ICT Project Guidance

Information – Functional and Qualitative Assessment

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## Description

This document outlines base line functional and qualitative criteria and terms to use when analysing market offerings, developing market soundings, and/or developing procurement instructions.

## Synopsis

As per the systems used to disseminate them, Information itself can be procured. Criteria should be used to define expectations, and used to ascertain expectations are met.

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## Introduction

While Information & Communication Technology (ICT) projects focus on the delivery of service from providers to service consumers via automation, a key component of a service is the defining, designing, developing and delivering of the information via automation.

While not always a conscious decision, service consumers determine the value of the information found based on qualitative assessment criteria, supported by quantitative and functional criteria.

This assessment, and by extension, assessment of the system used to discover and access the information raises or lowers their perceived value of the whole.

The development of new information is an expensive undertaking.

## Objective

Therefore, it is important that project delivery risks are reduced by using frameworks to guide the development of instructions for developing new information for services, and the subsequent assessing of deliverables obtained.

## Issues

Information is used by people every day, so much so evaluation of its worth is perceived by them to be second nature and does not require the discipline of a framework for assessment.

## Resolution

A resolution of the above issue is the use of a framework of requirements, defining the purpose, functionality, quantitative and qualitative characteristics of the information, relying heavily on the ISO-25012’s framework of assessing systems information.

## Functionality, Quantity and Quality Requirements

This document proposes functional, quantitative and qualitative attributes to consider for specification when discussing information requiring developing.

# Functionality

While not an *automated* system, a collection of information can be a system, distinct form the system it relies on to automate its availability.

The information’s has a case specific Purpose, and a Function of transferring information from one to another entity is achieved by its defined organisation, structure that meets expected qualities.

Consider the following:

* Develop a definition of the Purpose of the information set,
* Develop a catalogue of stakeholder and roles associated to achieving the purpose,
* Develop a Categorisation schema that aligns and supports the declared purpose,
* Develop a schema of the elements to use to assemble an information resource and relationships element schema[[1]](#footnote-2)
* Develop one or more schemas for the resources, and their relationships between them.
* Develop instructions on how to develop resources, and relate them, according to the schemas developed from defined elements, allocating the tasks to one or more defined roles.
* Develop instructions on how to consume and navigate the resources according to different roles.

# Quantitative Outcomes

Quantitative outcomes are the easiest to define of the three requirement groups.

Consider grouping them by Use, Resources and Relationships.

Therefore, consider the following areas to quantify, as a starting point:

### Use:

* How many Users must be able to access the resources,
  + Potentially defining by Roles (Tester, Test takers, Assessors, Parents, etc.)
* Concurrently.

### Resources

* Defining the minimum number of resources by Categories
* Defining the sum of the above for the overall number of resources

### Relationships:[[2]](#footnote-3)

* Min Number of expected subparts of specific elements an information resource (e.g., Aspects within a single per Concept).
* Min Number of expected navigation Relationships per Information Resource (e.g., a Resource may be expected to link to a previous, next, parent items, or more, such as source Curriculum, target Achievements, etc).
* Minimum Number of expected cross-category links per information resource (e.g., it might be expected that all resources are linked to at least 2 other information resources, etc.)

# Qualities

ISO-25012 defines qualities to consider when evaluating information, while accepting that some of them are not exclusive to the information resource itself, but depend on the qualities of the underlying system.

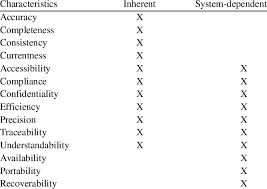


Figure 2: ISO-25012 Data Qualities

The definition of the terms used above are defined below.

### Inherent Qualities

The following sub set of qualities apply to the information resources only:

Table 1: ISO-25012 Inherent Data Qaulities

#### Accuracy

*“The degree to which subject data associated with an entity has values for all expected attributes and related entity instances in a specific context of use.”*

##### Syntactic Accuracy,

##### Semantic Accuracy

Consider the following:

* That the information is developed, contributed to and reviewed by Subject Matter Experts (SMEs) before publishing.
* That information submitted by non SMEs is review.

#### Completeness

*“The degree to which subject data associated with an entity has values for all expected attributes and related entity instances in a specific context of use.”*

Consider the following:

* Having a shared framework outlining all the subject areas to be covered, and their sub aspects, that can be checked off.

#### Consistency

*“The degree to which subject data associated with an entity has values for all expected attributes and related entity instances in a specific context of use.”*

#### Credibility

*“The degree to which data has attributes that are regarded as true and believable by users in a specific context of use. Credibility includes the concept of authenticity (the truthfulness of origins, attributions, commitments).”*

Consider the following:

* The system on which the data is published has an internet domain name that can readily be associated to a trusted authority (e.g.: *mynewsystem.education.govt.nz*).
* That the system is mentioned and linked to from trusted channels (e.g.: *education.govt.nz*)
* That the information published has been reviewed and accepted, for content accuracy.

#### Currentness

*“The degree to which data has attributes that are of the right age in a specific context of use.”*

Consider the following:

* Having in place an information resource management role
* Having in place guiding principles to inform their decisions as to which actions to take to curate the data to ensure it remains Discoverable (by classification), it and its links to other information remain current.
* Having in place processes that adhere to the above processes
  + Including reaching out to SMEs for validation of assumptions

### Combined (Inherent & System Dependent) Data Qualities

The second set of attributes apply to the data – while being dependent on the system used to provide the information.

Table 2: ISO-25012 Combined (Inherent & System Dependent) Data Qualities

#### Accessibility

*“The degree to which data can be accessed in a specific context of use, particularly by people who need supporting technology or special configuration because of some disability.”*

Consider the following:

* Is the delivery in a format that can be used to embed display instructions?
* Do the instructions contain text descriptions of images?
* Is the image media in black/transparent [or white], falling back blue/yellow (avoiding red/green)?
* Similar considerations for videos.
* Is the system capable of rendering the format of the information without loss of information?

#### Compliance

*“The degree to which data has attributes that adhere to standards, conventions or regulations in force and similar rules relating to data quality in a specific context of use.”*

Consider the following:

* The use of Dublin Core defined attributes
* Extending as needed.

#### Confidentiality

*“The degree to which data has attributes that ensure that it is only accessible and interpretable by authorized users in a specific context of use. Confidentiality is an aspect of information security (together with availability, integrity) as defined in ISO/IEC 13335-1:2004.”*

Consider the following:

* The system provides at least:
  + authentication of users,
  + checking to ensure they have access to requested resources, based on their role (Role based authorisation),
  + permanently records their operations for auditing and accountability purposes as needed.
  + Transmits information over secure channels (eg HTTPS only) so as to reduce a risk of in-flight tampering,
  + Secures data at rest by limiting physical and virtual access to storage devices, on which data is encrypted.

#### Efficiency

*“The degree to which data has attributes that can be processed and provide the expected levels of performance by using the appropriate amounts and types of resources in a specific context of use.”*

Consider the following:

* Keeping information resources succinct and specific to reduce transmission times required.
* Reducing dependencies on imagery at the start of information resources. This in turns contributes to no transmitting larger associated resources until needed (eg: not retrieving and showing information that is still off screen).

#### Precision

*“The degree to which data has attributes that are exact or that provide discrimination in a specific context of use.”*

Consider the following:

* Ensuring fact-based monitoring of usage is in place, to inform organisation of information in a more usable manner.

#### Traceability

*“The degree to which data has attributes that provide an audit trail of access to the data and of any changes made to the data in a specific context of use.”*

Consider the following:

* Ensuring that the system creates more information, logging all system user operations that change data.
* Ensuring that the system also logs the viewing operations of users – even if it does not change the information resource -- to better understand and log who has seen the information.

#### Understandability

*“The degree to which data has attributes that enable it to be read and interpreted by users, and are expressed in appropriate languages, symbols and units in a specific context of use.*

Consider the following:

* The system uses a common reduced pallet of accessible symbols, that are recognisable, are black/transparent, are described by text for visually impaired users.
* That areas of the page are skippable by text readers, so that visually impaired users do not have to listen to the whole page again and again, which can be disorienting.  
    
  Some information about data understandability are provided by metadata.”

### System-Dependent Data Quality

Both the Data Qualities and Combined Data & Data System Qualities in turn rely on data related Qualities of the System.

Table 3: ISO-25012 System Dependent Data Qualities

#### Availability

*“The degree to which data has attributes that enable it to be retrieved by authorized users and/or applications in a specific context of use.”*

Consider the following:

* The system has to be more easily discoverable by having been Search Engine Optimised (SEO).

#### Portability

*“The degree to which data has attributes that enable it to be installed, replaced or moved from one system to another preserving the existing quality in a specific context of use.”*

Consider the following:

* The data can be exported by multiple means, including at least one preferring industry standards.

**Important**:  
It is essential that stakeholders do not confuse the use of external interoperability standards with the internal structure of the system, and request that the system itself organise data internally using a standard. This design approach must not be used as it is too limiting to functionality, flexibility and maintainability.

#### Recoverability

*“The degree to which data has attributes that enable it to maintain and preserve a specified level of operations and quality, even in the event of failure, in a specific context of use.”*

Consider the following:

* The system should be designed and developed by competent professionals who have ensured the design can avoid system failure, and even if it does, can restart without intervention, can log the error for later review, and message maintenance specialists to inform them that an issue may require attention.

Appendices

Appendix A - Document Information

### Images

[Figure 1: TODO Image 3](#_Toc147396648)

[Figure 2: ISO-25012 Data Qualities 6](#_Toc147396649)

### Tables

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### References

**There are no sources in the current document.**

### Review Distribution

The document was distributed for review as below:

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### Audience

The document is technical in nature but expected to be accessible for validation and/or use by a non-technical audience.

### Structure

Where possible, the document structure is guided by either ISO-\* standards or best practice.

### Diagrams

Diagrams are developed for a wide audience. Unless specifically for a technical audience, where the use of industry standard diagram types (ArchiMate, UML, C4), is appropriate, diagrams are developed as simple “box & line” monochrome diagrams.

### Terms

Refer to the project’s Glossary.

##### ICT

: Acronym for the *Information & Communication Technology* domain.

##### SEO

: acronym for public web Search Engine Optimisation, a process of [auto] registering systems and their resources that are publicly accessible.

Appendix B – Information Schama Elements

The value of Information is improved by being focused to purpose based on a use case agreed structure.

While some information systems will be aimed for the purpose of informing young learners, and therefore may required fewer elements, information developed for the purpose of consumption by more sophisticated consumers will require more elements.

And while some of the elements overlap or duplicate what one would expect to have been recorded as metadata, these structural elements are expected to be displayed.

Some elements to consider including in a schema are as follows:

* Metadata
* Synopsis
* Defined Purpose
* Intended Audience
  + Roles (e.g. Teacher, Learner, Caretakers, Public)
  + Levels
* Disclosures
  + Cost Expectations (time to read, etc.)
* Approvals and Endorsements
* Prerequisites
  + Achievements (previous tests)
  + Contractual (subscriptions, trials, number of free / month, etc.)
* Instruction
* Aspects
  + Steps
  + Supporting Facts & Proofs
* Relationships
  + Sequences (e.g.: links to next documents)
  + Near: links (e.g.: to other resources)
* Associated media:
  + Non-interactive:
    - Images
    - Videos
    - Sounds
  + Interactive:
    - 3D experiences
  + Activities
* Assessments

1. Refer to the Appendices for elements of a schema to consider. [↑](#footnote-ref-2)
2. Noting that not all can be met, but governance is required to explain why and whether the explanation is accepted. [↑](#footnote-ref-3)