IMPRESS

Improving management competences on Excellence based Stress avoidance and working towards sustainable organisational development in Europe

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Quality Management Process

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Main Project Partners:

P1. GAIA. ES. Bilbao

P2. UB -UNIVERSITAT DE BARCELONA. ES BARCELONA

P3. LMU - LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN. DE MUENCHEN

P4. RTU - RIGAS TEHNISKA UNIVERSITATE. LV RIGA

P5. IBK - IBK MANAGEMENT SOLUTIONS. DE Wiesbaden

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P7. BEFO - BIEDRIBA EUROFORTIS. LV Riga

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P10. REUH - RIGAS AUSTRUMU KLINISKA UNIVERSITATES SLIMNICA SIA. LV RIGA

Associated Partner:

UBT: UNIVERSITY FOR BUSINESS AND TECHNOLOGY, PRISTINA.

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DOCUMENT HISTORY

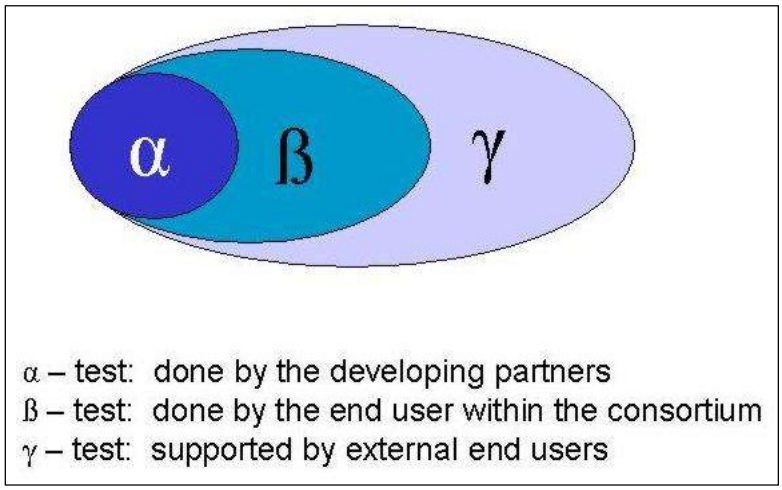
December 30th, 2017:	1. Draft of QG Process guidelines sent to between GAIA by IBK
January 15th, 2018:	Deadline for change requests by GAIA
January 19th, 2018:	QG Process Summary for inclusion to the PM Release 1.0
January 31st 2018:	2. Draft of QG Process Definition (full version) exchanged between GAIA & IBK for final agreement before publishing to all project members
February 8th, 2018:	Agreement to extend and add the QM in Field Testing chapters into this document
February 12th, 2018:	3. Draft with integrated chapters on QG + QM for Testing & Piloting sent to GAIA
February 15th, 2018:	Deadline for final changed on Release 1.1 of the IMPRESS QM Process guidelines (full version)
February 16th, 2018:	Agreed on Version 1.1 of Project Manual distributed to Project Partners

Inhalt

IMPRESS Quality Management

IMPRESS uses several layers of quality management containing both an ongoing process control combined with a Quality Gate approach for each major milestone of the product development.

For the ongoing process control of product and service development, the project uses a combination of the agile software development concept coupled with a rapid prototyping approach[1]. The agile phase could be considered as the internal “alpha cycle” of the overall piloting and validation process.



Picture: rapid prototyping – test procedure

The following description explains how each of these monitoring and control approaches are used and combined.

Agile software development principles

Agile software development describes an approach to software development under which requirements and solutions evolve through the collaborative effort of self-organizing cross-functional teams and their customer(s)/end user (s). It advocates adaptive planning, evolutionary development, early delivery, and continuous improvement, and it encourages rapid and flexible response to change.

[1] *A Spiral Model of Software Development". Barry Boehm in IEEE Computer. May 1988; The Connected Car in the Cloud: A Platform for Prototyping Telematics Services, T. Haberle in IEEE Software. 32 (6): 11–17. doi:10.1109/MS.2015.137; Rapid Application Development, James Martin, Macmillan(1991), ISBN 0-02-376775-8.*

The Manifesto for Agile Software Development is based on twelve principles[2]:

- Customer satisfaction by early and continuous delivery of valuable software
- Welcome changing requirements, even in late development
- Working software is delivered frequently (weeks rather than months)
- Close, daily cooperation between business people and developers
- Projects are built around motivated individuals, who should be trusted
- Face-to-face conversation is the best form of communication (co-location)
- Working software is the primary measure of progress
- Sustainable development, able to maintain a constant pace
- Continuous attention to technical excellence and good design
- Simplicity—the art of maximizing the amount of work not done—is essential
- Best architectures, requirements, and designs emerge from self-organizing teams
- Regularly, the team reflects on how to become more effective, and adjusts accordingly

Because testing is done in every iteration—which develops a small piece of the software—users can frequently use those new pieces of software and validate the value. After the users know the real value of the updated piece of software, they can make better decisions about the software's future. Having a value retrospective and software re-planning session in each iteration - Scrum[3] typically has iterations of just two weeks - helps the team continuously adapt its plans so as to maximize the value it delivers. This follows a pattern similar to the PDCA cycle, as the work is planned, done, checked (in the review and retrospective), and any changes agreed are acted upon.

This iterative approach supports a product rather than a project mindset. This provides greater flexibility throughout the development process; whereas on projects the requirements are defined and locked down from the very beginning, making it difficult to change them later. Iterative product development allows the software to evolve in response to changes in business environment or market requirements[4].

Because of the short iteration style of agile software development, it also has strong connections with the lean start-up concept.

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[2] *Kent Beck, James Grenning, Robert C. Martin, Mike Beedle, Jim Highsmith, ||Steve Mellor, Arie van Bennekum, Andrew Hunt, Ken Schwaber, Alistair Cockburn, Ron Jeffries, Jeff Sutherland, Ward Cunningham, Jon Kern, Dave Thomas, Martin Fowler, Brian Marick (2001). "Principles behind the Agile Manifesto". Agile Alliance. Archived from the original on 14 June 2010. Retrieved 6 June 2010.*

[3] *Scrum is a framework for managing work with an emphasis on software development. It is designed for teams of three to nine developers who break their work into actions that can be completed within time boxed iterations, called sprints*

[4] *"At the Kickoff: Project Development vs Product Development". AltexSoft Inc. 12 February 2016. Retrieved 31 May 2016.*

Rapid prototyping approach

Phase 1: Alpha Testing

This “first phase” of continually internal testing and improvement is followed by a secondary and tertiary, using an ever wider public until the integrated approach is seen ready as a Release Candidate for commercially stable use at the end of the project`s life time.

This alpha testing phase will be done by people who have been involved in development, with the content providers testing the technical implementation for ease of use and the implementers testing the content for ease of understanding. Alpha testing will be done as an integrated part of the design and implementation[5].

This first testing phase will be enhanced and extended via phase 2 of this test cycle with involving testers from the partner organisations (e.g. from different departments) that are not active within the projects. Subsequently phase 3 will consist of piloting under commercial conditions for a final validation, considering such issues as benefit to the end user organisations and ease of use by untrained end users.

Phase 2: External Beta Testing

Use the results of Phase 1 (individual support tools in English) to prepare a second testing level, that includes the interaction of the individual software and training modules. This test level will not be done any longer by the direct members of the project consortium, but by related persons or departments that have not been involved in the development effort on any level (content or technical implementation).

A special focus of this specific phase lies on see how well the tools and training can be used and understood by persons who do not have the background of being a project member. Besides permanent fine-tuning of the developed solution, a main goal of this phase is to ensure a good and easy to understand content representation as a basis for localisation to the relevant partner languages.

Phase 3: Public Validation (Gamma Testing)

Overlaps in time with parts of Phase 2: Get pilot users to test some (or all) of the tools under commercial conditions.

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[5] *Usage and Perceptions of Agile Software Development in an Industrial Context: An Exploratory Study, Andrew Begel, Nachiappan Nagappan, First International Symposium on Empirical Software Engineering and Metrics, 2007*

Here the fully localised solution will be tested by organisations and people who will use them under similar conditions as they would use a commercially bought solution, outside of the controlled environment of the project partners.

Only when these pilot users are satisfied with the overall performance of the delivered solution, the products and services can be regarded as commercially stable Release Candidates.

A major task herein will be to ensure that the localisation of all content is done in such a way that native speakers, that are not experts on the delivered content, can easily understand and use the tools and follow the trainings.

Test Results Reporting

In all test phases each implementing partner will provide a web-based form to the testers to collect test incident feedback, which may be used to generate a consistent report on testing results.

Additionally there will be a final field testing questionnaire to be filled in by every pilot user at the end of the field test phase that will summarize the experiences gained.

This questionnaire will be developed once the exact structure of each output has been defined to allow listing the modules to be tested in detail.

The Test Incident Report Form will be designed and delivered just-in-time for Beta Testing to ensure all technical issues are shown as a menu-list.

Quality Gates in IMPRESS

The Quality Gate [6] approach of the IMPRESS Project is based on the quality management developed by TU Dortmund for the Leonardo da Vinci Project LOPEC (Logistics personnel excellence by continuous self-assessment; DE/12/LLP-LDV/TOI/147538) for testifying that a quality gate within the LOPEC project had been successfully reached. The IMPRESS partners enhanced this approach by adding a web-based survey to it as a basis to replace formerly needed face-to-face meetings with a more time and cost friendly tele-conference approach without losing the one-on-one interaction dimension.

[6] *Interne Qualitätsanforderungen und Anforderungsbewertung; Jochen Peter Sondermann in: Tilo Pfeifer, Robert Schmitt (Hrsg.): Masing Handbuch Qualitätsmanagement. P. 400ff.*

What is a Quality Gate?

Quality Gates (also called phase-gates in some literature) are part of the Stage-Gate approach used by the NASA[7] and are used in companies to check the process compliance, risk and project control, synchronization of different sub-projects and quality assurance[8]. They are the determining factors for the workflow process that will identify whether a project phase is completed and the participants can start the next step in a work process. Quality gates also function as a kind of lock, and should not be equated with milestones. The latter is more likely a higher-level control variable, especially for the project coordinator. Milestones are mainly used to control project objectives and to provide an efficient coordination and orientation[9]. However, quality gates set a fixed minimum quality. This enables the participants in case of failure of a gate to return in the previous process section, without analysing the entire production process again[10].

Therefore, they are important criteria that serve to minimize vulnerabilities in a timely manner or to avoid it altogether and achieve the synchronization of the processes[11]. Thus, this instrument is an important factor concerning controlling and measurability of product quality in the manufacturing process.

When is a Quality Gate achieved?

Quality gates are primarily locks or decision points that can be connected to every important stage of the process to check the product quality; to detect errors early and to solve them[12]. This lock is passed when the pre-set goals were achieved at the given point. Therefore, it must be analysed if all steps are completed in this phase and if the lock can be closed in order to begin with the next phase.

So it needs to be checked what has to be achieved in one section and which results are accomplished and if appropriate, potentials for improvement can be identified. When all parties are satisfied with the process and the product quality, the quality gate can be closed.

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[7] *Best Practices in the Idea-to-Launch Process and Its Governance, Cooper, Robert G.; Edgett, Scott J. Research-Technology(1 March 2012); Kompetenzbasiertes Projektmanagement, Gessler/Kaestner: 2010; Top oder Flop in der Produktentwicklung, Robert G.Cooper 2002;*

[8] *Ibid. Gessler/Kaestner 2010*

[9] *ibid. Gessler/Kaestner 2010 p.353*

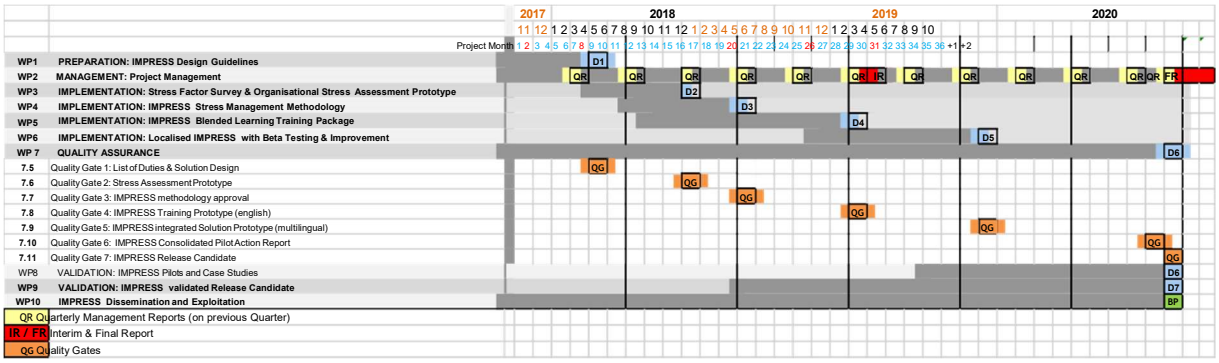
[10] *Gessler/Kaestner updated edition 2012, p.353*

[11] *Peters/Herrmann 2010, p.26; Gessler/Kaestner 2012, p.353*

[12] *Seidel 2005: p.35*

Quality Gates in IMPRESS - Which Quality Gates do exist and how are they to pass?

In IMPRESS at least seven Quality Gates have to be passed, each according to certain phases of work with a time lag. Typically, these Quality Gates lie at the end of each Milestone/Workpackage. The QG are managed as part of WP 7 "QUALITY ASSURANCE", but the results are also summarised in the WP Delivery Report for each WP. The table below shows the interlinkage and timely distribution of WPs, QGs and WP reporting.



Graph: GANTT with reporting and Quality Gate due dates

A common action guideline for all seven Quality Gates given below to show how the QG could be passed.

Action Guideline for moderation

We propose to review the achievements of quality gates in qualitative workshops or so-called gate meetings[13]. All stakeholders of the project are included. To allow for the geographical distribution and travel budget restrictions these workshops are prepared via a web-based survey for each QG, followed by a SKYPE based teleconference for agreeing on the vote.

This is required to stay close to the given time frame and still include all partners on defining to what extent they are satisfied with the development done and whether the quality gate can be passed. In case of derivations between results achieved and formally defined project goals, the decision how to meet the project requirements needs to be taken during this meeting[14].

[13] *Peters/Herrmann 2010: p.27*
[14] *Peters/Herrmann 2010: p.28*

1. First, it is asked what specifically the object was and what was actually necessary to attain it. This is the phase of **inventory**.
2. In a second step it is required to ask if the partners are of the opinion that the necessary parameters have been achieved and thus the **achievement of the process** is successful. This is done by asking on a task by task level of how satisfied each project member is with the work performed and results reached.
3. Reflects on the need of tasks to be kept open after the WP has been formally closed, e.g. for further monitoring and reflection on future developments on the market/topic. If such a case is identified, the reasons for such further activities must be described, as well as the argument, why this does not endanger the closing of the WP or the passing of the QG. This will happen in the web based workshop.
4. Finally the participants are asked if the status is "Passed" or "Not passed".
   a. Did we reach the point where the next Output depending on these results can be started? (Yes/no)
   b. Do you agree that we reached the point where this Quality Gate can be agreed as passed? (Yes/no)

   If all participants vote for the status of "Achieved" the Quality Gate is closed and the next work process can begin.

However, if one participant does not fully agree to the achievement of quality gates, it must be analysed which concrete factors must be changed in order to achieve the required improvement and results. Accordingly, the affecting factors must be examined first. That means:

- Where do the participants actually see the product quality at risk?
- In their opinion, where does something not work as intended?

Thereafter, the participants are asked to appoint changing conditions required to achieve the product quality agreed-on. In order to combine activities and **problematic factors** and to find a workable solution, managers are also asked about their personal commitment, how and where they could exercise personal influence. So the achievement of the Quality Gate could be accomplished based on this action guide line with concrete targets as well as named responsible participants. Finally, the participants are asked about their **next activities** to continue the process smoothly.

Action Guideline for the tele-workshop

1. What has been done so far? What is necessary? (Status quo)
2. Based on the web-survey answered by all project partners before the tele-meeting;

a. In the opinion of the participants are all stated objectives for the next process completed? (Target achievement)
b. Are they satisfied with the work process and results? (Satisfaction)

3. Discussion of any open issue disclosed by the survey results
4. Does everybody know his next tasks for the process phase? (Next step)
   ➔ If all the participants now vote for "Passed" the Quality Gate is passed

If **not**:

1 Where do the parties actually see the product quality at risk? What did not work? (Factors affecting)
2 What should be changed in order to achieve the specified product quality? (Changing conditions)
3 What could the participants do? (Task list / Personal interest / Deadline)
4 Fix date for new QG discussion to reach a “passed” level
5 Does everyone know his/her tasks for the next level that could be started already at this stage? (Next step)

Moderation Agenda

Moderation schedule (30 minutes)

1. First, the current situation is generally summarised. One participant (project coordinator or work package leader) will describe briefly the objectives, functions and working status.
2. The results of the survey performed on this QG are presented, and shortly commented on, with the possibility for additions by the participants (status quo), especially if the overall satisfaction with a given task is under 80%.
3. If there is no uniform result (e.g. one partner indicated strong dissatisfaction with a specific task result), the indicators will be discussed.
4. Then it is checked whether the activities for the next working phase are clear to each participant and if not, they are briefly explained.
5. The presenter explains the quality gate as passed if **all participants** give a positive vote.

If not all participants agree on „passed“ during the tele-meeting, the Quality Gate has to be repeated!

In that case:

6. Each participant will write possible impairment factors and associated change conditions into the message field of the conference window. These will be logged by the project coordinator for further monitoring.
7. The proposals will be discussed with the group and checked for operationalisation and importance. Then based on the proposals a task list is

created, providing necessary activities and deadlines, assigned to responsible persons. The list of participants will be confirmed by approval from the group.

8. Finally, the group is asked again whether the improvement tasks for obtaining the quality gates is accepted. If yes, the QG acceptance is postponed and a new quality gate meeting set up in which the agreed on remedies have to be voted on as "successfully carried out" to be able to close this QG as “Passed”.
9. To allow for minimising time loss in case of a delay in closing a QG, the group agrees on which tasks or part-results of the current QG can be seen as good enough to already start the next working steps; e.g. doing localisations on individual tools that have been seen as already OK.