Quality Management Plan

Project Name: Micro-Electronics Cloud Alliance

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Definition

The following are the meanings of terms, abbreviations and acronyms used in this document.

Term	Meaning
mClouds	Micro-Electronics Clouds
QMP	Quality Management Plan
QCCC	Quality Control Criteria
QCCA	Quality Control Activities
QAC	Quality Assurance Criteria
QAA	Quality Assurance Activities
QMT	Quality Management Tools
HE	Higher Education
OER	Open Educational Resources
CCL	Creative Commons License
IER	Intermediate Evaluation Report
FER	Final Evaluation Report
MoU	Memorandum of Understanding
DBRD	Design-Based Research and Development
PC	Project' Coordinator
PSC	Project's Steering Committee
SWOT	Strengths, Weaknesses, Opportunities and Threats
GCM	Group Concept Mapping

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1. Quality Management Approach

Quality management includes planned and systematic processes, activities and outcomes to build confidence among project's partners that they do the right things at the right time and in the right way.
More specifically, the purpose for managing quality is to validate that the project deliverables are completed with an acceptable level of quality. Quality management assures the quality of the project deliverables and the quality of the processes used to manage and create the deliverables.

This document follows a template recommended by the The European Committee For Standardisation (CEN) and was applied successfully in European projects on using information and communication technologies for education and training purposes.

The quality management plan identifies the following key components:

Objects of quality review	Quality Measure	Quality Evaluation Methods
Project Deliverables	Deliverable Quality Criteria	Quality Control Activities
Project Processes	Process Quality Criteria Stakeholder Expectations	Quality Assurance Activities

The following is a brief explanation of each of the components of the quality management plan.

Project Deliverables and Processes	The key project deliverables and processes subject to quality review.
Deliverable Quality Criteria	The quality criteria that are the "measures" used to determine a successful outcome for a deliverable. Deliverables are evaluated against these criteria before they are formally approved.
Process Quality Criteria **and** **Stakeholder Expectations**	The quality criteria that are the "measures" used to determine if project work processes are being followed. Stakeholder expectations describe when a project process is effective as defined by the project stakeholders.
Quality Control Activities	The quality control activities that monitor and verify that the project deliverables meet defined quality criteria.
Quality Assurance Activities	The quality assurance activities that monitor and verify that the processes used to manage and create the deliverables are followed and are effective.

2. Quality Management Objectives

The following are the project's quality objectives that reflect the overall intentions to be applied with regard to quality throughout the project.

Analysis of institutional, teachers' and students' needs in shared IT infrastructure, teaching materials and learning resources, meeting the requirement of the enterprises in micro- nanoelectronics and translation into functional specifications of mClouds

Networking of project partners from HE institutions and SMEs, to share ideas, methodologies and experiences in order to improve the HE programmes to face the rapid technological change in the sector and joint development of job-specific training modules.

Development of the mClouds system and realization of a shared server infrastructure, shared e-learning resources and the remote access to the CAD tools.

Pilot test of the virtual services and training teachers and technical staff in their use.

Implementation of jointly developed cloud-based open educational resources in micro-nanoelectronics in the partners' educational contexts.

3. Project Quality Control

The focus of quality control is on the deliverables of the project. Quality control monitors project deliverables to verify that the deliverables are of acceptable quality and are complete and correct.

The following table identifies:
- The major deliverables of the project that will be tested for satisfactory quality level.
- The quality criteria established for the project deliverable.
- The quality control activities that will be executed to monitor the quality of the deliverables.
- How often or when the quality control activity will be performed.

Project Deliverable	Deliverable Quality Criteria	Quality Control Activity	Time interval
Needs analysis report	QCC 1 Comprehensiveness (sampling including different *target groups* – teachers, students, trainers; different *data collection methods* e.g. survey through questionnaire, interview, technical check-lists for cloud infrastructure; *review documentation; identify trends*; different *data analysis methods* both quantitative and qualitative) QCC 2. Organisation/ structure QCC 3. Clarity QCC 4, Elaboration to a conference paper	Develop a draft strategy for reaching out the target groups Peer reviewing of the draft strategy Define operationally 'microelectronics clouds' Develop measurement instruments for the Needs Analysis (interviews, questionnaires, checklists) Peer review the measurement instruments for the Needs Analysis (interviews, questionnaires, checklists) Peer reviewing the deliverable	M 1 – M 5

Specification of clouds architecture	QCC 5. Comprehensiveness (definition of the model for private clouds; plans for interoperability; sharing the infrastructure; scenario for deployment of web-based e-learning applications; scenario for sharing CAD tools between institutions; scenario for sharing software tools for remote exercises) QCC 6. Organisation/ structure QCC 7. Clarity QCC 8. Elaboration to a journal paper	Carry out an analysis of the technical check-lists for institutional cloud infrastructure and tools Discuss possible scenarios for sharing cloud infrastructure and tools Define possible risks and eventual solutions Peer review the deliverable	M 5 – M 9
Development of job-specific training modules	QCC 9. Development of 16 courses (both for domain specific and domain-independent competences) QCC 10. Correspondence between the needs analysis and content and structure of the courses QCC 11. Learning outcomes defined using action verbs reflecting (a) the reference job situation and (b) taxonomy levels QCC 12. Correspondence between learning outcomes, teaching strategy and assessment QCC 13. Reusing Open Educational Resources (OER) QCC 14. Creating Open OER QCC 15. Selecting appropriate Creative Commons Licenses (CCL) QCC 16. Effectiveness measured by study/training outcomes QCC 17. Efficiency measured by time and efforts spent by students, trainees, teachers and trainers QCC 18. Satisfaction measured by the extent to which students/trainees like the course	Critical reflection on the results of the needs analysis study Organising a short internal workshop on defining learning outcomes and structuring learning content Sharing literature for defining and structuring learning content Peer reviewing of the courses Sharing information about Creative Commons Licenses Checking OER licenses with institutional legal departments and EU project's officers Preparing and applying valid and reliable performance tests Preparing and carrying out valid and reliable surveys Conducting interviews with teachers and trainers	M 9 – M 15
Microelectronics clouds for sharing institutional IT infrastructure (mClouds)	QCC 20. Implement a shared server infrastructure QCC 21. Implement a remote access to the CAD tools shared between institutions. QCC 22. A stable performance of	Presentation/Introduction og different potential scenarios of the mClouds system Organising technical workshop with system administrators representing the partner institutions	M 9 – M 20

	the mClouds system	Assure technical support for the mClouds implementation in the partner institutions	
		Test the mClouds system	
mClouds with open educational resources	QCC 23. Implement shared e-learning resources QCC 24. mCouds OER easy to access and use QCC 25. Effectiveness measured by study outcomes QCC 26. Efficiency measured by time and efforts spent QCC 27. Satisfaction measured by the extent to which students like the OERs	Pilot implementation of the courses as OER in the mClouds Prepare and apply valid and reliable performance tests Prepare and carry out valid and reliable surveys. Conduct interviews with students, trainees, teachers and trainers	M 9 – M 20
mClouds for sharing CAD software applications	QCC 28. implement shared CAD software applications QCC 29. Shared CAD software applications easy to access and use QCC 30. Effectiveness measured by study outcomes related to CAD QCC 31. Efficiency measured by time and efforts spent using CAD QCC 32. Satisfaction measured by the extent to which students like shared CAD applications	Pilot the CAD software implementation in the mClouds Prepare and apply valid and reliable performance tests Prepare and carry out valid and reliable surveys Conduct interviews with teachers, students, trainers, trainees and system administrators.	M 9 – M 20
Training seminars for teachers and, system officers for the use of mClouds	QCC 33. Clearly formulated operational objectives of the seminar QCC 34. Well-structured instruction and learning activities QCC 35. Increased self-efficacy of the participants QCC 36. Satisfaction of the participants	Develop a common design blueprint of the seminars Peer-reviewing the design blueprint	M 21 – M 28
Pilot test of mClouds	QCC 37. Pilot test script (detailed description of all activities included) QCC 38. At least 5 students per institution involved (95 % of all issues detected) QCC 39. Comprehensiveness of the report QCC 40. Good organisation/structure of the report	Check good practices for writing pilot test scripts Provide incentive for participation in the pilot (if possible) Peer reviewing the report Peer reviewing the conference/journal paper	M 21 – M 28

	QCC 41. Clarity		
	QCC 42. Extending the report to conference/journal paper		
Plan for the field trial of mClouds	QCC 43. Comprehensiveness (research design, participants, measurement instruments) QCC 44. Partners' consensus on the plan QCC 45. Involving at least 20 students from each institution in the pilot	Make a draft plan Plan open for a discussion by all partners (peer reviewing the plan) Make sure all partners involved in the WP 6 are committed to successfully executing the evaluation plan	M 28 – M 36
Quality Management Plan (QMP)	QCC 46. Comprehensiveness (scope, context, quality control criteria (QCCC), quality control activities (QCCA), quality assurance criteria (QAC), quality assurance activities (QAA; quality management tools - QMT). QCC 47. Partners' agreement on QMP QCC 48. Partners' commitments on execution of QMP	Check QMP good practices Use recommended templates for describing the quality control and quality assurance criteria and activities Open the plan for a discussion by project's partners Implement the suggestions made	M 1 - M 36
Intermediate Evaluation report (IER)	QCC 49. Comprehensiveness (scope, context, overall evaluation design, evaluation activities, measurement instruments, preliminary results) QCC 50. Clearly described recommendations for improvements of the project activities and processes	Integrate the results from all evaluation activities Cooperate with leaders of the WPs carrying out evaluation activities Open the report for discussion	M 1 – M 21
Final Evaluation Report (FER)	QCC 51. Comprehensiveness (scope, context, overall evaluation design, evaluation activities, measurement instruments, final results) QCC 52. Critical review to meet recommendations	Integrate the results from all evaluation activities Cooperate with leaders of the WPs carrying out evaluation activities Open the report for discussion	M 21 – M 36
Project Web Sites	QCC 53. Transparency (clear overview of all activities, public deliverables, templates) QCC 54. Reaching out different target groups (project partners, microelectronics industry, HE institutions, EU) QCC 55. Used various media (text, audio video) QCC 56. Use different languages	Use previous experience from other EU projects (i.e. selecting the technical platform and structure information in such a way as to be useful and easy to use). Pilot the web site prototypes with potential users Constantly updating the partners' web sites	M 1 – M 36

	(partners web sites)		
	QCC 57. Usability (useful and easy to use)		
	QCC 58. Visibility of the web sites (information about the project on the top of search engines suggestions, if possible)		
Project Leaflet	QCC 59. Brief, informative and appealing for different target groups QCC 60. Written in all project's partners languages	Use previous experience from other EU projects Peer reviewing the draft Translate the leaflet in all project's partners languages	M 1 – M 9
Publications	QCC 61. Write and present conference papers (20% acceptance rate) QCC 62. Write journal articles (impact factor 2) or higher) QCC 63. Organise or participate in workshops within the framework of conferences QCC 64. Present conference posters	Cooperative writing of conference and journal papers Conference reviewers' assessment of the papers quality Journal reviewers' assessment of the manuscripts quality	M 1 - M 36
Open Dissemination Workshop	QCC 65. Reaching out different target groups QCC 66. Representativeness of all partners' institutions	Prepare the workshop in detail Involved all partners' institutions in the preparation of the workshop	M 28 – M 36
Social media channels	QCC 67. Use different social media channels (LinkedIn, Facebook, Youtude, Twitter) QCC 68. High number visitors of the project's social media sites	Follow good practices and tips for preparing good social media pages Use social media monitoring tools (e.g. Hootsuite, Klout, Social Mention)	M 1 – M 36
Exploitation plan	QCC 69. Comprehensiveness (includes all indicators for impact namely: (a) at 20 students involved in the field trial; (b) at least 20 certified students per course; (c) minimum 50% of the participants in the field trial with positive attitudes to the courses; (d) minimum 50% of the participants in the field trial believing that the courses will provide them better opportunities for employment; (e) minimum 50% of the answers in the final questionnaire from the SMEs representatives positive to the extent to which the course address the needs of enterprises;	Make a draft of the Exploitation Plan Share the draft for contribution by project's partners	M 21 – M 28

	(f) at least 16 courses in the multidisciplinary area of microelectronics design and microelectronics technologies)		
Exploitation report	QCC 70. Comprehensiveness (addresses all impact indicators as described in the Exploitation Plan (see QCC 69) QCC 71. Partnership with enterprises QCC 72. Multiplication of the project effect on education of other engineering disciplines	Make a draft of the Exploitation report Share the draft for contribution by project's partners. Prepare Memorandum of Understanding (MoU) with representatives of HE institutions and industry Share and discuss the MoU with representatives of HE institutions and industry	M 28 – M 36
Exploitation agreement	QCC 72. Comprehensiveness (e.g. updating the courses as OERs; maintaining the project web site after the project's life; strengthening links to industry; collaborating at MSc level and join supervision of PhD projects) QCC 73. Commitment of all partners (the agreement signed by all)	Prepare an exploitation agreement draft Share the exploitation agreement draft for contribution by project's partners Prepare Memorandum of Understanding (MoU) with representatives of HE institutions and industry Share and discuss the MoU with representatives of HE institutions and industry	M 28 – M 36

4. Project Quality Assurance

The focus of quality assurance is on the processes used in the project. Quality assurance ensures that project processes are used effectively to produce quality project deliverables.

The following table identifies:
- The project processes subject to quality assurance.
- The quality criteria and stakeholder expectations[1] for that process.
- The quality assurance activity – such as a quality audit or reviews - that will be executed to monitor that project processes are properly followed.

Project Process	Process Quality Criteria	Quality Assurance Activity
Design-Based Research and Development (DBRD) (a) Curriculum development (b) Instructional Design (c) Software design	QAC1. Progressive, spiral refinement through a cyclical prototype development QAC 2. Stakeholders involvement in the design and evaluation of the project's products QAC 3. European reference frameworks such as Qualifications of the European Higher Education Area and Standards and Guidelines for Quality Assurance in the European Higher Education Area; QAC 4. Recent development in the domain of curriculum development for high quality QAC 5. Software engineering methodologies including qualitative standards such as (a) ISO/IEC 9126-1 and Software Quality Assurance within Capability Matured Model Integration); and (d) PRINCE 2 (**PR**ojects **IN C**ontrolled **E**nvironments) QAC 6. Evaluation considered not a single phase but cutting across other phases of the process	Supervision and Review by WPs leaders Review by the working groups Supervision by the WPs 7 and 8 leader Audit by the Project' Coordinator (PC) Audit by the Project's Steering Committee (PSC) Audit by European Commission project reviewers Audit by European Commission officers
Reviewing, monitoring and controlling the project's activities	QAC 7. Tasks assigned QAC 8. Deliverables deadlines QAC 9. Communication of the results from reviewing, monitoring and controlling QAC 10. Recommended measures for improvement	Supervision by the Project's Coordinator (PC) Audit by the Project's Steering Committee (PSC) Audit by the European Commission project's reviewers Audit by the European Commission

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[1] The project's partners expectations and concerns will be determined by carrying out a GCM study

		officers
Coordination of the project's activities	QAC 11. Tasks assigned QAC 12. Deliverables deadlines QAC 13. Communication of the results from reviewing, monitoring and controlling QAC 14. Recommended measures for improvement	Supervision by the Project's Coordinator Audit by the Project's Steering Committee (PSC) Audit by European Commission project reviewers Audit by European Commission officers
Different levels of decision-making.	QAC 15. WP leader, working groups, Project Steering Committee (PSC), the Project Coordinator, European Commission project's reviewers, European Commission officers (in that ascending order).	Supervision and Review by WPs leaders Review by the working groups Audit by the Project' Coordinator (PC) Audit by the Project's Steering Committee (PSC) Audit by European Commission project reviewers Audit by European Commission officers
Developing a Conflict Resolution Procedure	QAC 16. Transparency QAC 17. Fairness QAC 18. Instrumental (actionable)	Supervision by the Project' Coordinator (PC) Peer reviews by the project's partners Audit by the Project's Steering Committee (PSC) Audit by European Commission project reviewers Audit by European Commission officers
Report on the process and outcomes of the projects	QAC 19. Comprehensiveness (content, management, finance) QAC 20. Transparency	Supervision by the Project' Coordinator (PC) Peer review by the project partners Audit by the Project's Steering Committee (PSC) Audit by European Commission project reviewers Audit by European Commission officers
Identify expectations and concerns of the project's partners	QAC 21. Apply Group Concept Mapping (GCM) as a proven scientific methodology to show in objective way the shared vision of the partners	Supervision by the leader of WP 7 Review by the working groups

	in terms of expectations and concerns about the project's quality	Audit by the Project' Coordinator (PC) Audit by the Project's Steering Committee (PSC) Audit by European Commission project's reviewers Audit by European Commission officers
Identify strengths, weaknesses, opportunities and treats (SWOT)	QAC 22. SWOT analysis procedure and template	Supervision by the WP 7 leader Audit by the Project' Coordinator (PC) Audit by the Project's Steering Committee (PSC) Audit by European Commission project reviewers Audit by European Commission officers
Project's meetings	QAC 23. Agenda shared in advanced QAC 24. A good preparation for the meeting by everyone QAC 25. Constructive discussion QAC 26. A list with tasks 'to-do' and responsibility	Supervision by the Project Coordinator Audit by European Commission project's reviewers Audit by European Commission officers

5. Quality Tools

The following lists the tools to be used to support quality management implementation and the purpose or use of the tool.

Tool Name	Tool Purpose/Use
Quality Management Template	Supports writing the MECA Quality Management Plan
MECA project's web site	Informs about activities and outcomes of the MECA project
SWOT analysis template	Helps in carrying out the MECA SWOT analysis
Group Concept Mapping methodology	Pictures the expectations and concerns of the project's partners about quality aspects of the MECA project
Communication tools (Flash meeting, Skype Google Hangouts)	Facilitates communication between project's partners on quality control and quality assurance issues.

6. Quality Control and Assurance Problem Reporting Plan

The following logs will be used to itemize, document and track to closure items reported through quality management activities.

Quality Control Log

Exception ID Number	Review Date	Deliverable Reviewed	Findings	Resolution	Resolution Date

Quality Assurance Log

Exception ID Number	Review Date	Process Reviewed	Findings	Resolution	Resolution Date

8. Appendices

[The results from the MECA GCM study will be reported here]