Competency questions

Ontology Competency questions define design requirements in natural language form. These questions state information which should be provided by the ontology. The fulfillment of the questions is accomplished by providing a concept/relationship which represents the required information. Most questions were inspired by literature discovered in the state of the art review. However, certain questions were defined through application to use cases (**DTA**) and feedback from experts (**DTF**).**Table *1*** shows the final iteration of competency questions created for MQIO.

The **answer** to each question is structured as <Subject, Relationship, Concept> which represent an RDF triple. A description of each concept and relationship used is available[1]

Table 1: MQIO Competency Questions

#	Question	Relationship	Concept	References
Subject: `mqio:MappingArtefact` A mapping artefact contains rules which link or create linked data datasets.				
1	Who created the mapping?	`mqio:wasCreatedBy`	`prov:Agent` `mqio:MappingRefinement`	[2,3,9,12,18]
2	What was the rationale for creating the mapping?	`mqio:hasPurpose`	`xsd:string`	[4,9,18]
3	What instruments were utilized to define the mapping?	`mqio:usedTool`	`xsd:string`	[4,9,22,27]
4	When was the mapping defined?	`prov:generatedAtTime`	`xsd:dateTime`	[9,15,18]
Subject: `mqio:MappingAssessment` An activity in which the quality of a mapping document is assessed, generating information on quality issues within the mapping.				
5	Who performed the quality assessment of the	`prov:wasAssociatedWith`	`prov:Agent`	[8,9,15]

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	mapping?			
6	What mapping is associated with the assessment?	`mqio:assessedMapping`	`mqio:MappingArtefact`	[5,8,9,11]
7	What quality metrics were executed during the assessment process?	`mqio:wasExecuted`	`dqv:Metric`	[1,8,11–13]
8	What quality measurements resulted from the assessment?	`prov:generated`	`dqv:QualityMeasurement`	[1,6]
9	What quality issues were detected?	`mqio:hasValidationReport`	`mqio:MappingValidationReport`	[8,11,12,14,19]
10	What value is associated with the violation?	`mqio:hasObjectValue,` `mqio:hasLiteralValue`	`rdfs:Resource,` `xsd:string`	[8,11,12,14,19]
11	How are the quality issues described?	`mqio:hasResultMessage`	`mqio:MappingViolation`	[8,11,12,14,19]
12	When were the quality issues detected?	`prov:endedAtTime`	`xsd:dateTime`	[8,11,12,19]
13	Where can provenance on the issues be accessed?	`mqio:hasViolation`	`mqio:MappingValidationReport`	[14,15]
14	What quality metrics were associated with the detected quality issues?	`mqio:isDescribedBy`	`dqv:Metric`	[1,7,11,12,19]
15	What quality dimensions represent the metrics?	`dqv:inDimension`	`dqv:Dimension`	[1,7,11,12,19]

16	What quality categories represent the dimensions?	`dqv:inCategory`	`dqv:Category`	[1,7,1 1,12,1 9]
Subject: `mqio:MappingRefinement` An activity which involves removing quality violations contained within a mapping document.				
17	Who performed the quality refinement of the mapping?	`prov:wasAssociatedWith`	`prov:Agent`	[9,15]
18	When was the refinement process completed?	`prov:endedAtTime`	`xsd:dateTime`	[8,9,1 5]
19	What queries are associated with refinements?	`mqio:usedQuery`	`xsd:string`	DTA
20	What confidence score did the refinements have?	`mqio:hasConfidenceScore`	`xsd:double`	DTA
21	What violations have been refined?	`mqio:wasRefinedBy`	`mqio:Violation`	DTA
22	What quality requirements are associated with the mapping?	`mqio:hasQualityRequirement`	`mqio:QualityRequirement`	[1,12, 19]
Subject: `mqio:QualityRequirement` A quality requirement is a requirement a mapping should satisfy.				
23	What quality measurements were associated with the requirements?	`mqio:hasQualityMeasurement`	`dqv:QualityMeasurement`	[1,6]

24	Are the requirements satisfied?	`mqio:isSatisfied`	`xsd:boolean`	[1,6]
Subject: `dqv:Metric` Represents a standard to measure a quality dimension.				
25	What refinements are associated with the quality metrics?	`mqio:hasRefinement`	`mqio:MappingRefinement`	[8,11, 19]

SPARQL query answers to the competency questions are available[2]. Further information on the graph used to execute the queries can be found in the "Description" section of the ontology documentation.

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[2]