanding and ensure needs are being met

Assist, under supervision, the management of data relating to data designs

You need to know and understand:

K13 Identify and select which file, data organisation and storage technologies are available/in existence and can be used to define, organise, store and manage data

K14 Take action to populate a data dictionary in support of any particular data design assignment

K15 Document

K15.1 a logical and/or physical data design to support a particular assignment

K15.2 the needs of any external organisations or bodies with whom an organisation may need to exchange information and data

K15.3 information about the design considerations for data that may need to be exchanged with any external organisations, individuals or bodies

K16 The importance of

K16.1 using data naming conventions and standards in data design activities, in line with organisational strategy, policy and standards

K16.2 the systems development lifecycle as it relates to data design activities

K16.3 having an effective data dictionary

K16.4 data design activities and their deliverables being guided by and supporting the business needs

K16.5 verifying the accuracy, currency, completeness and relevance of information created, collected, used and documented during data design activities

ESKITP4054

Data Design Level 4 Role

Developed by	e-skills UK
Version number	1
Date approved	September 2009
Indicative review date	March 2014
Validity	Current
Status	Original
Originating organisation	e-skills UK
Original URN	4054
Relevant occupations	Database Administration; Information and Communication Technology; Software Development
Suite	IT and Telecoms
Key words	Logical data; Physical data; Data analysis