**GUIDELINE**

Project Quality Management

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PURPOSE OF THE DOCUMENT

Quality of project outputs and management directly affects the project’s ability to deliver the intended value on time.

This guideline defines how quality can be managed in projects, including the key roles and where the relevant registers or data should be maintained in a typical project.

QUALITY MANAGEMENT PRACTISE IN PROJECTS

1. Overview

Quality management in projects ensures that the project outputs meet the expectations and fulfil their purpose. Adequate quality management is the best safeguard against waste in project products and helps to maximise the value delivered.

Two key areas for quality management are:

1. Project outputs (deliverables, products); and
2. Project management artefacts.

The purpose is to ensure that all key aspects of a project are performed or implemented adequately. For the outputs, the key expectation is that they fulfil their function. The project management artefacts, in turn, are comprehensive and accurate enough to fully explain the approach and methods to be used to efficiently deliver the outputs.

The two key methods to assure the quality are review of documentation and testing or validation of the products.

Quality management is the responsibility of the Senior Supplier in the project. They oversee and confirm that the project outputs have been produced appropriately. The quality control activities are the means to validate this. The results are received and confirmed by the Senior User who is responsible for the usability and “fit for purpose’ and therefore should have a keen interest in the quality of the project outputs.
The planning and activities are usually delegated to the Project Manager and project team.

1. Introduction to project quality

Project quality consist of several parts. In a well-run project, all of them are developed, as applicable.

1. Quality expectations. These are the Executive Sponsor’s high-level requirements for the project, focusing on the outputs.
2. Quality Criteria. These specify the expectations and give measurable targets for the expectations. The criteria are always measurable or objective and unambiguous. The Executive Sponsor can use them as the acceptance criteria, i.e. approves the delivery only if all quality criteria have been met.
	1. E.g. “Screen refresh times after submitting new data is <3 seconds” or “The business rule complies with the process outlined in ISO101010 standard (section 6)”.
3. Testing. These are the activities to measure or demonstrate that the project outputs fulfil the quality criteria and business requirements.
	1. The testing is often done in multiple parts. E.g. business systems may involve unit and system testing (confirms the system itself functions correctly, e.g. a screen loads with correct fields and visuals), functional testing (the system components perform the operations or functions expected), security or penetration testing (the security arrangements keep the data secure), and user acceptance testing, UAT (the users can run the intended process correctly using the system).
	2. The artefacts developed for testing often consist of a traceability matrix, a test plan, test cases and a test report. These are described in the next section.
4. Reviews. The quality of project documentation is assured through reviews. It is always good to have both peers and subject matter experts (SME) to review documentation.
	1. The peer review answers the question “does this make sense?” and whether the document is well written and descriptive of the purpose.
	2. The SME review confirms the correctness of the of the information provided. In ACU, the project Business Cases need to be submitted to IT, Finance, UPMO (or relevant role) and service / process improvement for review. All other project documents, as applicable.
	3. After the applicable reviews, documents can be submitted to endorsement (“Is this document ready and can be presented for approval?”) prior to submitting it for approval. The endorsement can come from the line manager, the approver’s direct report, a committee Chair, or similar. E.g. a Business Case can be endorsed by an Executive Dean for the Provost or COO approval.
5. Quality management process

Project quality management should be seen as a process with three major parts to it:

1. Planning – Establish the quality metrics (expectations and criteria) and methods (e.g. what, when and how to test or review).
	1. Setting the metrics can sometimes be challenging, especially if you are not used to measure the related operations (e.g. process throughput times) or similar systems. Your metrics should help to verify that your quality criteria and business requirements are met. Approaching the question from this viewpoint may help to decide on what the respective measures or metrics should be.
2. Quality assurance – Assurance ensures that the quality management takes place, as appropriate. It should continue throughout the project lifecycle and catch any deviations from the plans. It also helps in continuous improvement related to quality in projects.
3. Quality control – This is where the actual quality activities are performed: reviews, tests, etc, as specified in the Quality Management Plan, Test Plans, etc. The results from testing are used to decide whether the outputs meet the criteria set for them or whether any corrective action is required.

One key aspect of quality assurance is to ensure that all measures used fulfil the principles listed below.

* Accurate – The data received reflects the true value of what is being measured.
* Precise – The activity is precisely measuring what it is supposed to measure.
* Repeatable – Any successive measurements by the same tester should be the same.
* Reproducible – Different testers measuring the same item will get the same result.

In other words, all your quality measures (tests, reviews, etc) should be robust enough to produce realistic results regardless how many times and by whom the testing is performed.

1. Key roles

The following four roles are crucial to the success of project quality.

|  |  |
| --- | --- |
| **ROLE** | **CONTRIBUTION** |
| Senior Supplier | Represents the groups who develop and implement the project outputs.They confirm the feasibility of the business and user requirements, and availability of functional or technical requirements. They also ensure the availability and quality of the supply teams, and that quality assurance is performed on the project deliverables, including documentation and training produced by the project. |
| Senior User | Represents the groups who are the intended users of the project outputs.They ensure the business and user requirements are defined adequately and are met by the project, and that the quality, usability and timeliness of the project deliverables meets the needs of the intended users. |
| Project Manager | A part of PM’s role is to implement the project outputs which the Executive Sponsor can use to achieve the desired long-term outcome. This means the day-to-day management of the project activities. When the PM plans the project, they include the necessary quality planning and activities into their plans. |
| Test Manager | Responsible for developing and/or executing the detailed test plans. They usually either perform the testing or lead the team of testing specialists.The role is recommended to be a separate one in complex projects. In medium or simple projects, this can be carried out by the Business Analyst or Project Manager, as applicable. |

1. Documentation expected

The following documentation is often used as part of quality management. The Project Manager will use them, as applicable. Some of them are developed by other roles in a project, e.g. by a Business Analyst or Test Analyst.

Quality Management Plan

This document outlines how quality is managed in the project. Overall, it introduces the quality expectations and criteria, and when and how they will be measured (what tests or reviews will be carried out).

It also refers to the relevant stakeholders, what other documents will be produced (e.g. test plans and reports), risks related to quality and how issues or defects will handled, what will constitute acceptable results (“test passed”) and other relevant aspects. Effectively, it is a subset of the Project Initiation Document (PID).

The Quality Management Plan (and any potential changes) needs to be approved by the Executive Sponsor.

Test Plan

The detailed information about tests to be performed are described in Test Plans. Each type or instance of testing can have its own plan, or they can be combined into a single document (most applicable only in simple projects).

A Test Plan specifies the testing to be done, how test cases are managed, how the test activities will be carried out and results recorded, and how the test outcome will be reported and accepted.

The Test Plans are approved by the Executive Sponsor or their delegate (typically the Senior Supplier).

Test Report

The results of the testing performed are collated into a report document. It summarises the number of test cases passed, failed and if any waivers have been granted.

If the initial testing has discovered defects in the project outputs, the test report also summarises the regression testing results to confirm the corrective actions have been effective.

The Test Reports are presented to the Executive Sponsor for approval. They will form an integral part of the background information the Executive Sponsor uses when approving the completion of the project delivery.

Test Cases

Test cases are the detailed instructions on what and how exactly will be tested. They refer to the business requirements, functions or use cases to be tested. Each case contains step-by-step instructions on carrying out the test, the acceptable range of results or response from the system (or any object that’s being tested), and what data is used in the test.

The steps and data used should emulate the respective operational activity as closely as possible. E.g. if a user can launch a query of student records from another system, the testing should be performed using similar datasets and a sequence of steps a user would normally follow.

The test cases are usually developed by a Business Analyst or Test Analyst and used internally in the project.

Traceability Matrix

This table matches the business requirements against the test cases and is used to confirm that at least all ‘must have’ requirements are tested appropriately. Ideally, all requirements are tested but if the project is short of time, funds or resources, the Executive Sponsor can waive the requirement to test ‘could have’ or even some ‘should have’ requirements (if they have been implemented in the project).

The matrix is usually collated by a Business Analyst or Test Analyst and used internally in the project.

1. Types of testing

Testing in projects can happen in multiple stages and cover several different aspects. The below defined some common tests and are most often used in relation to business systems. Different kinds of outputs should go through an equally comprehensive testing but adapt the approach, as appropriate.

Each project should tailor their quality management to best suit both the sourcing method (e.g. purchase vs develop in-house) and the outputs produced. Also, the resourcing available may constrain the level of quality management the project can do.

Unit testing

This is the lowest level of testing. It confirms that an individual component of a larger system is built or developed correctly and functions as expected in isolation. The component is not connected to the surrounding system yet.

For example, with a business system, a unit test can confirm that the right screen loads as a response to a menu command and uses the right field lengths and data formats (e.g. date format, currency, etc). Or, in a building, an individual air conditioning control unit turns on and off.

Functional testing

This testing confirms that selected components joined together allow a user to perform a function in a system. This are often based on business requirements or use cases. For example, a user can query the system for a student record and modify it. Or an air conditioning unit will warm up or cool down the air temperature following the temperature set in the control unit.

System testing

When the whole system has been developed or deployed, it can be tested as a whole. This uses “dummy” data to confirm that all commands work, as expected, screens load, data records are displayed correctly, etc. This testing is usually the final testing done by the developers and is based on the specifications given for the system.

Penetration / security testing

With business systems, the data security needs to be an integral part of the design and configuration. If a system contains public data only, the requirements are very low. At the other end of the spectrum, a system that stores or transmits health information needs to be secured with multiple layers of security to ensure the data can be viewed and used only by those individuals who have been authorised to it due to their role.

The testing focuses on the access control measures and network security aspects, i.e. can the system be “hacked” from outside. The detailed system design by IT should automatically include guidance on the protections required, and the testing will confirm they have been all implemented adequately.

Systems that are hosted externally, “in the cloud” (Software as a Solution, SaaS, or similar), the system provider should be able to supply information on the testing done to their system and the underlying platform. IT can facilitate and assess this information, when needed.

User Acceptance Testing (UAT)

UAT is the most important and highest level of testing. It confirms that the system fulfils its purpose and can be used to deliver the services intended. The testing is based on the business requirements or use cases and is performed by the future end users, assisted by the Business Analyst and/or Test Analyst.

At this point, life-like data should be used (e.g. a copy of real data) and the users should attempt to use the system as they would in their normal operational work. The users should be selected so that they represent all areas who will use the system and also cover all skills levels (some technologically “savvy” users, intermediate users and some who have only basic skills).

The project output(s) should be accepted into use only after the UAT has been passed.

The system or product related training of users should coincide with the UAT. Often, the test users are trained fully before the UAT and the remaining users right before the system is deployed in their area. The test users are also good candidates for becoming the “super users” or “system champions” in their areas.

Regression testing

If any defects are found in any of the tests, the regression testing confirms that the fix applied is effective and the respective part now functions correctly.

**Please note:** The earlier (at a lower level) defects are found, the easier they usually are to fix without any major remediation in other parts of the system and extensive re-testing. Therefore, it is prudent to also perform the lower levels of testing instead of only relying on a UAT to catch any errors.